SANTA ANA RIVER WATERMASTER

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

WATERMASTER
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April 30, 2021

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

Re: Watermaster Report for Water Year October 1, 2019 - September 30, 2020

Ladies and Gentlemen:

We have the honor of submitting herewith the Fiftieth 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 2019-20 are as follows:

At Prado

1	Measured Outflow at Prado	160,915	acre-feet
2	Base Flow at Prado	74,465	acre-feet
3	Annual Weighted TDS in Base and Storm Flows	462	mg/L
4	Annual Adjusted Base Flow	89,234	acre-feet
5	Cumulative Adjusted Base Flow	5,804,457	acre-feet
6	Other Credits (Debits)	1,108	acre-feet
7	Cumulative Entitlement of OCWD	2,100,000	acre-feet
8	Cumulative Credit	3,746,723	acre-feet
9	One-Third of Cumulative Debit	0	acre-feet
10	Minimum Required Base Flow in 2019-20	34,000	acre-feet

At Riverside Narrows

1	Base Flow at Riverside Narrows	32,096	acre-feet
2	Annual Weighted TDS in Base Flow	627	mg/L
3	Annual Adjusted Base Flow	32,096	acre-feet
4	Cumulative Adjusted Base Flow	2,150,591	acre-feet
5	Cumulative Entitlement of IEUA and WMWD	762,500	acre-feet
6	Cumulative Credit	1,388,091	acre-feet
7	One-Third of Cumulative Debit	0	acre-feet
8	Minimum Required Base Flow in 2019-20	12,420	acre-feet

Based on these findings, the Watermaster concludes that there was full compliance with the provisions of the Stipulated Judgment in 2019-20.

At the end of the 2019-20 Water Year, Inland Empire Utilities Agency (formerly Chino Basin Municipal Water District) and Western Municipal Water District have a cumulative credit of 3,746,723 acre-feet to their Base Flow obligation at Prado Dam. San Bernardino Valley Municipal Water District has a cumulative credit of 1,388,091 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: Shivaji Deshmukh
Shivaji Deshmukh

Michael R. Markus

Roy L. Herndon

Craig D. Miller

Wen B. Huang

SANTA ANA RIVER WATERMASTER

FOR

ORANGE COUNTY WATER DISTRICT

v. CITY OF CHINO, et al.

CASE NO. 117628 - COUNTY OF ORANGE

FIFTIETH
ANNUAL REPORT
OF THE
SANTA ANA RIVER WATERMASTER

FOR WATER YEAR
OCTOBER 1, 2019 - SEPTEMBER 30, 2020

APRIL 30, 2021

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APPENDICES

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

A USGS Flow Measurements and Water Quality Records of the Santa Ana River Flows below Prado and at MWD Crossing; USGS Flow Measurements of the Santa Ana River at E Street, of Temescal Creek above Main Street (at Corona), Temescal Creek at Corona Lake “Lee Lake” (near Corona), Cucamonga Creek (near Mira Loma), and Chino Creek at Schaefer Avenue (near Chino)

B Daily Precipitation Data for San Bernardino

C Santa Ana River Watermaster Statement of Assets and Liabilities Reviewed by Orange County Water District Accounting Manager

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CHAPTER I

WATERMASTER ACTIVITIES AND WATER CONDITIONS

Introduction

This Fiftieth Annual Report of the Santa Ana River Watermaster covers Water Year 2019-20. The annual report is required by the Stipulated Judgment (Judgment) in the case of Orange County Water District v. City of Chino, et al., Case No. 117628-County of Orange, entered by the court on April 17, 1969. The Judgment became effective on October 1, 1970. It contains a declaration of rights of the water users and other entities in the Lower Area of the Santa Ana River Basin downstream of Prado Dam as against those in the Upper Area tributary to Prado Dam, and provides a physical solution to satisfy those rights. Chapter IV presents a history of the litigation and a summary of the Judgment.

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

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

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

The Watermaster Committee signing the Water Year 2019-20 Annual Report consisted of Shivaji Deshmukh, Wen B. Huang, Roy L. Herndon, Michael R. Markus, and Craig D. Miller. At the January 21, 2021 meeting, Mr. Herndon was re-elected Chairman and Mr. Huang was elected Secretary/Treasurer. The history of the Watermaster membership is presented in Chapter IV.

Compilation of Basic Data

The Watermaster annually compiles the basic hydrologic and water quality data necessary to determine compliance with the provisions of the Judgment. The data include records of stream discharge (flow) and quality for the Santa Ana River (River) at Prado Dam and at Riverside Narrows as well as discharges for most tributaries; flow and quality of Nontributary water entering the River; rainfall records at locations in or adjacent to the Watershed; and other data that may be used to support the determinations of the Watermaster. For Water Year 2019-20 the United States Geological Survey (USGS) provided discharge and water quality data for the River at two gaging stations, "Santa Ana River Below Prado Dam" (Prado) and "Santa Ana River at Metropolitan Water District (MWD) Crossing" (Riverside Narrows). The discharge data at both stations consist of computed daily mean discharges, expressed in cubic feet per second (cfs), and are based on continuous recordings. At times the USGS must estimate daily mean discharges due to damaged or malfunctioning recording equipment.

The USGS also provided discharge data for other gaging stations for streams tributary to Prado, including, among others, the Santa Ana River at E Street in San Bernardino, Temescal Creek above Main Street in Corona, Cucamonga Creek near Mira Loma, Chino Creek at Schaefer Avenue, Lytle Creek at Colton, Warm Creek near San Bernardino, and San Timoteo Creek near Loma Linda (see Appendix A). Based on a determination by the Watermaster in Water Year 2011-12, the USGS was requested to establish a new gaging station at the spillway at Lee Lake. Expenses associated with the installation and measurements at this gage were added to the Watermaster costs paid by the Parties. Beginning in Water Year 2012-13, the new Temescal Creek at Corona Lake "Lee Lake" (near Corona) gage provided useful data (also included in Appendix A) to assist in the determination of the amount of water discharged from the San Jacinto Watershed that arrived at Prado.

The Water Year 2019-20 daily mean discharge records at Prado are rated "fair" by the USGS. Daily mean discharges at the station are controlled at times by storage operations in the reservoir behind Prado Dam just upstream. The maximum and minimum daily mean discharge values during the water year were, respectively, 795 cfs on April 12, 2020 and 52.8 cfs on August 28, 2020. The Water Year 2019-20 daily mean discharge record at Riverside Narrows was rated "fair" by the USGS. The maximum and minimum daily mean discharge values during the year were, respectively, 1,370 cfs on March 12, 2020 and 24.1 cfs on August 2, 2020.

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 38 measured values (three to four per month) for EC and/or total dissolved solids (TDS) expressed in milligrams per liter (mg/L). The water quality data at Riverside Narrows consist of 23 values measured by the USGS (generally twice per month) and 108 values measured by the City of Riverside (generally twice per week) for both EC and TDS. The maximum and minimum, daily, flow-weighted mean EC values reported by the USGS for the River at Prado were 1,240 μs/cm on January 27, 2020 and 236 μs/cm on December 26, 2019, respectively. The

corresponding calculated TDS concentrations were 741 and 141 mg/L. At Riverside Narrows, the maximum and minimum EC values were, respectively, 1,064 μs/cm on April 28, 2020 as reported by the City of Riverside and 270 μs/cm on April 7, 2020 as reported by the USGS. The corresponding measured TDS concentrations on these dates were 644 and 173 mg/L. Specific conductance records are affected by releases from Prado Dam. Interruptions in record occur at times due to malfunction of recording or sensing equipment. A portion of chemical data was collected for the National Water-Quality Assessment (NAWQA) Program. There were interruptions of the Prado EC records from November 7 to 8, 2019 and from July 4 to 30, 2020 due to malfunction of recording or sensing equipment.

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

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

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

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

For Water Year 2019-20, the total precipitation recorded at the Gilbert Street gage was 12.74 inches, or 71% of the average of 17.98 inches that occurred during the 26-year base

period (1934-35 through 1959-60) that was used in the formulation of the physical solution. Plate 3 graphically portrays the annual precipitation from 1934-35 through 2019-20.

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 2019-20 there were no sources of Nontributary Flow in the River at Riverside Narrows or Prado Dam.

There was one source of non-storm flow in the River at Prado that the Watermaster has not included in Base Flow. Eastern Municipal Water District (EMWD) reported that it discharged 7,280 acre-feet of treated wastewater to Temescal Creek, with a flow-weighted average TDS of 688 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). IEUA Groundwater Recharge Coordinator/Hydrogeologist Andy Campbell estimated that 4,596 acre-feet of the EMWD treated wastewater, with an average TDS concentration of 677 mg/L, reached Prado Reservoir, that 2,216 acre-feet of it was captured by OCWD, and recommended that the Cumulative Credit at Prado be increased 1,108 acre-feet accordingly using the previously established fifty percent rule. The Watermaster accepted the estimate and the recommendation.

The determinations of the Watermaster for Water Year 2019-20 are explained in detail for Prado in Chapter II and for Riverside Narrows in Chapter III. A summary of the annual determinations by the Watermaster is presented in Table 1 for both locations for the period of 1970-71 through 2019-20. Note that the Base Flow obligations set forth in the Judgment at both Prado and Riverside Narrows have been met for the water year and cumulative credits have accrued to the upper respective Districts.

TABLE 1

SUMMARY OF FINDINGS AT PRADO

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

TABLE 1 (continued)

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]
2011-12	9.01	121,123	121,123	93,068	597	101,056	3,401,833
2012-13	9.53	100,003	99,735	81,452	621	86,814	3,446,890
2013-14	12.42	86,486	86,486	63,536	582	69,784	3,474,674
2014-15	11.09	107,600	107,600	64,048	522	73,548	3,506,222
2015-16	8.84	115,023	102,610	71,225	560	79,535	3,543,757
2016-17	21.57	191,539	191,539	70,010	408	87,046	3,588,803
2017-18	6.81	82,554	82,554	65,438	625	69,528	3,616,331
2018-19	19.85	251,974	251,974	97,993	395	122,900	3,698,381
2019-20	12.74	160,915	160,915	74,465	462	89,234	3,746,723

TABLE 1 (continued)

SUMMARY OF FINDINGS AT RIVERSIDE NARROWS

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

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]
2011-12	9.01	45,049	45,049	42,641	664	42,641	1,249,024
2012-13	9.53	41,337	41,337	36,407	662	36,407	1,270,181
2013-14	12.42	42,766	42,766	32,313	646	32,313	1,287,244
2014-15	11.09	41,958	41,958	28,302	630	28,302	1,300,296
2015-16	8.84	41,007	41,007	30,877	635	30,877	1,315,923
2016-17	21.57	83,601	83,601	36,090	650	36,090	1,336,763
2017-18	6.81	34,792	34,792	28,378	662	28,378	1,349,891
2018-19	19.85	97,063	97,063	36,604	652	36,604	1,371,245
2019-20	12.74	56,622	56,622	32,096	627	32,096	1,388,091

TABLE 1 (continued)

SUMMARY OF FINDINGS
FOOTNOTES

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

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

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

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

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

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

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

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

Notable Watershed Programs and Activities

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

Upper Area Treated Wastewater Discharges

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

Salt Exports from the Upper Area

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

Arundo donax Eradication

Arundo donax is a non-native species of reed that has invaded many waterways in California. It displaces native vegetation, resulting in undesirable habitat for animals. *Arundo* also consumes water at the rate of about 5.6 acre-feet per acre per year compared to only about 1.9 for native plants, a net water loss of about 3.7 acre-feet per year per acre of *Arundo*. By the early 1990s there were about 10,000 acres of *Arundo* in the Santa Ana River Watershed. In 1997 a consortium of local, state and federal agencies launched a long-term eradication program in the watershed for reasons of both habitat restoration and water savings. *Arundo* spreads quickly downstream as roots and rhizomes break off during high stream flows. Therefore, the eradication program began at the farthest upstream locations and is working toward the River mouth. Each location requires multiyear retreatment. To date the consortium has eradicated 8,173 acres of *Arundo* in the watershed.

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

Water Year	Wastewater discharges upstream from Colton that generally do not flow continuously to Santa Ana River above E Street				Wastewater discharges to Santa Ana River and its tributaries that have hydraulic continuity to the Santa Ana River above Riverside Narrows					Wastewater discharges to the Santa Ana River between Riverside Narrows and Prado Dam								Wastewater discharges to Temescal Creek or its tributaries which have hydraulic continuity to the Santa Ana River					Total Discharge to surface flow of the Santa Ana River	Total Waste Water Discharged in the Watershed
																			Est. EMWD Temescal Elsinore						
	Redlands	Beaumont	Yucaipa[8]	Subtotal (A)	San Bernardino[7]	Colton	Rialto	RIX[1]	Subtotal (B)	Riverside	Corona[2]	IEUA RP 1[3]	IEUA RP 2	IEUA RP 5	IEUA CCWRF[4]	WRCRW[5]	Subtotal (C)	EMWD Discharge (1)	Arriving at Prado (2)	Valley[6] WRP (3)	Valley MWD (4)	Subtotal (D) (2+3+4)	(B+C+D)	(A+B+C+D+1-2)
1970-71	2,650	no record	-	2,650	17,860	2,520	2,270	-	22,650	18,620	3,190	-	-	-	-	-	21,810	-	-	-	-	-	44,460	47,110
1971-72	2,830	no record	-	2,830	16,020	2,230	2,400	-	20,650	19,010	3,230	6,740	-	-	-	-	28,980	-	-	-	-	-	49,630	52,460
1972-73	2,810	450	-	3,260	18,670	2,530	2,260	-	23,460	19,060	3,340	10,380	-	-	-	-	32,780	-	-	-	-	-	56,240	59,500
1973-74	2,770	600	-	3,370	17,680	2,530	2,320	-	22,530	19,560	3,510	11,440	2,320	-	-	-	36,830	-	-	-	-	-	59,360	62,730
1974-75	2,540	570	-	3,110	16,750	1,980	2,320	-	21,050	19,340	4,020	14,960	2,280	-	-	-	40,600	-	-	-	-	-	61,650	64,760
1975-76	2,450	620	-	3,070	17,250	2,540	2,240	-	22,030	19,580	4,700	15,450	2,950	-	-	-	42,680	-	-	-	-	-	64,710	67,780
1976-77	3,170	580	-	3,750	17,650	3,260	2,330	-	23,240	18,770	5,010	14,640	3,380	-	-	-	41,800	-	-	-	-	-	65,040	68,790
1977-78	3,280	620	-	3,900	18,590	3,810	2,380	-	24,780	20,310	5,200	14,650	4,060	-	-	-	44,220	-	-	-	-	-	69,000	72,900
1978-79	3,740	670	-	4,410	19,040	3,850	3,050	-	25,940	21,070	5,390	15,040	5,070	-	-	-	46,570	-	-	-	-	-	72,510	76,920
1979-80	4,190	690	-	4,880	20,360	4,190	2,990	-	27,540	22,910	5,360	14,410	5,520	-	-	-	48,200	-	-	-	-	-	75,740	80,620
1980-81	4,410	690	-	5,100	20,550	3,930	3,370	-	27,850	24,180	5,590	17,270	5,260	-	-	-	52,300	-	-	-	-	-	80,150	85,250
1981-82	4,420	700	-	5,120	23,340	3,780	3,470	-	30,590	25,640	5,410	19,580	5,360	-	-	-	55,990	-	-	-	-	-	86,580	91,700
1982-83	4,530	710	-	5,240	24,160	3,600	3,620	-	31,380	25,020	5,860	20,790	4,290	-	-	-	55,960	-	-	-	-	-	87,340	92,580
1983-84	5,150	800	-	5,950	22,080	3,700	3,830	-	29,610	26,090	6,200	20,950	3,950	-	-	-	57,190	-	-	-	-	-	86,800	92,750
1984-85	4,990	840	-	5,830	23,270	3,830	4,070	-	31,170	27,750	6,250	25,160	4,280	-	-	-	63,440	-	-	-	-	-	94,610	100,440
1985-86	5,200	820	-	6,020	24,720	4,010	4,720	-	33,450	28,820	5,900	28,240	2,660	-	-	-	65,620	-	-	-	-	-	99,070	105,090
1986-87	5,780	880	800	7,460	26,810	4,170	5,350	-	36,330	30,340	6,170	27,160	5,000	-	-	-	68,670	-	-	-	-	-	105,000	112,460
1987-88	6,060	940	1,850	8,850	27,880	5,240	6,040	-	39,160	34,660	6,050	31,290	5,500	-	-	-	77,500	-	-	-	-	-	116,660	125,510
1988-89	5,250	1,030	2,260	8,540	27,640	5,550	6,280	-	39,470	35,490	8,080	35,510	6,180	-	-	-	85,260	-	-	-	-	-	124,730	133,270
1989-90	6,360	1,100	2,370	9,830	28,350	5,810	6,260	-	40,420	33,210	9,140	34,760	5,730	-	-	-	82,840	-	-	-	-	-	123,260	133,090
1990-91	6,690	1,120	2,490	10,300	27,570	5,670	6,290	-	39,530	32,180	9,110	36,840	6,100	-	-	-	84,230	-	-	-	-	-	123,760	134,060
1991-92	6,230	1,150	2,580	9,960	25,060	5,660	6,360	-	37,080	32,660	9,010	40,360	5,780	-	1,550	-	89,360	-	-	-	-	-	126,440	136,400
1992-93	6,880	1,180	2,580	10,640	25,550	6,210	6,460	-	38,220	34,100	9,600	41,510	5,640	-	4,720	-	95,570	-	-	-	-	-	133,790	144,430
1993-94	6,440	1,150	2,710	10,300	23,800	5,830	6,540	-	36,170	32,640	7,790	37,310	5,430	-	7,010	-	90,180	-	-	-	-	-	126,350	136,650
1994-95	6,720	1,180	2,560	10,460	26,330	5,500	6,820	-	38,650	33,950	7,340	39,680	5,360	-	8,690	-	95,020	-	-	-	-	-	133,670	144,130
1995-96	6,550	1,260	2,640	10,450	13,240	2,770	6,890	20,760	43,660	33,960	7,850	39,590	4,810	-	9,060	-	95,270	-	-	-	-	-	138,930	149,380
1996-97	6,510	1,280	2,780	10,570	-	-	7,160	42,800	49,960	34,240	5,040	39,940	4,790	-	9,750	-	93,760	-	-	-	-	-	143,720	154,290
1997-98	7,022	1,356	3,116	11,494	-	-	7,063	49,683	56,746	35,422	8,718	44,940	4,969	-	9,264	1,461	104,774	1,779	1690	-	-	1,690	163,210	174,793
1998-99	7,379	1,367	3,128	11,874	-	-	6,524	47,587	54,111	34,844	11,629	43,354	5,345	-	9,534	4,594	109,300	-	-	-	3,049	3,049	166,460	178,334
1999-00	7,670	1,373	3,284	12,327	-	-	7,392	45,012	52,404	35,399	13,152	42,967	4,378	-	9,954	2,371	108,221	-	-	-	4,159	4,159	164,784	177,111
2000-01	7,379	1,377	3,345	12,101	-	-	8,346	49,407	57,753	35,663	13,100	43,863	4,401	-	11,615	2,210	110,852	-	-	-	4,245	4,245	172,850	184,951
2001-02	7,395	1,434	3,285	12,114	-	-	7,952	44,513	52,465	35,586	12,378	40,377	4,056	-	10,677	2,380	105,454	-	-	352	4,477	4,829	162,748	174,862
2002-03	7,499	1,593	3,480	12,572	217	4	8,042	45,570	53,833	36,298	12,027	45,838	4,343	-	10,837	2,409	111,752	2,312	2,024	444	5,012	7,480	173,065	185,925
2003-04	6,625	1,793	3,898	12,316	124	0	8,158	44,526	52,808	36,664	11,394	39,734	2,307	4,821	9,113	2,818	106,851	4,345	1,140	549	5,037	6,726	166,386	181,907
2004-05	7,632	2,051	3,899	13,583	4,406	183	7,815	42,025	54,428	38,123	12,558	40,644	-	8,777	8,637	3,521	112,260	15,195	13,746	653	7,025	21,424	188,112	203,144
2005-06	5,789	2,246	3,945	11,981	1,184	101	7,883	45,259	54,427	37,358	13,021	35,486	-	9,036	8,389	3,311	106,601	14,669	12,631	701	6,259	19,591	180,618	194,637
2006-07	4,991	2,555	4,056	11,601	10	-	7,654	44,011	51,676	36,355	11,727	31,829	-	12,534	6,851	4,376	103,672	13,105	11,092	691	4,792	16,575	171,922	185,537
2007-08	3,665	2,856	4,055	10,576	518	0	7,258	42,476	50,252	35,703	9,408	26,001	-	12,200	8,029	5,952	97,293	10,808	8,930	811	1,553	11,294	158,839	171,293
2008-09	2,386	2,894	3,993	9,273	263	0	6,724	40,311	47,299	33,636	9,062	23,854	-	9,711	8,920	6,374	91,557	6,669	4,653	948	518	6,119	144,975	156,264
2009-10	2,876	2,956	4,105	9,937	298	-	6,658	40,672	47,628	33,731	8,808	21,983	-	8,046	7,258	6,153	85,978	4,961	4,814	934	876	6,624	140,231	150,315
2010-11	3,271	3,050	4,196	10,516	1,292	-	6,710	39,333	47,335	33,487	9,275	18,177	-	7,279	5,987	6,486	80,690	5,680	5,418	622	4,464	10,504	138,529	149,308
2011-12	3,503	3,054	4,112	10,669	76	-	6,703	37,966	44,745	31,622	9,249	14,563	-	7,184	5,137	6,409	74,164	1,225	735	507	786	2,027	120,936	132,096
2012-13	3,652	3,139	4,191	10,982	13	-	6,611	35,390	42,014	31,996	9,406	10,647	-	5,388	5,015	6,994	69,446	2,727	502	502	650	1,654	113,113	126,321
2013-14	3,549	3,345	4,133	11,028	175	-	6,527	33,271	39,973	30,302	8,662	9,898	-	3,188	3,606	6,402	62,058	-	-	533	623	1,156	103,187	114,215
2014-15	3,149	3,428	2,892	9,469	-	-	6,285	31,668	37,954	29,673	9,611	11,589	-	3,957	4,124	6,690	65,644	-	-	605	626	1,231	104,828	114,297
2015-16	3,274	3,372	3,148	9,794	15	-	6,420	32,343	38,778	29,074	10,425	12,531	-	2,910	3,368	7,097	65,405	-	-	174	644	818	105,001	114,794
2016-17	3,084	3,645	3,445	10,174	327	-	6,755	35,306	42,387	30,030	8,445	12,390	-	3,324	3,813	6,882	64,884	-	-	894	589	1,482	108,754	118,928
2017-18	1,891	3,749	3,562	9,202	0	-	6,210	32,493	38,703	28,922	8,574	12,564	-	3,854	1,627	7,610	63,151	-	-	1154	626	1,780	103,634	112,836
2018-19	3,909	4,043	3,430	11,382	0	-	6,892	32,925	39,817	24,962	8,851	19,093	-	6,831	2,944	7,845	70,526	6,116	4,317	1,070	520	5,907	116,250	129,430
2019-20	3,633	4,272	2,996	10,901	0	-	7,385	32,506	39,890	23,283	8,668	16,228	-	4,982	2,872	7,483	63,516	7,280	4,597	139	569	5,305	108,712	122,295

1. RIX = Rapid Infiltration and Extraction Facility for San Bernardino and Colton, including over-extraction of groundwater
2. A portion of the Corona discharge goes to ponds, which are considered tributary to the Santa Ana River.
3. Beginning in 1997-98, includes IEUA Plant #4 flows. In 2016-17 RP1 effluent includes flows into Prado Regional Park Lake.
4. CCWRF = Carbon Canyon Water Reclamation Facility
5. WRCRW = Western Riverside County Regional Wastewater Treatment Plant
6. Lee Lake WTP name changed to Temescal Valley WRP in WY 2014-15
7. Discharge numbers were updated during the 2016-17 reporting cycle.
8. Discharge numbers for Water Year 2014-15 through 2018-19 were updated during the 2019-20 reporting cycle.

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 IEUA and SARI Flow (acre-feet)
1970-71	NA	---	---	---
1971-72	NA	---	---	---
1972-73	NA	---	---	---
1973-74	NA	---	---	---
1974-75	NA	---	---	---
1975-76	NA	---	---	---
1976-77	NA	---	---	---
1977-78	NA	---	---	---
1978-79	NA	---	---	---
1979-80	NA	---	---	---
1980-81	NA	---	---	---
1981-82	4,236	---	---	4,236
1982-83	4,651	---	---	4,651
1983-84	4,142	---	---	4,142
1984-85	2,346	---	---	2,346
1985-86	2,995	2,791 [3]	NA	5,786 [3]
1986-87	4,943	2,869 [3]	NA	7,813 [3]
1987-88	5,177	2,948 [3]	NA	8,125 [3]
1988-89	5,949	3,622 [3]	NA	9,572 [3]
1989-90	5,240	7,393	1,649	12,633
1990-91	2,847	7,340	1,906	10,187
1991-92	3,421	6,457	2,346	9,878
1992-93	3,774	5,277	2,516	9,051
1993-94	3,764	7,860	2,302	11,624
1994-95	4,131	8,656	1,903	12,787
1995-96	3,863	9,597	2,175	13,460
1996-97	4,191	10,225	2,292	14,417
1997-98	4,575	8,210	2,456	12,785
1998-99	3,666	4,305	2,611	7,971
1999-00	4,272	7,711	2,154	11,983
2000-01	5,075	8,205	2,504	13,280
2001-02	4,297	8,385	3,289	12,682
2002-03	3,926	9,331	3,482	13,257
2003-04	3,950	10,505	3,798	14,455
2004-05	4,220	10,971	3,460	15,191
2005-06	5,085	12,847	4,118	17,932
2006-07	4,609	13,168	4,120	17,777
2007-08	4,658	12,123	4,986	16,781
2008-09	4,284	12,993	5,037	17,277
2009-10	3,865	13,325	5,003	17,190
2010-11	3,443	13,282	5,066	16,725
2011-12	3,668	13,471	5,884	17,139
2012-13	3,862	12,061	5,626	15,923
2013-14	4,190	12,185	5,350	16,375
2014-15	4,063	12,056	5,460	16,119
2015-16	4,110	11,396	5,364	15,506
2016-17	4,324	11,957	5,361	16,281
2017-18	4,410	11,520	5,626	15,930
2018-19	4,193	11,336	5,953	15,529
2019-20	4,033	12,628	5,806	16,661

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

NA = Data Not Available

Chino Groundwater Basin Hydraulic Control

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

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

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

Watermaster Service Expenses

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

The Watermaster annually adopts a budget for the costs of services other than those provided by the USGS. Table 4 shows the budget and actual expenses incurred for such services during the 2019-20 fiscal year as well as the budget adopted for the 2020-21 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, 2019 to June 30, 2020 Budget	July 1, 2019 to June 30, 2020 Expenses	July 1, 2020 to June 30, 2021 Budget
Support Services	$9,000.00	$8,500.00*	$11,500.00
Reproduction of Annual Report	1,000.00	710.00*	1,000.00
TOTAL	$10,000.00	$9,210.00*	$12,500.00

* The expenses for Fiscal Year 2019-20 were paid during Fiscal Year 2020-21.

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 2019-20, 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, 2019 to September 30, 2020

	Total Cost	USGS Share	Parties' Share
USGS PRECIPITATION GAGING STATIONS			
Gilbert Street Precipitation Gage at San Bernardino	$9,200	$0	$9,200
Middle Fork Lytle Creek Precipitation	$5,500	$5,500	$0
USGS FLOW AND WATER QUALITY GAGING			
Santa Ana River at MWD Crossing (Riverside Narrows)			
Surface Water Gage	$33,300	$11,150	$22,150
Water Quality Monitoring TDS Sampling	$13,850	$4,650	$9,200
Santa Ana River below Prado Dam			
Surface Water Gage	$26,300	$26,300	$0
Extra Measurements in WY20	$16,500	$0	$16,500
Water Quality Monitoring	$19,050	$6,400	$12,650
Water Quality Monitoring TDS Sampling	$12,700	$4,250	$8,450
Water Quality Conductance Program	$2,950	$0	$2,950
Temescal Creek above Main St., near Corona	$23,750	$7,950	$15,800
Chino Creek at Schaefer Avenue	$23,750	$7,950	$15,800
Cucamonga Creek near Mira Loma	$23,750	$7,950	$15,800
Temescal Creek at Corona Lake near Corona	$17,770	$0	$17,770
TOTAL COST AND SHARES	$228,370	$82,100	$146,270
COST DISTRIBUTION AMONG PARTIES			
Inland Empire Utilities Agency	20%		$29,254
Orange County Water District	40%		$58,508
San Bernardino Valley Municipal Water District	20%		$29,254
Western Municipal Water district	20%		$29,254

CHAPTER II

BASE FLOW AT PRADO

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

Flow at Prado

During Water Year 2019-20, the flow of the River as measured at the USGS gaging station below Prado Dam amounted to 160,915 acre-feet. There were 2 acre-feet of water in storage at the beginning of the Water Year, and no water remained in storage at the end of the Water Year. Inflow to the reservoir included 74,465 acre-feet of Base Flow and 81,855 acre-feet of Storm Flow. There were no Nontributary Flows to Prado. Water discharged from the San Jacinto Watershed was excluded from Base Flow but was partially credited to the Cumulative Credit at Prado. Discharge from the San Jacinto Watershed calculated to have reached Prado Reservoir was 4,596 acre-feet. The monthly components of flow of the River at Prado Dam for Water Year 2019-20 are listed in Table 6 and are shown graphically on Plate 4. Historical Base and Storm Flows of the River below Prado during Water Years 1934-35 through 2019-20 are presented on Plate 5.

Nontributary Flow

Nontributary Flow includes water that originated outside the watershed and other water that the Watermaster has determined should be excluded from Base Flow. During Water Year 2019-20, there were no Nontributary Flows that were determined to have reached Prado. Some flows from the San Jacinto Watershed were determined to have reached Prado Reservoir. In the past, Nontributary Flows have included, and may include in the future, other water discharged to the River pursuant to water exchange or other such programs.

Releases to San Antonio Creek

Since May 1973, OCWD has from time to time purchased State Water Project water for the replenishment of the groundwater basin in Orange County. The water has been released at two locations: Santa Ana River above Riverside Narrows (1972-72 only) and San Antonio Creek near the City of Upland. The general procedure used by the Watermaster to account for Nontributary Flows released to San Antonio Creek via OC-59 is fully described in the Twelfth (1981-82) Annual Report. During Water Year 2019-20, there was no water discharged to San Antonio Creek for OCWD via OC-59.

TABLE 6

COMPONENTS OF FLOW AT PRADO DAM
WATER YEAR 2019-20
(acre-feet)

	USGS Measured Outflow	Storage Change (1)	Computed Inflow	San Jacinto Watershed Flow at Prado (2)	San Antonio Creek (3)	Storm Flow	Base Flow
2019							
October	4,992	1	4,993	0	0	0	4,993
November	7,014	7,391	14,405	0	0	8,765	5,640
December	25,894	4,683	30,577	0	0	23,632	6,946
2020							
January	23,238	(12,060)	11,178	518	0	2,666	7,994
February	8,727	(11)	8,716	313	0	632	7,771
March	14,630	15,677	30,307	1,463	0	20,304	8,539
April	31,700	3,203	34,903	2,187	0	25,358	7,359
May	16,725	(9,873)	6,852	115	0	476	6,261
June	12,623	(7,543)	5,080	0	0	22	5,058
July	6,598	(1,467)	5,131	0	0	0	5,131
August	4,248	(1)	4,247	0	0	0	4,247
September	4,526	0	4,526	0	0	0	4,526
Total	160,915	0	160,915	4,596	0	81,855	74,465

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

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

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

San Jacinto Watershed Discharge

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

During water Year 2019-20, EMWD discharged 7,280 acre-feet of treated wastewater to Temescal Wash, and 4,596 acre-feet of that discharge was estimated to have reached Prado Reservoir. OCWD captured 2,216 acre-feet of the San Jacinto Watershed discharge and 2,380 acre-feet flowed past OCWD groundwater recharge facilities and was considered as lost to the ocean. Because discharges from the San Jacinto Watershed were not envisioned in the formulation of the Judgment, 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. Thus, for Water Year 2019-20, the Cumulative Credit at Prado includes 1,108 acre-feet of San Jacinto Watershed outflow. Summaries of the EMWD Discharges, San Jacinto Watershed Discharge Calculations, and San Jacinto Watershed Discharges are contained in Appendix E. Page E-16 of Appendix E includes hydrographs of Discharge of Temescal Creek at Main Street in Corona, Lee Lake Discharge, EMWD Discharge, and Elsinore Precipitation. These hydrographs illustrate 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 United States Army Corps of Engineers (USACE) owns and operates the Dam according to a flow release schedule which allows for water to be captured and subsequently released at rates which can be captured and recharged by OCWD. The Dam has a spillway elevation of 543 feet above mean sea level. On April 12, 1995, the USACE, the United States Fish and Wildlife Service (USFWS), and OCWD reached an agreement to increase the seasonal water conservation pool from elevation 494 to elevation 505 feet after March 1 of each year in exchange for a $1 million contribution by OCWD to the USFWS to be used to develop least Bell's vireo habitat by the removal of a non-native plant, *Arundo donax*. In 2006 the USACE and OCWD signed an agreement to increase the winter conservation pool elevation from elevation 494 to 498 in exchange for a $930,000 contribution from OCWD to habitat restoration in the watershed. Monthly and annual quantities of Storm Flow at Prado Dam are shown in Table 6.

During Water Year 2019-20, the maximum volume of water stored in Prado Reservoir reached 30,789 acre-feet on April 11, 2020. The maximum daily mean flow released from Prado Dam to the River during the Water Year was 795 cfs on April 12, 2020.

Base Flow

The Base Flow is that portion of the total flow remaining after subtracting Storm Flow, Nontributary Flow and certain other flows determined by the Watermaster. Flows affecting the determination of Base Flow in Water Year 2019-20 did not include discharges from the San Jacinto Watershed. The general procedure used by the Watermaster to separate the Water Year 2019-20 flow components was the same as used for previous years and is fully described in the Fifth (1974-75) Annual Report. Table 6 shows the monthly and annual quantities of Base Flow.

Water Quality Adjustments

The flow-weighted average TDS for the total flow passing Prado Dam was calculated to be 468 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 thirty-nine (38) grab samples for EC collected by the USGS and then analyzed for TDS.

For Water Year 2019-20 a correlation between TDS and EC yields the following best fit equation:

$$TDS = EC \times 0.6041$$

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

Using the daily EC data, flow-weighted average daily concentrations for TDS were calculated using the above equation. The plot of TDS on Plate 6 shows the average daily TDS concentration of the River flow passing Prado Dam. A summary of daily TDS and EC of the River below Prado Dam is contained in Appendix F. At Prado Dam, the flow-weighted average annual TDS concentration of 468 mg/L represents the quality of the total flow including releases to San Antonio Creek and discharges from San Jacinto Watershed, if any. The Judgment requires that Base Flow shall be subject to adjustment based on the TDS of Base Flow and Storm Flow only. Hence, a determination of the TDS of Base Flow plus Storm Flow only is detailed in the following paragraphs.

Adjustment for State Water Project Flow to San Antonio Creek

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

Adjustment for San Jacinto Watershed Discharge

Discharge from the San Jacinto Watershed during Water Year 2019-20 reaching Prado Reservoir was estimated to be 4,596 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 677 mg/L was calculated. A summary of these calculations is contained in Appendix E.

Flow Component	Annual Flow (acre-feet)	Average TDS	Annual Flow X Average TDS
1. Measured Outflow	160,915	468	75,308,220
2. Less Nontributary Flow San Antonio Creek	0	---	---
3. Less San Jacinto Watershed Discharge	4.596	677	3,111,492
4. Measured Outflow less lines 2 and 3	156,319		72,196,728
Average TDS in Total Base and Storm Flow	72,196,728 ÷ 156,319 = 462 mg/L		

As shown above, the flow-weighted average annual TDS of Storm Flow and Base Flow for Water Year 2019-20 is 462 mg/L.

Adjusted Base Flow at Prado

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

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

where Q = Base Flow actually received.

The flow-weighted average annual TDS of 462 mg/L is less than 700 mg/L. Therefore, the Base Flow of 74,465 acre-feet must be adjusted by the above equation for TDS less than 700 mg/L. Thus, the Adjusted Base Flow is as follows:

$$(74{,}465 \text{ acre-feet}) + \frac{35}{42{,}000} \times (74{,}465 \text{ acre-feet}) \times (700 - 462) = 89{,}234 \text{ acre-feet}$$

Entitlement and Credit or Debit

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

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

The findings of the Watermaster concerning flow at Prado for Water Year 2019-20 required under the Judgment are as follows:

1.	Measured Outflow at Prado	160,915 acre-feet
2.	Base Flow at Prado	74,465 acre-feet
3.	Annual Weighted TDS of Base and Storm Flow	462 mg/L
4.	Annual Adjusted Base Flow	89,234 acre-feet
5.	Cumulative Adjusted Base Flow	5,804,457 acre-feet
6.	Other Credits (Debits) [1]	1,108 acre-feet
7.	Cumulative Entitlement of OCWD	2,100,000 acre-feet
8.	Cumulative Credit [2]	3,746,723 acre-feet
9.	One-Third of Cumulative Debit	0 acre-feet
10.	Minimum Required Base Flow in 2019-20	34,000 acre-feet

1. Other Credits (Debits) are comprised of San Jacinto Watershed outflow.
2. Cumulative Credit includes 42,266 acre-feet of San Jacinto Watershed cumulative outflow.

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

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

TABLE 7 (Continued)
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]
2013-14	63,536	69,784	5,282,666	0	1,848,000	3,474,674
2014-15	64,048	73,548	5,356,214	0	1,890,000	3,506,222
2015-16	71,225	79,535	5,435,749	0	1,932,000	3,543,757
2016-17	70,010	87,046	5,522,795	0	1,974,000	3,588,803
2017-18	65,438	69,528	5,592,323	0	2,016,000	3,616,331
2018-19	97,993	122,900	5,715,223	1,150	2,058,000	3,698,381
2019-20	74,465	89,234	5,804,457	1,108	2,100,000	3,746,723

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

(2) Cumulative Credit includes 42,266 acre-feet of San Jacinto Watershed cumulative outflow.

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

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

CHAPTER III

BASE FLOW AT RIVERSIDE NARROWS

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

Flow at Riverside Narrows

The flow of the River at Riverside Narrows was to 56,622 acre-feet, measured at the USGS gaging station near the MWD Crossing. Separated into its components, Base Flow was 32,096 acre-feet and Storm Flow was 26,428 acre-feet. Included in Base Flow is 1,902 acre-feet of treated wastewater from Rubidoux Community Services District (Rubidoux CSD) 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 2019-20 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 2019-20 are presented on Plate 8.

Nontributary Flow

Nontributary Flow includes water that originated outside the watershed, as well as other water that the Watermaster has determined should be excluded from Base Flow. During Water Year 2019-20, no Nontributary Flow was delivered to the River upstream of Riverside Narrows and Prado Dam. In the past, Nontributary Flows have included, and may include in the future, other water discharged to the River pursuant to water exchange or other such programs.

Base Flow

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

In April 1980, Rubidoux CSD made the first delivery of treated wastewater to the regional treatment plant at Riverside. Prior to that time, Rubidoux CSD had discharged to the River upstream of the Riverside Narrows gaging station. Treated wastewater from Rubidoux CSD during Water Year 2019-20, in the amount of 1,902 acre-feet, has been added to the Base Flow as measured at the gaging station. A summary of Rubidoux CSD discharges is contained in Appendix G.

TABLE 8

COMPONENTS OF FLOW AT RIVERSIDE NARROWS
WATER YEAR 2019-20
(acre-feet)

	Month	USGS Measured Flow	Storm Flow	Rubidoux Waste-water	Base Flow [1]
2019	October	1,860	0	178	2,038
	November	5,381	3,211	152	2,322
	December	9,256	6,271	155	3,140
2020	January	3,599	389	151	3,361
	February	3,053	40	142	3,155
	March	11,147	7,901	157	3,403
	April	11,710	8,569	156	3,297
	May	2,833	47	161	2,947
	June	2,229	0	158	2,387
	July	1,755	0	165	1,920
	August	1,786	0	167	1,953
	September	2,013	0	160	2,173
Total		56,622	26,428	1,902	32,096

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

Water Quality Adjustments

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

In October 2013, the City of Riverside changed the TDS and EC location for sampling. That new sampling location was further upstream and was not representative of stream flow at the Riverside Narrows. Beginning October 2016, the City of Riverside again changed its sampling location and its TDS and EC data are again representative of stream flow at the Riverside Narrows. The City data are used in the water quality adjustments for Water Year 2019-20.

Adjustment for Nontributary Flow

During Water Year 2019-20, there was no Nontributary Flow. Therefore, no water quality adjustment was required.

Adjustment for Treated Wastewater Discharges from the Rubidoux Community Services District

The flow-weighted quality of treated wastewater from Rubidoux CSD was 784 mg/L. A monthly summary of discharges and quality is contained in Appendix G.

The Base Flow quality adjustments resulting from exclusion of the Nontributary Flow and inclusion of the Rubidoux CSD treated wastewater are shown in the following table, and resulted in a Base Flow TDS of 627 mg/L.

Flow Component	Annual Flow (acre-feet)	Average TDS (mg/L)	Annual Flow x Average TDS
1. Base Flow plus Nontributary Flow	30,194	617	18,629,698
2. Less Nontributary Flow	0	---	---
3. Plus Rubidoux CSD Treated Wastewater	1,902	784	1,491,168
4. Base Flow (line 1 less line 2 plus line 3)	32,096		20,120,866
Average TDS of Base Flow		20,120,866 ÷ 32,096 = 627 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 2019-20 was 627 mg/L. Therefore, no adjustment is necessary, and the Adjusted Base Flow for Water Year 2019-20 is 32,096 acre-feet.

Entitlement and Credit or Debit

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

Findings of the Watermaster concerning flow at Riverside Narrows for Water Year 2019-20 required under the Judgment are as follows:

1.	Base Flow at Riverside Narrows	32,096 acre-feet
2.	Annual Weighted TDS of Base Flow	627 mg/L
3.	Annual Adjusted Base Flow	32,096 acre-feet
4.	Cumulative Adjusted Base Flow	2,150,591 acre-feet
5.	Cumulative Entitlement of IEUA and WMWD	762,500 acre-feet
6.	Cumulative Credit	1,388,091 acre-feet
7.	One-Third of Cumulative Debit	0 acre-feet
8.	Minimum Required Base Flow in 2019-20	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 [2]	Max Bookman [1]	John M. Toups
1970-71 through 1973-74	James C. Hanson	William J. Carroll	Albert A. Webb [2]	Max Bookman [1]	John M. Toups
1974-75 through 1977-78	James C. Hanson	William J. Carroll	Donald L. Harriger	Max Bookman [1]	John M. Toups [2]
1978-79 through 1981-82	James C. Hanson	William J. Carroll	Donald L. Harriger	Max Bookman [1]	William R. Mills, Jr. [2]
1982-83 through 1983-84	James C. Hanson	William J. Carroll	Donald L. Harriger	Harvey O. Banks [1]	William R. Mills, Jr. [2]
1984-85 through 1988-89	Robert L. Reiter	William J. Carroll	Donald L. Harriger	Harvey O. Banks [1]	William R. Mills, Jr. [2]
1989-90 through 1994-95	Robert L. Reiter [2], [3]	William J. Carroll	Donald L. Harriger	Harvey O. Banks [1]	William R. Mills, Jr.
1995-96	Robert L. Reiter [2] [3]	William J. Carroll [1]	Donald L. Harriger	Bill B. Dendy	William R. Mills, Jr.
1996-97	Robert L. Reiter [2] [3]	William J. Carroll	Donald L. Harriger	Bill B. Dendy	William R. Mills, Jr. [1]
1997-98	Robert L. Reiter [2] [3]	Robb D. Quincey	Donald L. Harriger	Bill B. Dendy	William R. Mills, Jr. [1]
1998-99 through 2000-01	Robert L. Reiter [2] [3]	Richard W. Atwater	Donald L. Harriger	Bill B. Dendy	William R. Mills, Jr. [1]
2001-02 through 2002-03	Robert L. Reiter [2] [3]	Richard W. Atwater	Donald L. Harriger [1]	Bill B. Dendy	Virginia L. Grebbien
2003-04 through 2005-06	Robert L. Reiter [1] [3]	Richard W. Atwater	John V. Rossi	Bill B. Dendy [2]	Virginia L. Grebbien
2006-07 through 2007-08	Samuel H. Fuller [2] [3]	Richard W. Atwater	John V. Rossi	Bill B. Dendy [1]	Craig D. Miller
2008-09	Samuel H. Fuller [2] [3]	Richard W. Atwater	John V. Rossi	Robert C. Wagner	Craig D. Miller [1]
2009-10	Samuel H. Fuller [2] [3]	Thomas A. Love	John V. Rossi [1]	Michael R. Markus	Roy L. Herndon
2010-11	Samuel H. Fuller [2] [3]	Thomas A. Love [1]	John V. Rossi	Michael R. Markus	Roy L. Herndon
2011-12	Samuel H. Fuller [2] [3]	Thomas A. Love	John V. Rossi	Michael R. Markus	Roy L. Herndon [1]
2012-13 through 2015-16	Douglas D. Headrick [2] [3]	P. Joseph Grindstaff	John V. Rossi	Michael R. Markus	Roy L. Herndon [1]
2016-17 through 2017-18	Douglas D. Headrick [2] [3]	Halla Razak	Craig D. Miller	Michael R. Markus	Roy L. Herndon [1]
2018-19 through 2019-20	Wen B. Huang [2] [3]	Shivaji Deshmukh	Craig D. Miller	Michael R. Markus	Roy L. Herndon [1]

Footnotes:
(1) Watermaster Committee Member serving as Chairman during the Water Year.
(2) Watermaster Committee Member serving as Secretary during the Water Year.
(3) Watermaster Committee Member serving as Treasurer during the Water Year.

Santa Ana River Watershed

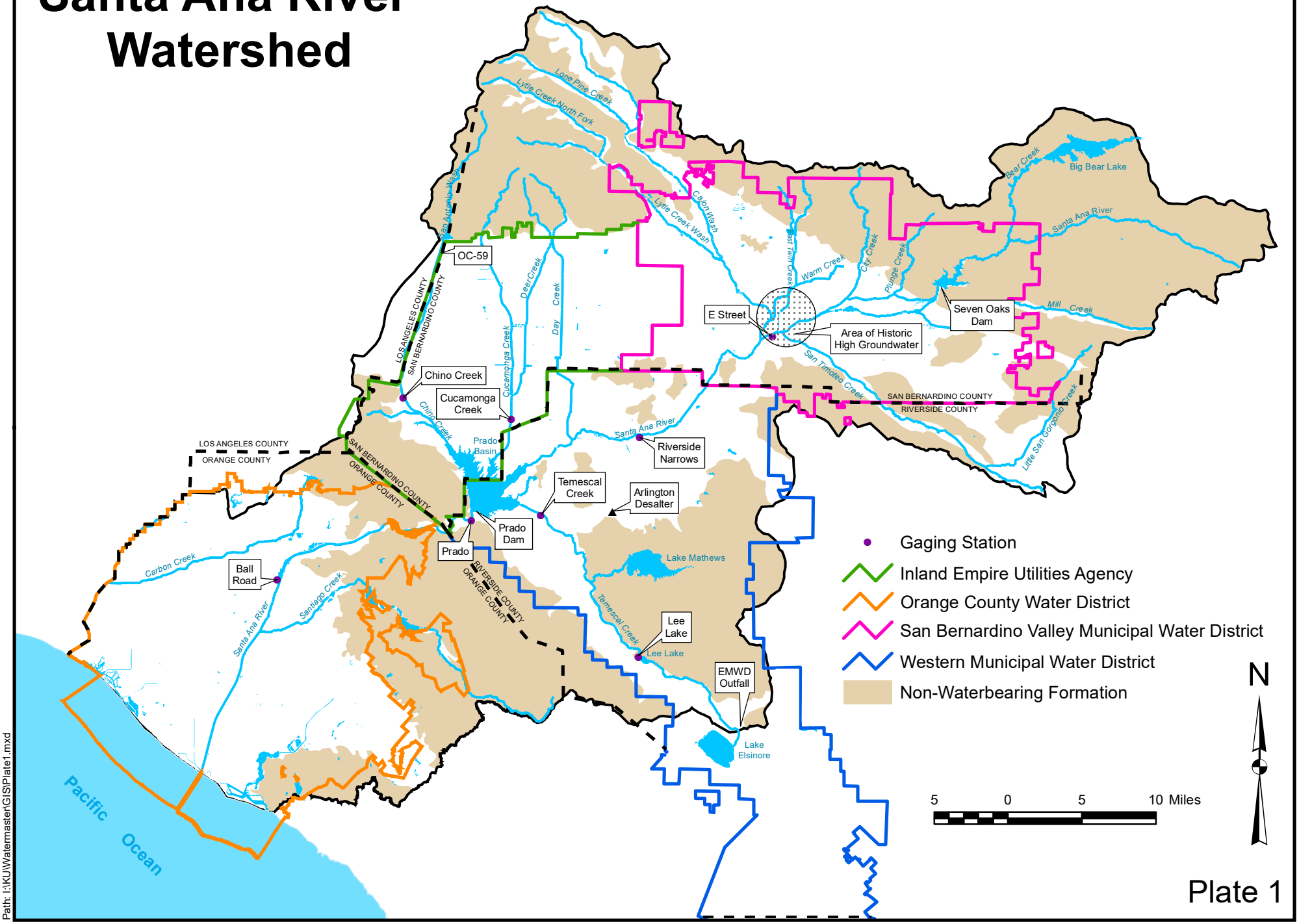

Plate 1

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Santa Ana River Watershed Wastewater Treatment Plants and Salt Export Pipelines

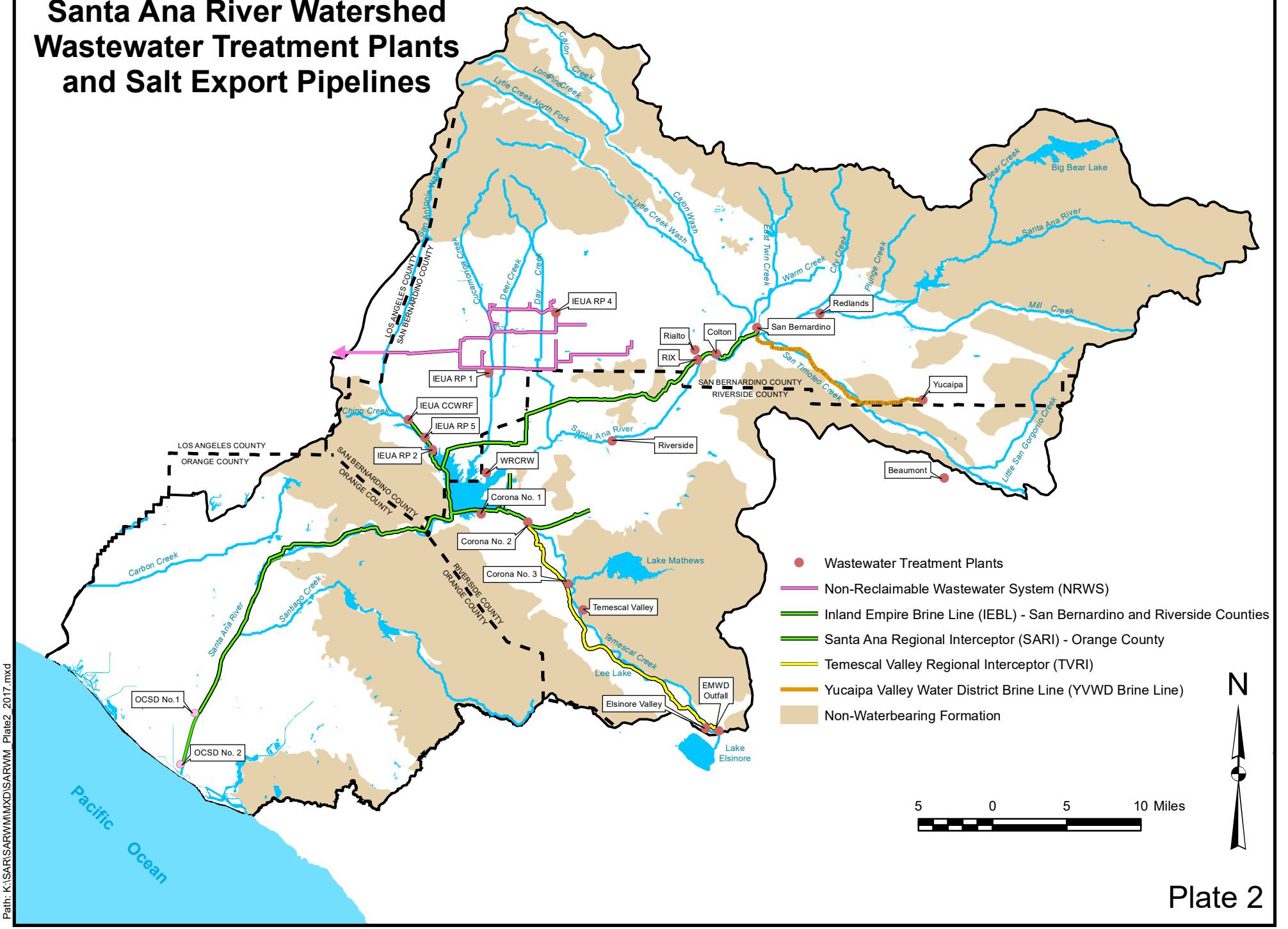

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Plate 2

PRECIPITATION AT SAN BERNARDINO STARTING IN 1934-35

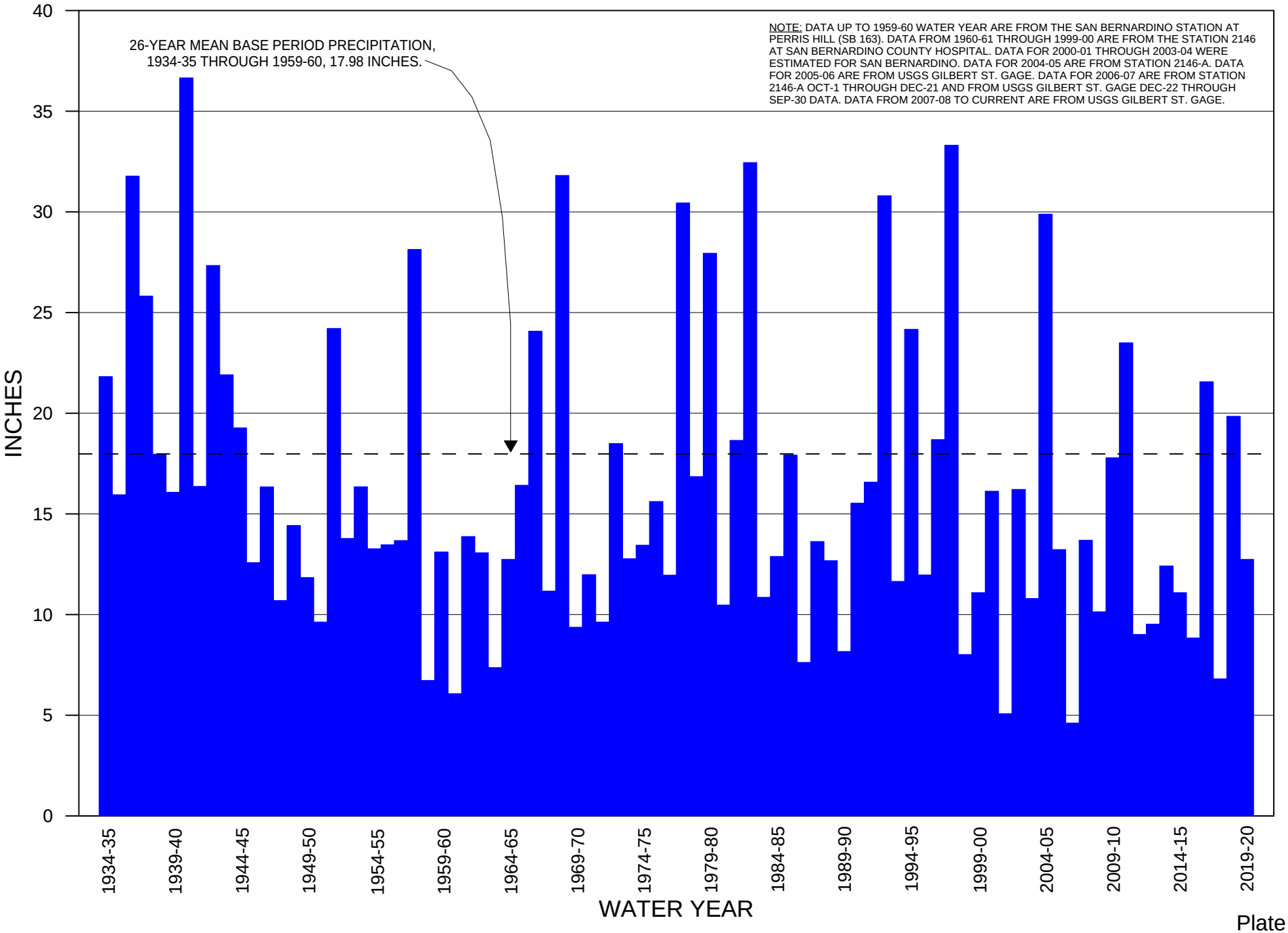


Plate 3

2019-20 SAN BERNARDINO PRECIPITATION
USGS GILBERT STREET GAGE
TOTAL = 12.74"

INCHES

0.00" 2.21" 2.79" 0.19" 0.31" 3.90" 3.34" 0.00" 0.00" 0.00" 0.00" 0.00"

X: Missing Data

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

CUBIC FEET PER SECOND

STORM FLOW
USGS MEASURED OUTFLOW
INFLOW TO PRADO DAM LESS SAN JACINTO WATERSHED DISCHARGES AND NONTRIBUTARY FLOWS REACHING PRADO

PERIODS OF SAN JACINTO WATERSHED ARRIVAL AT PRADO GAGE

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

DISCHARGE OF THE SANTA ANA RIVER AT PRADO DAM & SAN BERNARDINO PRECIPITATION
WATER YEAR 2019-20

Plate 4

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

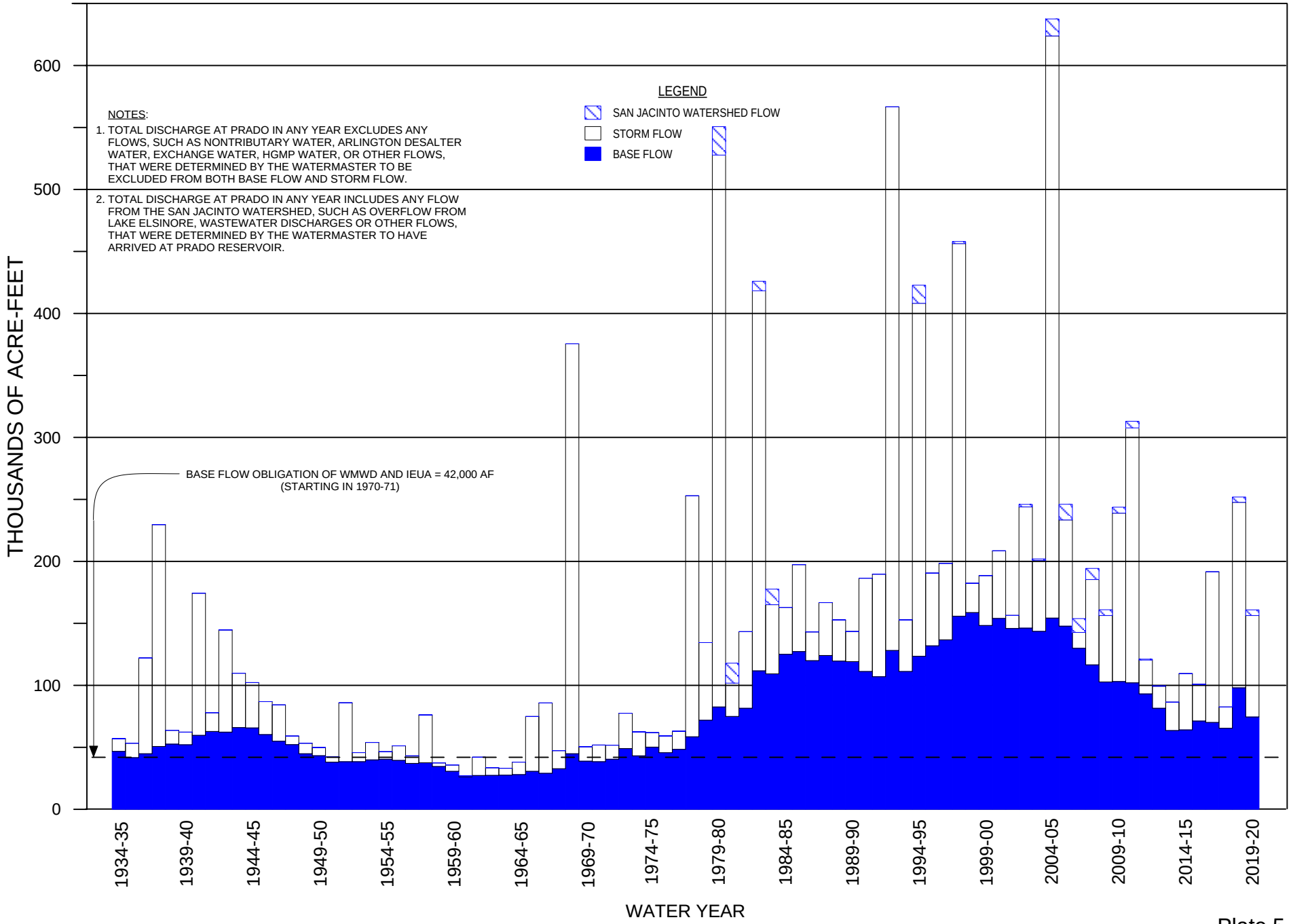
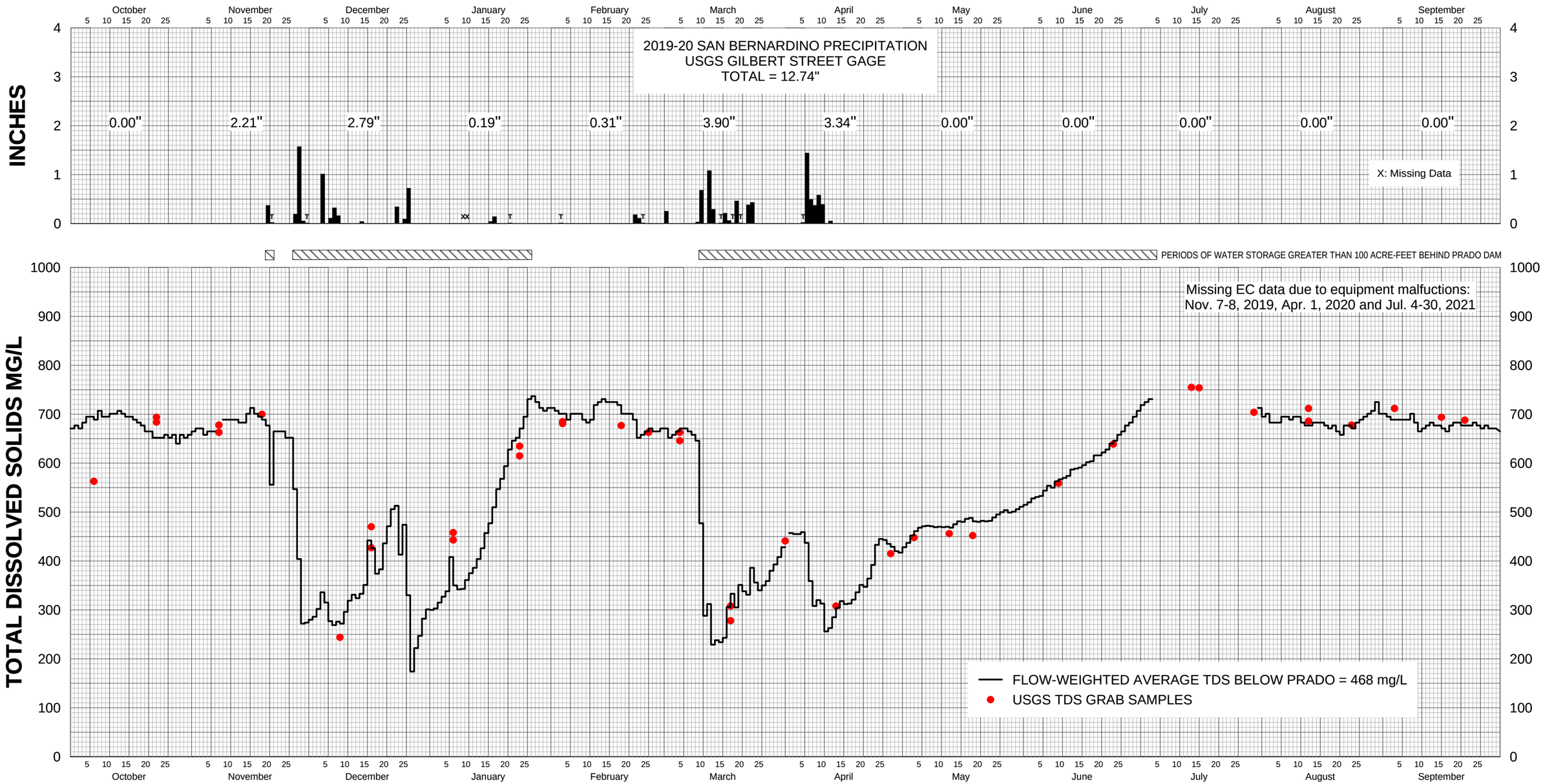
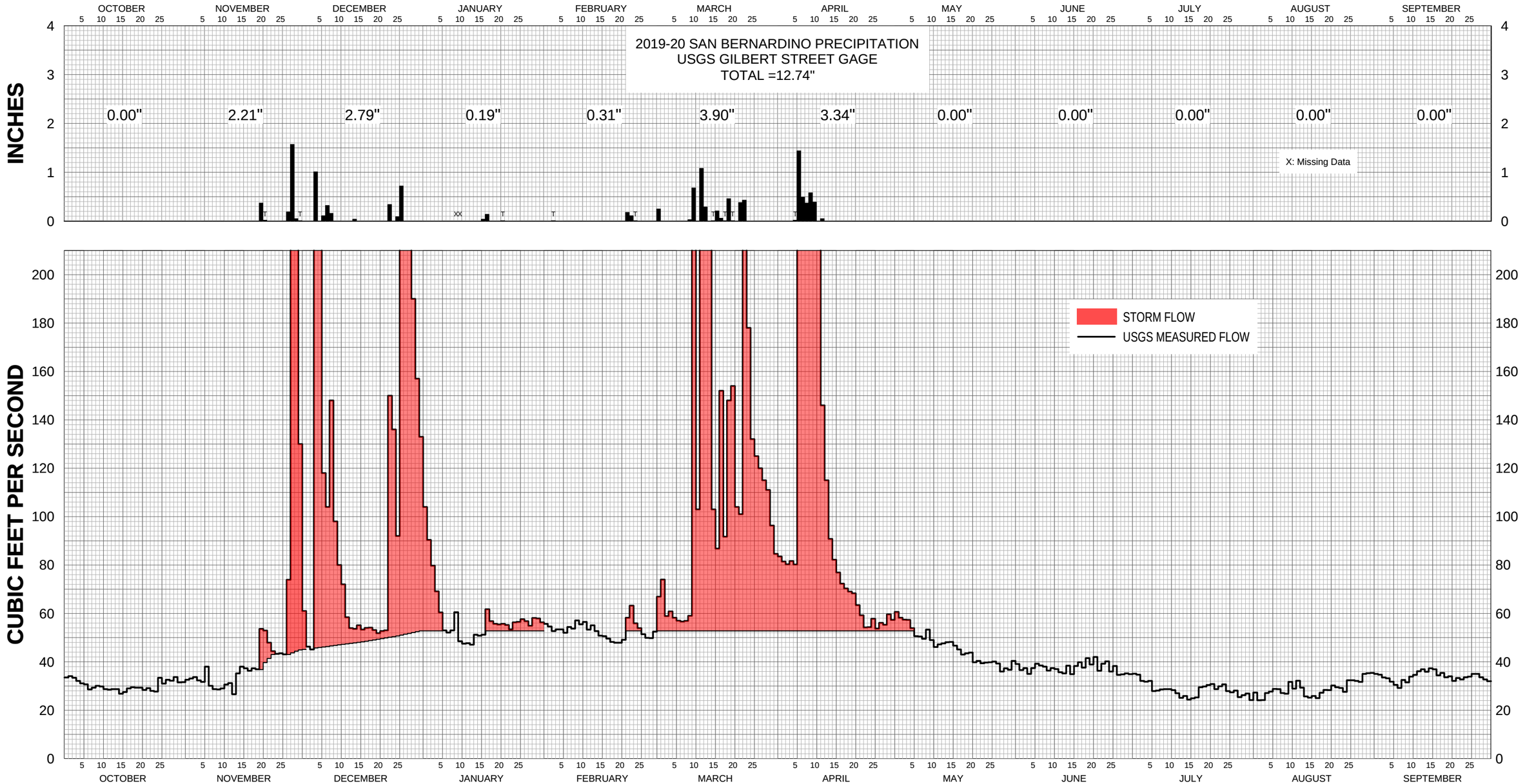


Plate 5



DISSOLVED SOLIDS IN SANTA ANA RIVER BELOW PRADO DAM
WATER YEAR 2019-20

Plate 6



DISCHARGE OF SANTA ANA RIVER AT RIVERSIDE NARROWS & SAN BERNARDINO PRECIPITATION
WATER YEAR 2019-20

Plate 7

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

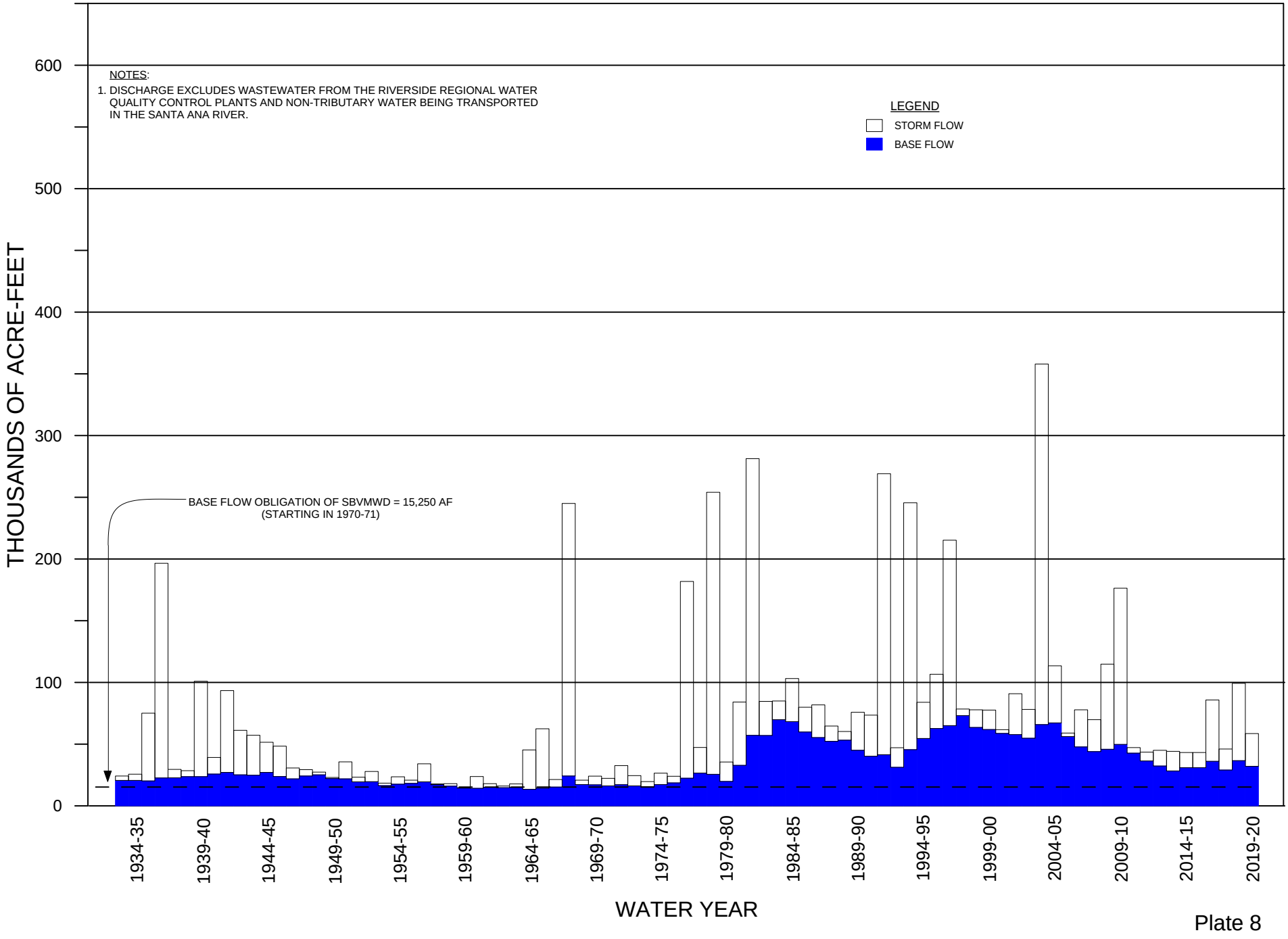


Plate 8

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

FIFTIETH ANNUAL REPORT

OF THE

SANTA ANA RIVER WATERMASTER

FOR WATER YEAR

OCTOBER 1, 2019 - SEPTEMBER 30, 2020

April 30, 2021

APPENDIX A

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

WATER YEAR 2019-20

USGS Water-Year Summary 2020

11074000 Santa Ana River below Prado Dam, CA

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

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

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

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 - Flow regulated since 1940 by Prado Flood-Control Reservoir, capacity, 196,200 acre-ft. Natural streamflow affected by extensive ground-water withdrawals, diversion for irrigation, discharges of treated effluent, and return flow from irrigated areas. Releases of imported water are made to the basin by the California Water Project at times in some years, via San Antonio Creek from Rialto Pipeline below San Antonio Dam. During the current year, 12,780 acre-ft was released. See schematic diagram of Santa Ana River Basin available from the California Water Science Center.

EXTREMES OUTSIDE PERIOD OF RECORD - Flood of Mar. 2, 1938, reached a discharge of 100,000 ft^3/s, on basis of slope-area measurement of peak flow at site 2.5 mi downstream.

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

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

DISCHARGE, CUBIC FEET PER SECOND
YEAR 2019-10-01 to 2020-09-30
DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	2019	2019	2019	2020	2020	2020	2020	2020	2020	2020	2020	2020
1	93.4	83.5	241	504	159	151	245	308	266	295	68.2	70.5
2	90.0	74.3	394	512	167	165	259	304	243	290	65.0	72.1
3	91.7	85.0	369	512	172	151	274	301	189	277	75.2	74.1
4	84.5	95.8	270	505	161	144	285	257	171	255	73.6	73.0
5	80.2	95.4	366	498	155	137	291	263	170	203	76.2	69.7
6	82.8	96.3	417	500	149	139	360	262	170	101	70.9	67.6
7	86.2	109	418	502	151	136	671	261	173	85.6	74.2	63.7
8	75.9	104	418	494	154	140	748	261	180	77.4	74.2	68.6
9	75.0	94.4	418	388	165	148	762	260	185	76.1	69.4	76.5
10	69.9	93.4	416	261	166	154	784	260	186	76.4	75.4	86.5
11	63.0	95.6	413	261	149	184	792	258	194	77.1	73.5	77.1
12	62.7	102	448	260	124	177	795	258	202	76.7	74.3	78.8
13	70.8	106	470	383	121	248	762	257	205	74.2	71.5	76.9
14	79.7	94.2	466	451	123	336	744	255	208	80.4	68.4	76.8
15	80.3	71.6	461	445	129	335	738	255	218	78.2	66.3	87.1
16	79.9	73.2	487	422	135	333	737	252	223	74.6	65.5	117
17	79.8	80.0	502	408	138	334	740	249	224	72.4	69.6	96.6
18	83.9	86.0	537	401	144	331	733	266	226	74.6	70.6	71.4
19	87.3	77.5	550	391	145	328	727	287	226	74.8	73.3	70.0
20	88.2	73.0	537	385	130	329	743	287	226	78.7	73.9	69.5
21	87.6	184	518	378	133	328	759	284	226	81.9	71.5	72.3
22	84.9	170	498	371	141	327	756	283	225	78.8	67.3	72.3
23	84.4	124	369	386	149	315	521	282	224	78.3	67.7	73.7
24	79.6	126	311	385	205	312	242	282	223	80.0	68.7	70.1
25	73.8	136	289	367	183	274	222	281	222	79.7	67.3	71.4
26	76.8	133	296	340	169	222	217	280	220	77.8	64.3	73.1
27	82.8	156	400	311	169	234	240	279	218	76.9	61.4	73.3
28	84.5	236	399	196	160	239	266	279	214	72.3	52.8	76.6
29	86.6	242	398	172	154	248	272	277	228	66.3	58.2	78.3
30	86.1	239	469	165		239	297	274	279	67.3	66.0	77.1
31	84.4		510	162		238		270		69.1	67.3	
Total	2,517	3,536	13,050	11,720	4,400	7,376	15,980	8,432	6,364	3,327	2,142	2,282
Mean	81.2	118	421	378	152	238	533	272	212	107	69.1	76.1
Max	93.4	242	550	512	205	336	795	308	279	295	76.2	117
Min	62.7	71.6	241	162	121	136	217	249	170	66.3	52.8	63.7
Ac-ft	4,992	7,014	25,890	23,240	8,727	14,630	31,700	16,730	12,620	6,598	4,248	4,526

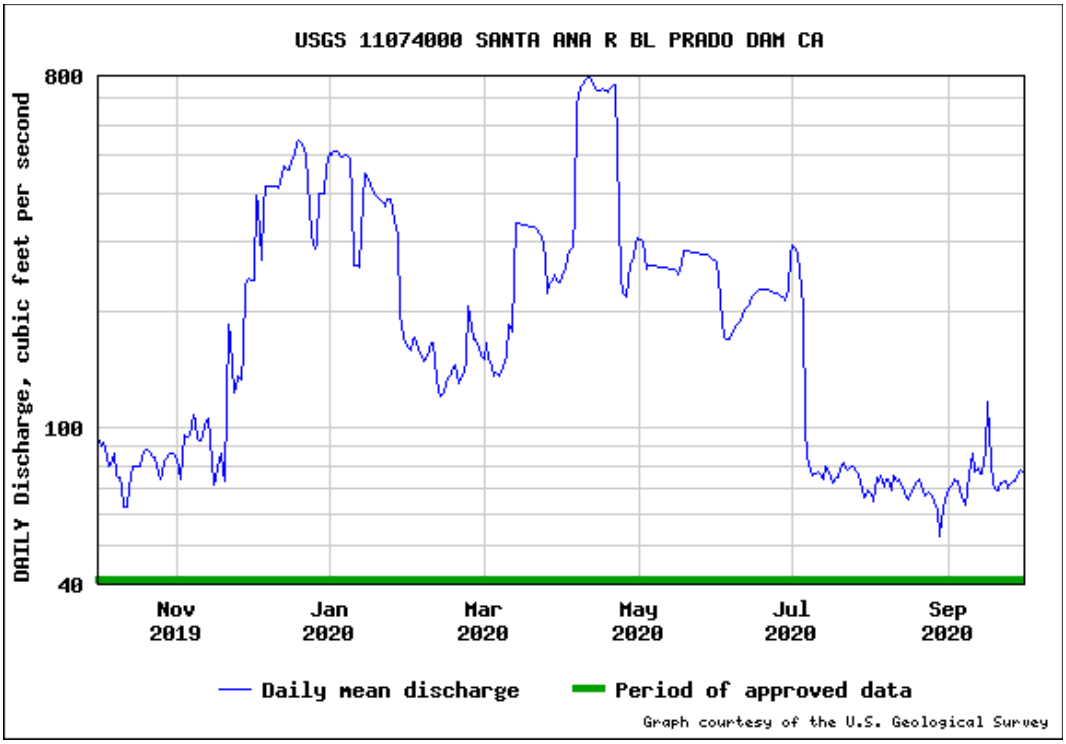
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1941 - 2020, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	128	148	241	395	439	387	261	188	152	124	105	101
Max	910	322	1,300	3,543	2,733	2,556	1,101	915	736	446	403	372
(WY)	(2005)	(1997)	(2011)	(1993)	(1998)	(1980)	(1980)	(1998)	(1983)	(1998)	(2005)	(1997)
Min	22.4	33.5	39.5	49.2	49.8	54.3	43.3	35.2	29.0	17.7	14.8	16.2
(WY)	(1962)	(1963)	(1963)	(1963)	(1961)	(1961)	(1961)	(1961)	(1961)	(1960)	(1960)	(1960)

SUMMARY STATISTICS

	Water Year 2020		Water Years 1941 - 2020	
Annual total	81,130			
Annual mean	221.7		221.3	
Highest annual mean			882.0	2005
Lowest annual mean			36.4	1961
Highest daily mean	795.0	Apr 12	11,400	Jan 14, 2005
Lowest daily mean	52.8	Aug 28	2.40	Jul 29, 1978
Annual 7-day minimum	62.5	Aug 25	3.00	Sep 24, 1973
Maximum peak flow	800[a]	Apr 12	13,200[a]	Jan 15, 2005
Maximum peak stage	5.19	Apr 12	8.73	Jan 15, 2005
Annual runoff (cfsm)	0.098		0.098	
Annual runoff (inches)	1.34		1.33	
10 percent exceeds	462.5		385.0	
50 percent exceeds	170.0		136.0	
90 percent exceeds	71.5		44.0	

[a] Discharge affected by Regulation or Diversion



USGS Water-Year Summary 2020

11074000 Santa Ana River below Prado Dam, CA

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

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

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

WATER-QUALITY RECORDS

PERIOD OF RECORD -

DISCRETE WATER-QUALITY DATA:
CHEMICAL DATA: Water years 1967 to current year.
BIOLOGICAL DATA: Water years 1975-81.
SEDIMENT DATA: Water years 1974-94, 1999 to current year.

CONTINUOUS WATER-QUALITY DATA:
SPECIFIC CONDUCTANCE: Water years February 1968 to current year.
WATER TEMPERATURE: Water years February 1968 to current year.
CHLORIDE: Water years October 1970 to September 1971.
SUSPENDED-SEDIMENT DISCHARGE: Water years October 1973 to June 1982.

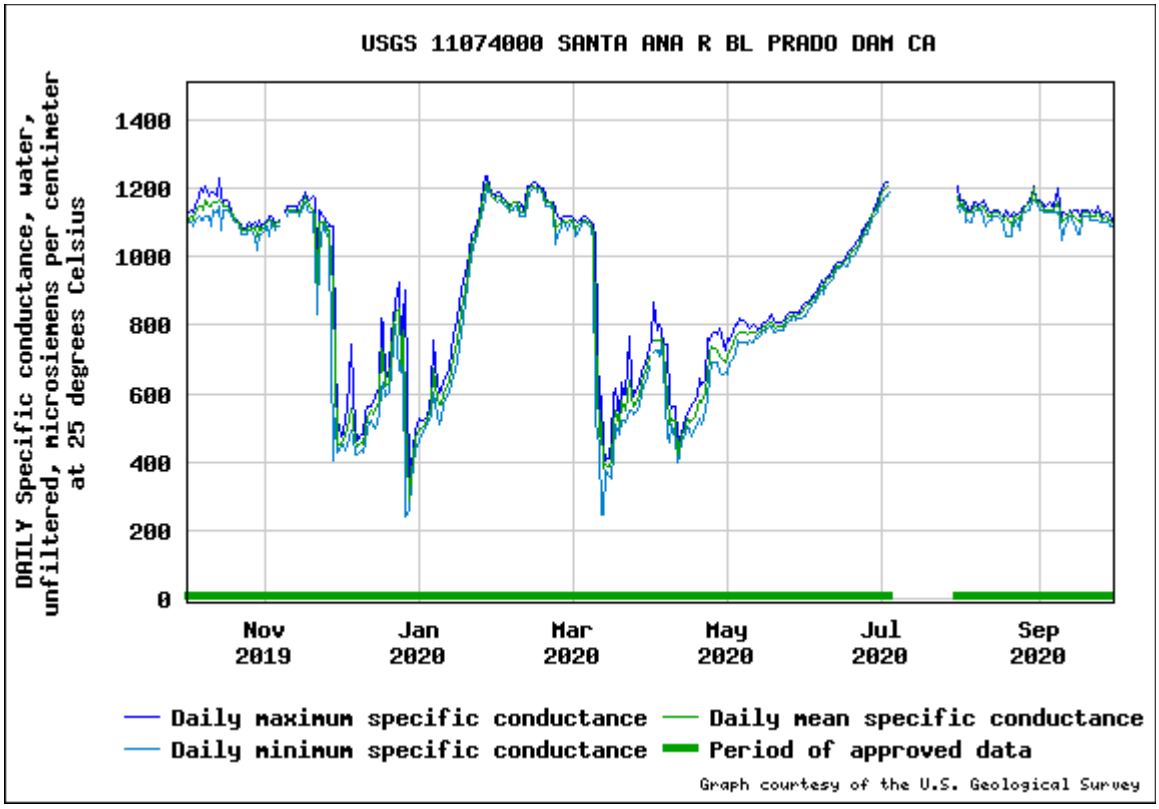
INSTRUMENTATION - Water-quality monitor recording specific conductance and water temperature since October 1969. On October 26th 2016 (QM 3915) Continuous water quality equipment setup (YSI 600R)moved to ~30 ft down stream of the gage house.

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

Suggested citation: U.S. Geological Survey, 2021, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed [March 11, 2021], https://nwis.waterdata.usgs.gov/nwis/wys_rpt?dv_ts_ids=&8184_8185_8186_8187&adr_begin_date=2019-10-01&adr_end_date=2020-09-30&site_no=11074000&agency_cd=USGS

SPECIFIC CONDUCTANCE, WATER, UNFILTERED, MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS
YEAR 2019-10-01 to 2020-09-30
DAILY VALUES

Day	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean
	October			November			December			January			February			March			April			May			June			July			August			September		
1	1,130	1,100	1,110	1,100	1,090	1,100	479	453	464	521	481	497	1,190	1,170	1,180	1,110	1,100	1,110	751	---	---	760	656	708	870	826	853	1,200	1,160	1,190	1,170	1,130	1,150	1,170	1,140	1,160
2	1,140	1,100	1,120	1,120	1,060	1,110	529	432	473	518	486	502	1,180	1,160	1,170	1,110	1,060	1,080	868	723	756	755	693	723	867	851	860	1,220	1,180	1,200	1,170	1,160	1,160	1,160	1,140	1,150
3	1,130	1,090	1,110	1,120	1,100	1,110	549	443	500	534	509	521	1,170	1,150	1,160	1,100	1,070	1,090	784	729	753	788	702	748	885	857	874	1,220	1,180	1,210	1,160	1,100	1,130	1,150	1,130	1,140
4	1,150	1,110	1,130	1,100	1,080	1,090	744	492	556	559	523	542	1,160	1,150	1,160	1,110	1,090	1,100	804	711	754	801	712	763	888	867	879	---	1,190	---	1,140	1,110	1,130	1,150	1,130	1,140
5	1,180	1,120	1,150	1,100	1,090	1,100	601	476	521	601	534	560	1,150	1,130	1,140	1,120	1,100	1,110	782	743	760	800	754	774	898	869	882	---	---	---	1,140	1,100	1,130	1,160	1,130	1,140
6	1,200	1,110	1,150	1,110	1,090	1,100	495	423	458	757	601	676	1,160	1,140	1,160	1,120	1,100	1,110	746	681	724	821	748	780	916	891	900	---	---	---	1,160	1,130	1,150	1,150	1,130	1,140
7	1,190	1,110	1,140	---	---	---	461	418	445	624	537	579	1,160	1,150	1,160	1,110	1,090	1,100	742	471	594	812	749	781	932	902	917	---	---	---	1,160	1,140	1,150	1,150	1,130	1,140
8	1,210	1,120	1,170	1,130	---	---	479	433	457	605	509	566	1,160	1,150	1,160	1,100	1,090	1,090	573	454	510	808	751	780	923	894	911	---	---	---	1,150	1,140	1,140	1,200	1,130	1,160
9	1,180	1,120	1,150	1,150	1,120	1,140	478	424	450	607	522	568	1,160	1,120	1,140	1,090	1,040	1,070	558	510	529	799	747	776	938	916	932	---	---	---	1,160	1,140	1,150	1,150	1,110	1,130
10	1,190	1,090	1,150	1,150	1,130	1,140	543	453	490	633	574	597	1,140	1,120	1,130	1,060	513	790	564	468	518	794	758	778	946	928	939	---	---	---	1,170	1,100	1,150	1,120	1,050	1,100
11	1,190	1,140	1,160	1,150	1,130	1,140	560	496	528	653	593	620	1,160	1,120	1,140	513	449	476	468	397	423	800	752	777	954	932	944	---	---	---	1,150	1,090	1,130	1,130	1,080	1,110
12	1,180	1,130	1,160	1,150	1,130	1,140	562	519	548	673	611	639	1,210	1,160	1,190	593	247	516	464	417	436	795	767	778	965	939	951	---	---	---	1,140	1,100	1,120	1,120	1,110	1,120
13	1,230	1,150	1,170	1,140	1,130	1,130	573	505	537	719	624	668	1,210	1,190	1,200	439	244	379	486	459	472	786	764	775	979	965	972	---	---	---	1,130	1,110	1,120	1,140	1,120	1,130
14	1,180	1,080	1,160	1,160	1,120	1,130	589	497	551	774	648	705	1,220	1,200	1,210	406	375	394	524	481	503	799	771	786	986	967	975	---	---	---	1,140	1,120	1,130	1,130	1,110	1,120
15	1,160	1,140	1,150	1,170	1,150	1,160	618	537	581	813	694	757	1,220	1,200	1,200	408	354	387	543	502	526	810	787	797	987	973	978	---	---	---	1,140	1,120	1,130	1,140	1,100	1,120
16	1,170	1,140	1,150	1,190	1,160	1,180	819	608	732	864	737	789	1,210	1,190	1,200	465	350	403	548	490	517	807	777	794	993	981	986	---	---	---	1,140	1,120	1,130	1,140	1,070	1,110
17	1,160	1,130	1,140	1,170	1,140	1,160	797	634	706	901	778	844	1,210	1,200	1,200	594	422	506	565	471	518	816	791	804	1,010	976	996	---	---	---	1,120	1,110	1,120	1,120	1,070	1,100
18	1,130	1,120	1,130	1,170	1,130	1,150	641	591	619	950	866	905	1,200	1,180	1,190	617	509	551	579	496	531	831	795	808	1,020	992	1,000	---	---	---	1,120	1,090	1,110	1,140	1,110	1,120
19	1,120	1,110	1,120	1,180	1,130	1,140	674	603	634	972	919	940	1,180	1,150	1,160	528	477	505	593	510	557	813	782	796	1,020	1,000	1,020	---	---	---	1,140	1,060	1,120	1,140	1,120	1,130
20	1,110	1,100	1,100	1,170	1,010	1,120	771	668	721	1,010	958	984	1,160	1,150	1,160	633	523	581	645	526	581	810	779	794	1,030	1,000	1,020	---	---	---	1,120	1,060	1,100	1,140	1,120	1,130
21	1,100	1,090	1,100	1,010	834	921	810	747	780	1,070	1,010	1,040	1,160	1,150	1,160	598	522	559	627	508	575	811	785	798	1,050	1,020	1,030	---	---	---	1,120	1,060	1,090	1,130	1,110	1,120
22	1,090	1,070	1,080	1,140	1,000	1,100	868	800	837	1,080	1,050	1,070	1,160	1,130	1,140	599	517	548	637	549	603	808	784	797	1,050	1,030	1,040	---	---	---	1,130	1,110	1,120	1,140	1,110	1,120
23	1,080	1,070	1,080	1,120	1,100	1,100	925	665	850	1,100	1,070	1,080	1,140	1,040	1,080	765	552	639	764	588	649	812	785	798	1,080	1,050	1,060	---	---	---	1,120	1,110	1,120	1,130	1,110	1,120
24	1,090	1,070	1,080	1,110	1,080	1,100	730	662	684	1,120	1,100	1,110	1,120	1,060	1,090	624	552	589	756	652	717	821	800	810	1,080	1,060	1,070	---	---	---	1,130	1,080	1,110	1,150	1,110	1,130
25	1,100	1,080	1,090	1,100	1,060	1,080	826	730	784	1,170	1,120	1,150	1,110	1,090	1,100	589	536	563	776	691	736	833	808	819	1,100	1,070	1,090	---	---	---	1,140	1,130	1,130	1,130	1,100	1,120
26	1,090	1,080	1,080	1,090	1,060	1,080	902	236	547	1,240	1,170	1,210	1,120	1,100	1,110	614	550	579	777	690	733	836	815	828	1,110	1,090	1,100	---	---	---	1,150	1,130	1,140	1,120	1,100	1,110
27	1,100	1,060	1,090	1,090	401	905	343	255	288	1,240	1,210	1,220	1,120	1,090	1,100	629	568	595	774	689	720	838	827	834	1,120	1,110	1,120	---	---	---	1,150	1,130	1,150	1,130	1,100	1,120
28	1,090	1,020	1,060	734	525	669	384	342	367	1,210	1,190	1,200	1,120	1,080	1,100	665	600	629	790	660	710	836	817	826	1,140	1,120	1,130	---	---	---	1,170	1,140	1,160	1,130	1,100	1,110
29	1,110	1,070	1,090	525	428	450	431	383	409	1,190	1,180	1,180	1,120	1,100	1,110	675	629	650	745	657	695	840	820	830	1,170	1,130	1,150	---	---	---	1,180	1,160	1,170	1,120	1,090	1,110
30	1,090	1,070	1,080	475	444	453	494	430	466	1,180	1,170	1,170				706	647	676	727	659	691	855	823	838	1,180	1,160	1,170	---	---	---	1,210	1,170	1,200	1,110	1,090	1,100
31	1,100	1,080	1,090				528	462	498	1,190	1,160	1,180				741	681	709				860	826	846				1,210	1,150	1,180	1,170	1,160	1,160			
Max	1230	1150	1170				925	800	850	1240	1210	1220	1220	1200	1210	1120	1100	1110	868			860	827	846	1180	1160	1170				1210	1170	1200	1200	1140	1160
Min	1080	1020	1060				343	236	288	518	481	497	1110	1040	1080	406	244	379	464			755	656	708	867	826	853				1120	1060	1090	1110	1050	1100


USGS 11074000 SANTA ANA R BL PRADO DAM CA
DAILY Specific conductance, water, unfiltered, microsiemens per centimeter at 25 degrees Celsius
1400
1200
1000
800
600
400
200
0
Nov 2019
Jan 2020
Mar 2020
May 2020
Jul 2020
Sep 2020
Daily maximum specific conductance
Daily mean specific conductance
Daily minimum specific conductance
Period of approved data
Graph courtesy of the U.S. Geological Survey

USGS Water-Year Summary 2020

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

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

DRAINAGE AREA - 852 mi².

REVISIONS HISTORY - WDR CA-83-1: Drainage area.

SURFACE-WATER RECORDS

PERIOD OF RECORD - March 1970 to current year.

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

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

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

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

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

Suggested citation: U.S. Geological Survey, 2021, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed [March 8, 2021], https://nwis.waterdata.usgs.gov/nwis/wys_rpt?dv_ts_ids=&8098&adr_begin_date=2019-10-01&adr_end_date=2020-09-30&site_no=11066460&agency_cd=USGS

DISCHARGE, CUBIC FEET PER SECOND
YEAR 2019-10-01 to 2020-09-30
DAILY MEAN VALUES

Day	Oct 2019	Nov 2019	Dec 2019	Jan 2020	Feb 2020	Mar 2020	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020
1	33.5	32.6	61.0	104	55.7	66.9	83.5	60.6	39.1	35.1	27.3	35.0
2	34.1	33.1	46.3	90.4	54.6	74.0	81.4	58.2	36.6	34.7	24.1	34.7
3	33.4	33.7	45.1	79.7	52.7	58.9	80.3	57.4	37.4	32.1	24.2	33.5
4	32.1	32.3	575	69.1	53.4	60.8	81.6	57.3	35.0	31.8	27.1	33.2
5	31.1	31.7	236	60.4	53.4	58.2	80.2	53.9	37.4	32.1	27.7	31.8
6	30.7	38.0	118	53.0	52.0	57.0	798	50.6	39.2	27.9	28.8	30.5
7	28.6	30.1	104	52.1	54.4	56.6	943	50.5	38.5	28.1	28.7	29.2
8	29.3	28.7	148	53.0	53.7	56.9	662	49.5	38.0	28.6	27.1	32.5
9	30.1	28.6	98.0	60.5	57.1	59.0	652	53.3	36.4	28.7	26.8	31.5
10	29.8	29.0	80.0	48.5	55.5	298	795	49.0	37.4	28.7	31.7	33.9
11	28.7	30.6	72.0	47.5	56.5	103	285	46.1	37.0	28.3	28.9	34.6
12	28.5	31.2	58.4	47.7	53.3	1,370	146	47.2	35.7	27.0	32.2	36.1
13	28.7	26.6	53.9	47.1	55.1	634	115	47.6	35.2	25.1	29.3	36.9
14	28.7	35.2	53.6	51.2	52.7	245	90.8	48.1	38.4	25.9	25.7	35.9
15	26.8	38.0	55.1	50.8	50.8	103	82.2	48.2	34.9	24.4	25.2	37.3
16	27.5	37.3	53.3	51.2	50.6	86.8	76.9	46.7	38.3	24.9	25.9	36.9
17	29.0	36.3	54.0	61.7	49.6	152	72.3	45.1	39.8	25.3	25.0	34.4
18	29.5	37.3	54.1	56.8	48.2	91.7	70.3	43.0	37.6	29.5	27.2	35.4
19	29.3	36.9	53.1	55.7	47.9	148	69.0	43.5	41.5	29.8	28.4	33.6
20	29.3	53.6	51.8	55.4	47.9	154	68.3	43.8	38.9	30.4	28.3	34.0
21	28.4	52.9	52.7	55.7	49.1	104	63.4	39.8	42.0	30.8	30.2	32.1
22	29.1	47.9	53.0	55.2	58.2	101	59.2	40.4	36.3	28.7	29.5	33.3
23	28.0	44.4	150	53.4	63.2	519	54.2	39.4	39.2	29.9	29.2	32.7
24	27.7	43.3	136	56.3	55.9	178	54.3	39.7	40.2	30.7	27.6	33.6
25	33.4	43.5	92.0	56.5	53.9	132	57.8	39.8	36.0	27.9	32.4	33.9
26	31.0	43.1	968	57.6	51.4	125	53.7	40.1	38.3	27.4	32.4	35.0
27	32.6	73.9	422	56.8	49.9	120	56.1	39.3	34.6	28.1	32.1	35.0
28	32.2	963	242	54.9	49.8	115	55.3	36.0	34.8	25.4	31.7	33.6
29	33.7	590	190	58.1	52.5	111	59.6	37.3	35.2	26.2	35.0	32.7
30	31.5	130	157	57.9		96.3	57.3	36.7	34.9	26.9	35.3	32.0
31	31.6		133	56.3		84.6		40.4		24.2	35.4	
Total	938	2,713	4,666	1,815	1,539	5,620	5,904	1,429	1,124	885	900	1,015
Mean	30.3	90.4	151	58.5	53.1	181	197	46.1	37.5	28.5	29.0	33.8
Max	34.1	963	968	104	63.2	1370	943	60.6	42.0	35.1	35.4	37.3
Min	26.8	26.6	45.1	47.1	47.9	56.6	53.7	36.0	34.6	24.2	24.1	29.2
Ac-ft	1,860	5,381	9,256	3,599	3,053	11,150	11,710	2,833	2,229	1,755	1,786	2,013

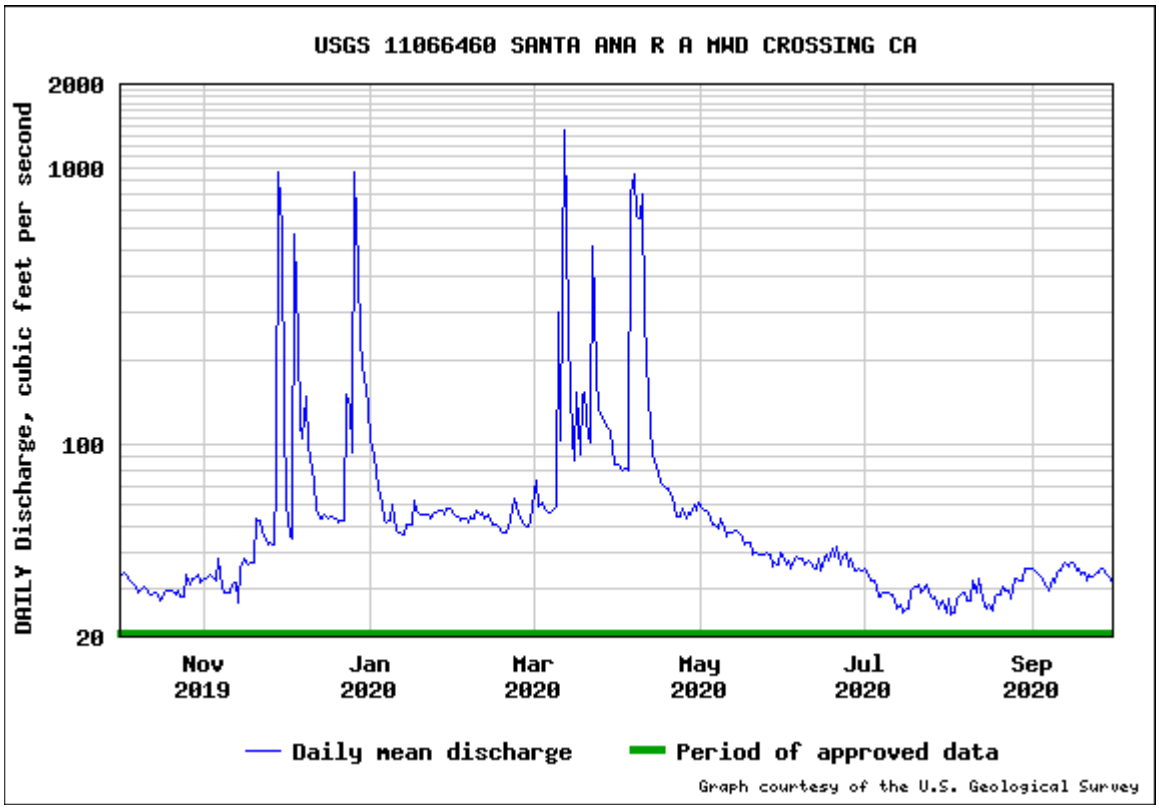
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2000 - 2020, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	84.6	84.3	209	282	212	136	126	83.4	63.1	55.7	59.4	57.4
Max	498	141	1,729	2,350	756	498	501	314	192	137	201	97.6
(WY)	(2005)	(2003)	(2011)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)	(2015)
Min	30.1	36.4	37.7	36.9	46.7	32.1	38.1	38.4	30.5	25.7	27.3	29.7
(WY)	(2018)	(2018)	(2018)	(2014)	(2018)	(2015)	(2015)	(2018)	(2017)	(2016)	(2016)	(2016)

SUMMARY STATISTICS

	Water Year 2020		Water Years 2000 - 2020	
Annual total	28,550			
Annual mean	78.0		120.7	
Highest annual mean			491.0	2005
Lowest annual mean			48.1	2018
Highest daily mean	1,370	Mar 12	22,000	Jan 11, 2005
Lowest daily mean	24.1	Aug 02	17.1	Dec 21, 2015
Annual 7-day minimum	25.5	Jul 28	23.3	Aug 22, 2013
Maximum peak flow	5,700[a,b]	Mar 12	49,100[a,b]	Dec 21, 2010
Maximum peak stage	10.34	Mar 12	16.83	Dec 21, 2010
Annual runoff (cfsm)	0.092		0.142	
Annual runoff (inches)	1.25		1.92	
10 percent exceeds	112.2		120.0	
50 percent exceeds	42.5		67.4	
90 percent exceeds	28.4		34.1	

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



SAR@MWDXing Water Quality				
	EC (um/cm)	TDS (mg/L)		TDS/EC Ratio
Date			**Source**	
10/7/2019	1020	620	USGS	0.61
10/22/2019	1040	629	USGS	0.60
11/7/2019	1020	627	USGS	0.61
11/19/2019	1020	633	USGS	0.62
12/9/2019	837	502	USGS	0.60
12/16/2019	980	610	USGS	0.62
1/6/2020	1000	627	USGS	0.63
1/23/2020	975	606	USGS	0.62
2/3/2020	990	615	USGS	0.62
2/19/2020	980	596	USGS	0.61
3/4/2020	949	606	USGS	0.64
3/17/2020	284	266	USGS	0.94
4/7/2020	270	173	USGS	0.64
4/21/2020	973	609	USGS	0.63
5/7/2020	905	635	USGS	0.70
5/20/2020	905	643	USGS	0.71
6/24/2020	1000	628	USGS	0.63
7/7/2020	997	625	USGS	0.63
7/20/2020	1010	631	USGS	0.62
8/7/2020	1010	628	USGS	0.62
8/24/2020	1020	618	USGS	0.61
9/9/2020	1020	636	USGS	0.62
9/21/2020	1020	652	USGS	0.64
Average	923	583		0.64

USGS Water-Year Summary 2020

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

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

DRAINAGE AREA - 541 mi².

SURFACE-WATER RECORDS

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

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

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

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

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

Suggested citation: U.S. Geological Survey, 2021, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed [March 8, 2021], https://nwis.waterdata.usgs.gov/nwis/wys_rpt?dv_ts_ids=&8056&adr_begin_date=2019-10-01&adr_end_date=2020-09-30&site_no=11059300&agency_cd=USGS

DISCHARGE, CUBIC FEET PER SECOND
YEAR 2019-10-01 to 2020-09-30
DAILY MEAN VALUES
[e, Value has been estimated.]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	2019	2019	2019	2020	2020	2020	2020	2020	2020	2020	2020	2020
1	e1.05	e0.00	6.92	2.19	e1.88	17.8	e3.02	e2.39	e0.91	0.00	0.00	0.00
2	0.12	e0.00	5.52	1.04	e1.89	6.29	e1.67	e1.85	0.00	0.00	0.00	0.00
3	0.00	e0.00	3.34	1.00	e2.15	0.15	e1.89	e3.97	0.00	0.00	0.00	0.00
4	0.00	e0.00	389	0.65	e0.39	0.25	e1.29	e2.58	0.00	0.00	0.00	0.00
5	0.00	e0.00	59.5	1.48	1.45	0.08	e3.05	0.84	0.00	0.00	0.00	0.00
6	0.00	e0.00	e37.6	1.02	0.34	e1.23	928	0.11	e1.68	0.00	0.00	0.00
7	0.00	e0.00	e52.0	1.75	0.30	e2.81	674	0.35	e5.58	0.00	0.00	0.00
8	0.00	e0.00	67.9	1.46	0.07	e7.39	613	0.00	1.56	0.00	0.00	0.00
9	e0.00	e0.00	e31.6	1.32	1.78	e13.1	405	0.00	0.05	0.00	0.00	0.00
10	e0.00	e0.00	e11.0	1.26	0.43	e154	644	0.08	0.00	0.00	0.00	0.00
11	e0.00	e0.00	e5.02	0.39	e0.56	26.2	95.7	0.00	0.00	0.00	0.00	2.32
12	e0.00	e0.00	3.07	1.39	e2.16	1,200	e58.6	0.00	e1.18	0.00	0.00	5.78
13	e0.00	e0.00	e3.18	1.70	e2.13	e221	e61.4	0.48	0.27	0.00	0.00	3.32
14	e0.00	e0.00	e2.54	1.24	e2.40	e125	e20.1	0.00	0.00	0.00	0.00	4.50
15	e0.00	e0.00	e1.40	e3.03	e0.78	52.2	2.56	0.03	0.00	0.00	0.00	0.06
16	e0.00	e0.00	e5.11	e4.82	0.25	45.6	1.33	e3.46	0.00	0.00	0.00	0.00
17	e0.00	e0.00	e4.06	e2.63	0.88	86.6	2.70	0.00	0.00	0.00	0.00	0.01
18	e0.00	e0.00	1.46	1.80	1.05	15.2	e24.0	0.00	0.00	0.00	0.00	0.00
19	e0.00	e0.00	2.56	e2.66	e0.13	52.3	e24.7	e0.04	0.00	0.00	0.00	0.00
20	e0.00	e28.9	1.57	e0.66	e0.67	25.3	e23.2	e0.16	0.00	0.00	0.00	1.26
21	e0.00	e9.59	1.15	e6.14	e1.20	5.77	e12.6	e0.03	0.00	0.00	0.00	0.80
22	e0.00	e12.6	2.01	e4.73	e15.5	8.60	4.15	e0.13	0.00	0.00	0.00	0.00
23	e0.00	e15.0	35.2	e3.40	13.0	314	2.07	0.00	0.00	0.00	0.00	0.00
24	e0.00	e15.0	e54.1	e2.61	e2.99	32.3	0.49	0.00	0.00	0.00	0.00	0.00
25	e0.00	e14.6	e31.5	e1.97	e1.49	3.85	0.52	0.00	0.00	0.00	0.00	0.00
26	e0.00	e12.1	472	e1.98	e0.36	7.42	0.09	0.00	0.00	0.00	0.00	0.00
27	e0.00	e28.8	e48.4	e1.42	e0.39	6.97	0.15	0.00	0.00	0.00	0.00	0.00
28	e0.00	956	e17.7	e2.69	e0.50	1.50	0.00	0.00	0.00	0.00	0.00	0.00
29	e0.00	e240	e13.3	e1.87	e0.66	2.64	0.00	0.00	0.00	0.00	0.00	0.00
30	e0.00	e21.5	6.97	e1.86		e4.35	e0.42	0.00	0.00	0.00	0.00	0.00
31	e0.00		3.81	e1.87		e4.28		0.00		0.00	0.00	
Total	1.17	1,354	1,380	64.0	57.8	2,444	3,610	16.5	11.2	.000	.000	18.1
Mean	.038	45.1	44.5	2.07	1.99	78.8	120	.53	.37	.000	.000	.60
Max	1.05	956	472	6.14	15.5	1200	928	3.97	5.58	0.00	0.00	5.78
Min	0.00	0.00	1.15	0.39	0.07	0.08	0.00	0.00	0.00	0.00	0.00	0.00
Ac-ft	2.32	2,686	2,738	127	115	4,848	7,160	32.7	22.3	.000	.000	35.8

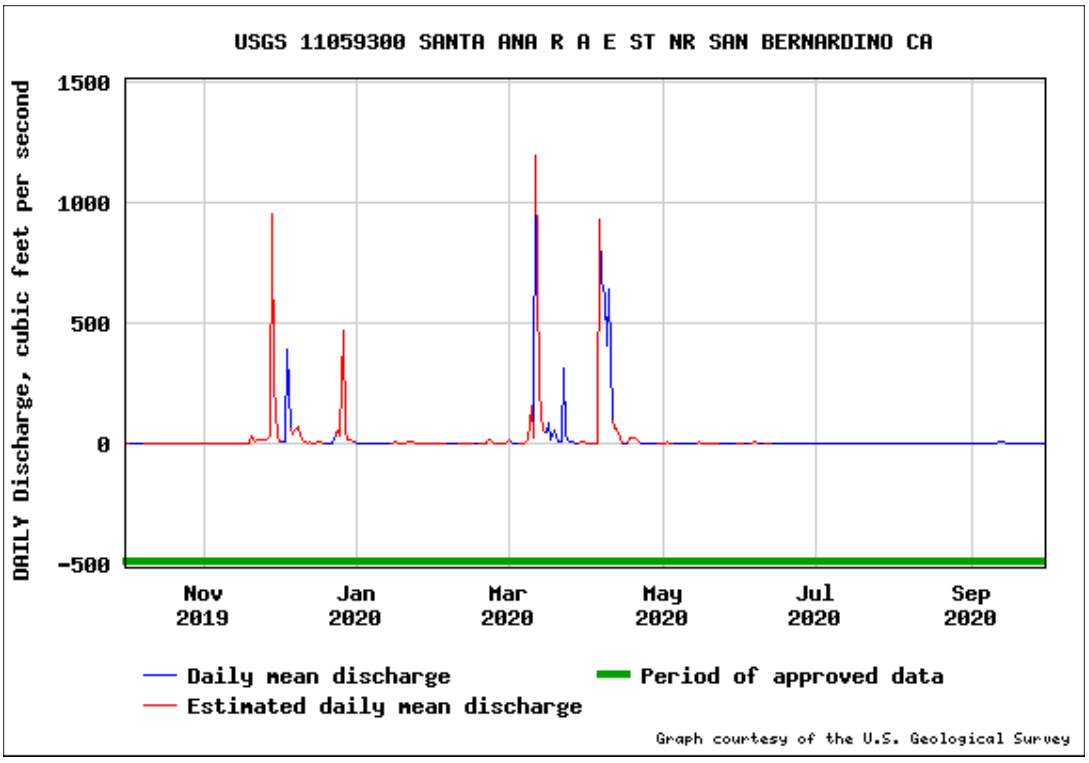
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2000 - 2020, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	13.5	14.5	70.7	106	74.5	53.7	50.1	25.3	6.51	4.93	6.43	3.74
Max	200	47.1	764	1,185	376	398	351	247	112	52.9	102	40.6
(WY)	(2005)	(2014)	(2011)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)	(2005)
Min	.000	.67	.98	.000	.82	4.11	.041	.000	.000	.000	.000	.000
(WY)	(2003)	(2001)	(2018)	(2003)	(2002)	(2008)	(2002)	(2002)	(2002)	(2002)	(2002)	(2002)

SUMMARY STATISTICS

	Water Year 2020		Water Years 2000 - 2020	
Annual total	8,957			
Annual mean	24.5		35.7	
Highest annual mean			264.8	2005
Lowest annual mean			1.70	2002
Highest daily mean	1,200	Mar 12	12,500	Jan 11, 2005
Lowest daily mean	0.0	Oct 03	0.0	May 14, 2000
Annual 7-day minimum	0.0	Oct 03	0.0	Sep 11, 2000
Maximum peak flow	6,210[a,b]	Mar 12	35,700[a,b]	Jan 11, 2005
Maximum peak stage	5.99	Mar 12	9.04	Jan 11, 2005
Annual runoff (cfsm)	0.045		0.066	
Annual runoff (inches)	0.616		0.896	
10 percent exceeds	24.2		39.0	
50 percent exceeds	0.100		0.900	
90 percent exceeds	0.0		0.0	

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



USGS Water-Year Summary 2020

11072100 Temescal Creek above Main Street, at Corona, CA

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

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

REVISIONS HISTORY -

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

Period October 4, 2018 to October 1, 2019 was accidentally approved in Aquarius Time-Series with no Analysis record.

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

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

EXTREMES FOR PERIOD OF RECORD - Maximum discharge, 6,140 ft³/s, Feb. 14, 2019, gage height, 7.22 ft, from rating curve on basis of step-backwater 2018 analysis; minimum daily, 0.34 ft³/s, July 3, 1992.

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

Suggested citation: U.S. Geological Survey, 2021, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed [March 8, 2021], https://nwis.waterdata.usgs.gov/nwis/wys_rpt?dv_ts_ids=&8161&adr_begin_date=2019-10-01&adr_end_date=2020-09-30&site_no=11072100&agency_cd=USGS

DISCHARGE, CUBIC FEET PER SECOND
YEAR 2019-10-01 to 2020-09-30
DAILY MEAN VALUES

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	2019	2019	2019	2020	2020	2020	2020	2020	2020	2020	2020	2020
1	3.06	1.43	2.88	2.83	14.1	1.93	56.0	64.7	5.22	3.45	2.82	1.22
2	2.88	1.88	3.01	2.85	11.3	2.49	51.5	56.6	3.53	5.03	2.90	1.55
3	1.76	1.97	2.30	2.76	8.70	1.13	52.2	44.9	2.87	3.25	4.92	1.29
4	2.70	2.81	262	2.61	6.62	1.09	50.6	38.9	2.83	1.91	4.06	1.34
5	2.60	3.06	4.21	2.70	6.42	1.01	46.2	31.7	2.14	1.64	2.43	1.49
6	2.78	3.63	13.0	2.82	7.04	1.22	266	31.2	2.22	1.95	2.41	1.54
7	3.40	3.00	4.58	3.25	6.69	1.01	244	30.7	2.43	1.69	2.11	2.51
8	3.53	2.93	4.38	3.97	6.37	0.99	140	27.2	2.54	1.62	2.17	1.25
9	5.71	3.65	2.54	3.49	19.3	1.05	303	26.4	2.10	1.71	2.36	2.22
10	6.55	3.56	1.94	4.79	10.9	141	504	26.3	2.50	1.22	1.50	1.19
11	4.85	4.02	1.77	3.06	6.67	11.0	188	26.7	3.05	1.49	1.41	1.00
12	5.67	3.92	1.82	3.18	4.12	529	141	25.3	1.88	1.57	1.22	1.20
13	6.48	4.50	1.85	3.21	2.99	89.4	118	27.3	1.64	0.93	2.20	1.05
14	7.50	4.22	2.55	3.41	2.75	60.6	102	27.2	1.18	0.95	1.96	1.51
15	6.94	3.98	3.21	3.70	4.09	59.3	91.1	26.3	1.47	0.72	1.66	1.98
16	9.10	5.02	1.85	3.27	15.0	90.6	87.1	26.7	2.62	0.90	1.01	1.88
17	9.04	5.86	1.90	8.41	20.4	93.1	86.4	25.0	2.65	0.98	1.21	1.99
18	7.03	5.89	1.75	3.73	21.8	62.7	84.0	24.3	3.08	0.83	2.72	2.07
19	5.41	6.55	1.90	3.57	22.3	116	80.0	24.6	3.17	0.85	1.89	1.27
20	4.62	18.2	2.17	3.83	22.4	68.0	76.7	24.2	3.22	1.01	1.54	0.94
21	5.18	3.73	1.97	19.6	21.9	62.1	71.3	22.4	3.03	1.21	2.04	1.51
22	4.89	3.26	1.99	32.9	18.0	127	72.3	17.1	3.87	1.33	1.77	2.37
23	4.20	2.39	137	35.9	12.7	257	73.5	15.8	3.33	1.52	1.08	2.63
24	3.37	2.22	4.26	35.3	8.70	74.7	69.9	15.2	2.89	1.23	1.65	2.59
25	3.27	2.32	12.2	34.9	5.68	69.9	68.7	14.1	2.49	1.40	1.45	2.03
26	2.44	1.84	475	33.0	3.90	66.2	65.8	13.2	2.33	1.93	2.44	2.51
27	1.70	34.3	6.29	33.0	3.05	65.2	65.4	11.0	3.02	1.45	2.37	2.24
28	1.58	548	3.97	34.0	1.62	65.0	72.1	9.65	2.94	1.55	1.08	2.12
29	1.30	56.2	3.15	35.1	1.18	64.7	74.1	9.42	2.31	2.90	1.26	2.15
30	1.59	8.36	3.14	31.9		60.9	69.0	8.48	2.34	3.17	1.13	1.78
31	1.24		3.00	22.9		58.9		5.09		2.52	1.09	
Total	132	753	974	420	297	2,304	3,469	778	80.9	53.9	61.9	52.4
Mean	4.27	25.1	31.4	13.5	10.2	74.3	116	25.1	2.70	1.74	2.00	1.75
Max	9.10	548	475	35.9	22.4	529	504	64.7	5.22	5.03	4.92	2.63
Min	1.24	1.43	1.75	2.61	1.18	0.99	46.2	5.09	1.18	0.72	1.01	0.94
Ac-ft	263	1,492	1,931	833	588	4,570	6,882	1,542	160	107	123	104

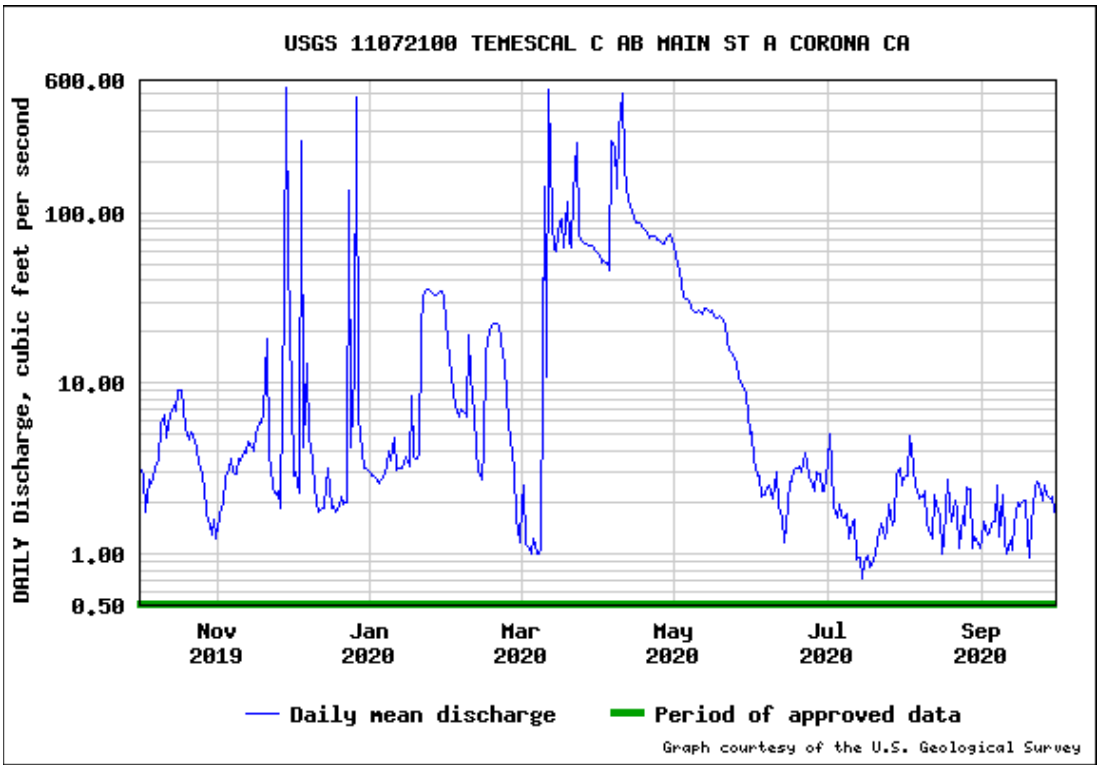
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1991 - 2020, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	11.6	14.9	25.9	49.3	76.4	51.5	32.2	16.5	9.38	8.49	7.89	8.60
Max	52.6	58.3	222	335	400	349	190	100	34.3	24.9	20.7	30.4
(WY)	(2005)	(2006)	(2011)	(2005)	(2005)	(1995)	(1995)	(1995)	(1995)	(1993)	(2005)	(2005)
Min	1.95	1.76	1.59	2.51	3.24	1.75	1.15	.79	1.38	1.70	1.58	1.25
(WY)	(2015)	(2016)	(2018)	(2014)	(2016)	(2015)	(2018)	(2016)	(2016)	(2016)	(2015)	(2018)

SUMMARY STATISTICS

	Water Year 2020		Water Years 1991 - 2020	
Annual total	9,376			
Annual mean	25.6		25.7	
Highest annual mean			104.4	2005
Lowest annual mean			4.09	2018
Highest daily mean	548.0	Nov 28	2,870	Dec 22, 2010
Lowest daily mean	0.720	Jul 15	0.340	Jul 03, 1992
Annual 7-day minimum	0.880	Jul 13	0.513	May 08, 2013
Maximum peak flow	3,630[a,b]	Mar 12	6,140[a,b]	Feb 14, 2019
Maximum peak stage	6.21	Mar 12	7.27	Dec 22, 2010
Annual runoff (cfsm)	0.114		0.115	
Annual runoff (inches)	1.56		1.56	
10 percent exceeds	68.8		53.1	
50 percent exceeds	3.27		9.50	
90 percent exceeds	1.27		1.66	

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



USGS Water-Year Summary 2020

11071900 Temescal Creek at Corona Lake, near Corona, CA

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

DRAINAGE AREA - 57.9 mi^2.

SURFACE-WATER RECORDS

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

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

REMARKS - Gage established for the purpose of monitoring discharges from concrete weir on spill way of Corona Lake flowing into Temescal Creek.

EXTREMES FOR PERIOD OF RECORD - Maximum discharge, 1090 ft^3/s, Feb. 19, 2019, gage height, 39.93 ft; minimum discharge, 0.00 ft^3/s, on many days, gage height, <17.34 ft., many days in 2015, while stage was below orifice.

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

Suggested citation: U.S. Geological Survey, 2021, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed [March 9, 2021], https://nwis.waterdata.usgs.gov/nwis/wys_rpt?dv_ts_ids=&8159&adr_begin_date=2019-10-01&adr_end_date=2020-09-30&site_no=11071900&agency_cd=USGS

DISCHARGE, CUBIC FEET PER SECOND
YEAR 2019-10-01 to 2020-09-30
DAILY MEAN VALUES

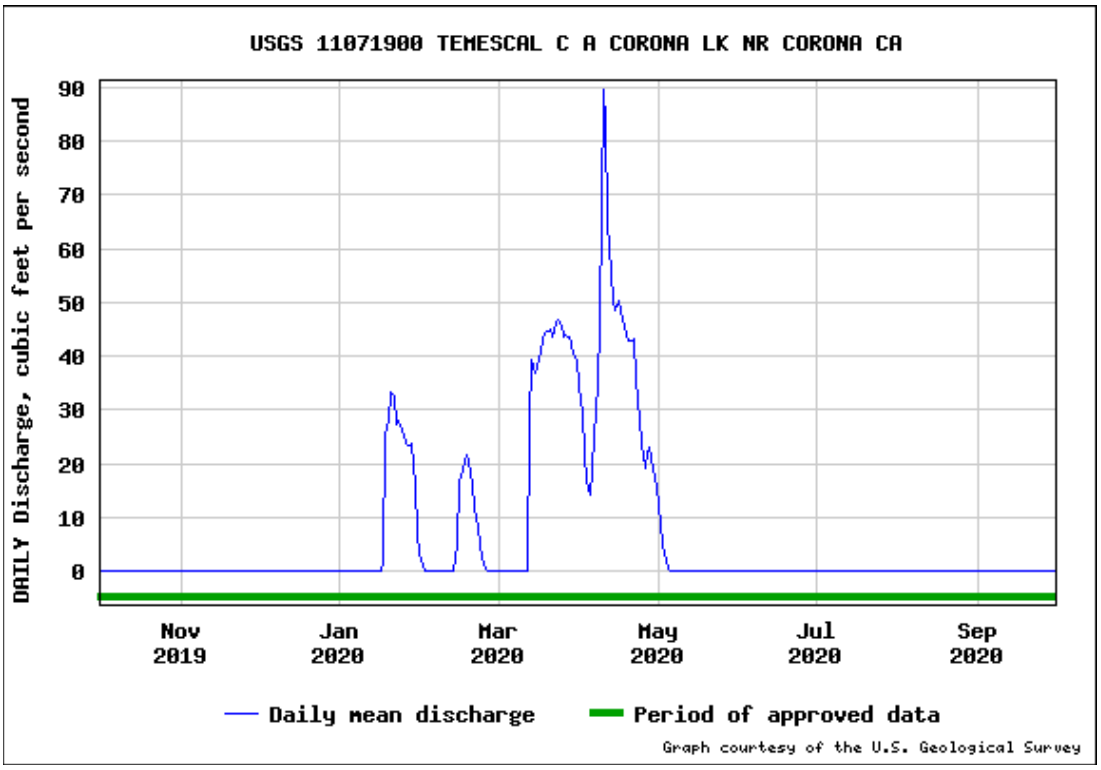
Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	2019	2019	2019	2020	2020	2020	2020	2020	2020	2020	2020	2020
1	0.00	0.00	0.00	0.00	1.19	0.00	34.4	15.6	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.02	0.00	29.6	8.91	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	22.0	4.52	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	16.6	2.02	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	14.4	0.38	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	18.9	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	25.3	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	34.9	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	46.2	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	89.6	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.00	83.4	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.02	64.6	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	27.7	55.5	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	5.01	39.4	50.4	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	16.7	36.9	48.4	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00	17.7	38.0	50.3	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	1.84	20.2	41.0	48.1	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	25.2	21.5	42.7	45.5	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	28.1	20.2	44.2	44.0	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	33.2	16.1	44.8	42.9	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	32.5	11.9	44.9	43.0	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	27.3	8.37	43.4	43.3	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.00	28.0	5.19	46.1	35.7	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	26.2	2.52	46.9	27.9	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.00	25.2	0.44	45.8	23.9	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.00	23.6	0.00	43.7	19.3	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	23.3	0.00	44.0	22.0	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	23.7	0.00	43.7	22.9	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	16.0	0.00	42.3	19.1	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	6.65		40.3	17.1	0.00	0.00	0.00	0.00	0.00
31	0.00		0.00	3.19		39.3		0.00		0.00	0.00	
Total	.000	.000	.000	324	147	795	1,139	31.4	.000	.000	.000	.000
Mean	.000	.000	.000	10.5	5.07	25.6	38.0	1.01	.000	.000	.000	.000
Max	0.00	0.00	0.00	33.2	21.5	46.9	89.6	15.6	0.00	0.00	0.00	0.00
Min	0.00	0.00	0.00	0.00	0.00	0.00	14.4	0.00	0.00	0.00	0.00	0.00
Ac-ft	.000	.000	.000	643	292	1,577	2,260	62.3	.000	.000	.000	.000

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2013 - 2020, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	.000	.000	.000	2.50	12.4	8.86	5.79	.13	.000	.000	.000	.000
Max	.000	.000	.000	10.5	56.4	33.0	38.0	1.01	.000	.000	.000	.000
(WY)	(2014)	(2014)	(2013)	(2020)	(2019)	(2019)	(2020)	(2020)	(2013)	(2013)	(2013)	(2013)
Min	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
(WY)	(2014)	(2014)	(2013)	(2014)	(2014)	(2014)	(2013)	(2013)	(2013)	(2013)	(2013)	(2013)

SUMMARY STATISTICS

	Water Year 2020		Water Years 2013 - 2020	
Annual total	2,437			
Annual mean	6.66		2.56	
Highest annual mean			7.82	2019
Lowest annual mean			0.0	2014
Highest daily mean	89.6	Apr 10	449.0	Feb 14, 2019
Lowest daily mean	0.0	Oct 01	-0.010	Feb 02, 2017
Annual 7-day minimum	0.0	Oct 01	-0.001	Jan 30, 2017
Maximum peak flow	126	Apr 10	1,090	Feb 19, 2019
Maximum peak stage	37.78	Apr 10	39.93	Feb 19, 2019
Annual runoff (cfsm)	0.115		0.042	
Annual runoff (inches)	1.57		0.571	
10 percent exceeds	32.7		0.0	
50 percent exceeds	0.0		0.0	
90 percent exceeds	0.0		0.0	



USGS Water-Year Summary 2020

11073360 Chino Creek at Schaefer Avenue, near Chino, CA

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

DRAINAGE AREA - 48.9 mi².

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

SURFACE-WATER RECORDS

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

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

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

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

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

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

Suggested citation: U.S. Geological Survey, 2021, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed [March 8, 2021], https://nwis.waterdata.usgs.gov/nwis/wys_rpt?dv_ts_ids=&8167&adr_begin_date=2019-10-01&adr_end_date=2020-09-30&site_no=11073360&agency_cd=USGS

DISCHARGE, CUBIC FEET PER SECOND
YEAR 2019-10-01 to 2020-09-30
DAILY MEAN VALUES

Day	Oct 2019	Nov 2019	Dec 2019	Jan 2020	Feb 2020	Mar 2020	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020
1	0.25	0.26	0.51	0.36	0.27	0.70	0.39	0.39	0.45	0.46	0.36	0.44
2	0.25	0.25	0.49	0.46	0.28	0.46	0.38	0.35	0.48	0.39	0.65	0.44
3	0.23	0.25	0.37	0.43	0.30	0.10	0.37	0.36	0.41	0.39	0.36	0.41
4	0.32	0.30	272	0.40	0.26	0.11	0.37	0.36	0.53	0.38	0.38	0.44
5	0.28	0.30	1.15	0.33	0.25	0.13	0.39	0.37	0.64	0.33	0.37	0.45
6	0.24	0.32	8.68	0.41	0.33	0.26	275	0.40	0.51	0.32	0.44	0.45
7	0.26	0.31	11.2	0.37	0.29	0.12	71.0	0.41	0.90	0.31	0.34	0.58
8	0.31	0.31	15.3	0.31	0.31	0.14	101	0.38	0.57	0.36	0.85	0.68
9	0.29	0.23	0.88	0.38	0.41	0.18	158	0.32	0.51	0.34	1.07	0.87
10	0.29	0.27	0.52	0.32	0.23	99.5	55.8	0.32	0.36	0.42	0.42	0.81
11	0.35	0.30	0.31	0.33	0.20	0.55	1.60	0.31	0.35	1.92	0.46	0.78
12	0.28	0.25	0.29	0.32	0.24	322	1.39	0.30	0.52	0.82	0.63	0.73
13	0.95	0.37	0.29	0.37	0.24	107	3.40	0.28	0.36	0.43	0.73	0.72
14	0.38	0.32	0.43	0.57	0.23	2.68	0.92	0.35	0.89	0.78	0.35	0.78
15	0.54	0.24	0.27	0.45	0.22	2.84	0.86	0.31	0.46	0.38	0.38	0.55
16	0.28	0.48	0.20	0.52	0.26	30.5	0.76	0.28	0.40	0.37	0.39	0.42
17	0.29	0.94	0.44	9.43	0.24	3.33	0.73	0.28	0.42	0.34	0.39	0.42
18	0.25	0.19	0.40	0.49	0.30	0.36	1.26	20.6	0.39	0.35	0.42	0.50
19	0.26	0.19	0.14	0.42	0.31	163	0.65	0.63	0.45	0.66	0.44	0.41
20	0.26	13.7	0.17	0.37	0.23	4.07	0.65	0.56	0.36	0.32	0.58	0.40
21	0.59	0.61	0.16	0.40	0.24	0.52	0.68	0.52	0.37	0.39	0.57	0.46
22	0.46	0.30	0.19	0.53	0.42	195	0.77	0.50	0.58	0.38	0.49	0.54
23	0.55	0.35	161	0.35	0.28	87.2	0.71	0.46	1.80	0.41	0.54	0.48
24	0.44	0.58	1.02	0.35	0.22	1.04	0.70	0.47	1.37	0.36	0.48	0.58
25	0.41	0.30	25.0	0.40	0.22	0.75	0.74	0.42	0.80	0.38	0.43	0.49
26	0.34	0.26	644	0.48	0.25	0.54	0.72	0.43	1.20	0.39	0.47	0.49
27	0.32	76.6	1.61	0.43	0.23	0.43	0.58	0.43	1.31	0.35	0.55	0.48
28	0.35	470	0.94	0.31	0.21	0.38	0.44	0.44	1.13	0.45	0.47	0.52
29	0.33	10.8	0.67	0.29	0.20	0.36	0.54	0.45	1.24	0.42	0.47	0.54
30	0.45	1.35	0.60	0.30		0.35	0.42	0.45	0.36	0.40	0.49	0.52
31	0.28		0.48	0.27		0.39		0.46		0.37	0.48	
Total	11.1	581	1,150	21.2	7.67	1,025	681	32.6	20.1	14.4	15.5	16.4
Mean	.36	19.4	37.1	.68	.26	33.1	22.7	1.05	.67	.46	.50	.55
Max	0.95	470	644	9.43	0.42	322	275	20.6	1.80	1.92	1.07	0.87
Min	0.23	0.19	0.14	0.27	0.20	0.10	0.37	0.28	0.35	0.31	0.34	0.40
Ac-ft	22.0	1,152	2,280	42.0	15.2	2,033	1,351	64.6	39.9	28.5	30.6	32.5

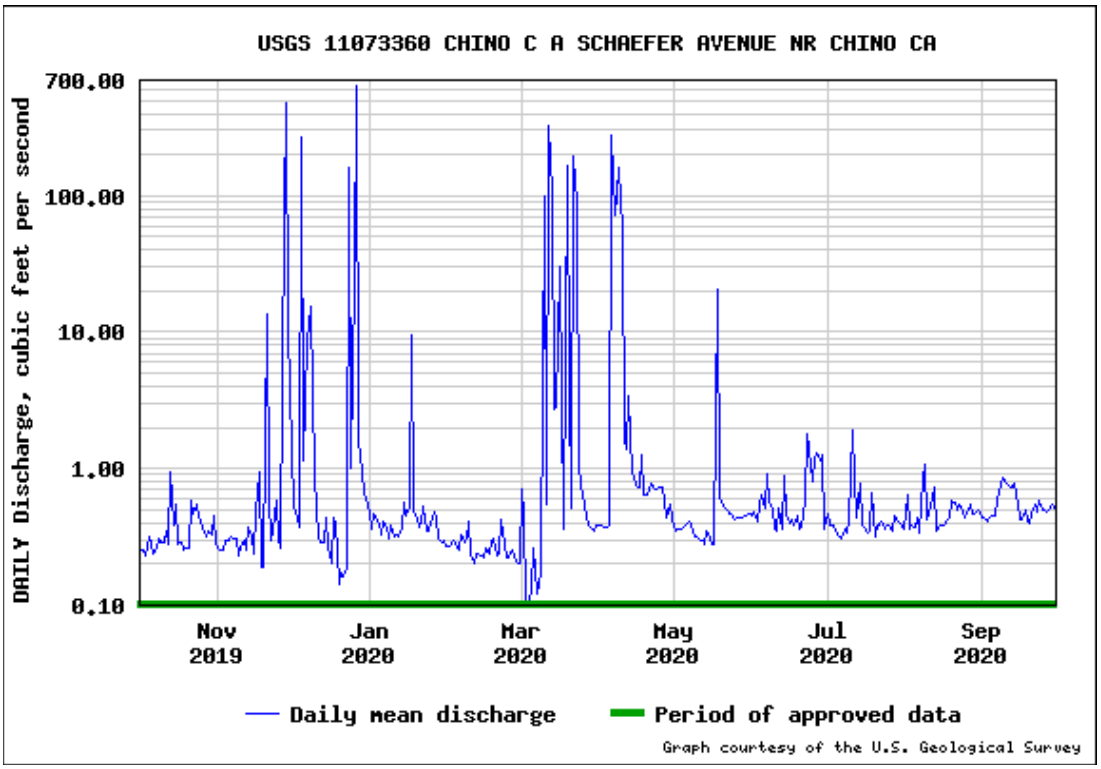
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1970 - 2020, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	13.9	13.8	23.7	31.7	33.8	22.8	8.42	9.88	14.2	16.0	14.1	11.3
Max	126	113	189	221	193	257	68.6	104	184	176	191	198
(WY)	(1979)	(1976)	(1976)	(2005)	(1980)	(1978)	(1974)	(1997)	(1976)	(1974)	(1974)	(1997)
Min	.061	.20	.29	.48	.26	.30	.14	.22	.062	.069	.12	.13
(WY)	(1978)	(2018)	(2018)	(2014)	(2020)	(1972)	(1977)	(1973)	(1977)	(1977)	(2015)	(1977)

SUMMARY STATISTICS

	Water Year 2020		Water Years 1970 - 2020	
Annual total	3,576			
Annual mean	9.77		17.8	
Highest annual mean			92.4	1974
Lowest annual mean			2.09	2018
Highest daily mean	644.0	Dec 26	2,060	Mar 01, 1978
Lowest daily mean	0.100	Mar 03	0.0	May 21, 1977
Annual 7-day minimum	0.149	Mar 03	0.024	Oct 28, 1977
Maximum peak flow	4,200[a,b]	Mar 22	13,100[a,b]	Feb 27, 1983
Maximum peak stage	7.33	Mar 22	10.32	Feb 27, 1983
Annual runoff (cfsm)	0.200		0.363	
Annual runoff (inches)	2.72		4.93	
10 percent exceeds	1.36		54.5	
50 percent exceeds	0.420		1.10	
90 percent exceeds	0.250		0.290	

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



USGS Water-Year Summary 2020

11073495 Cucamonga Creek near Mira Loma, CA

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

DRAINAGE AREA - 75.8 mi².

SURFACE-WATER RECORDS

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

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

REMARKS - 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, 0.00 ft³/s, For several days for this period.

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

Suggested citation: U.S. Geological Survey, 2021, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed [March 8, 2021], https://nwis.waterdata.usgs.gov/nwis/wys_rpt?dv_ts_ids=&8174&adr_begin_date=2019-10-01&adr_end_date=2020-09-30&site_no=11073495&agency_cd=USGS

DISCHARGE, CUBIC FEET PER SECOND
YEAR 2019-10-01 to 2020-09-30
DAILY MEAN VALUES

Day	Oct 2019	Nov 2019	Dec 2019	Jan 2020	Feb 2020	Mar 2020	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020
1	6.27	5.82	4.89	30.0	54.1	36.6	54.4	25.0	29.1	0.92	16.2	2.64
2	15.4	8.94	6.91	27.6	55.4	41.2	54.7	24.4	6.86	1.80	12.4	4.21
3	13.1	11.8	6.28	32.6	57.7	38.0	50.5	29.5	16.7	1.01	22.0	4.24
4	2.62	9.04	281	29.9	61.1	34.3	58.0	44.3	9.40	1.46	9.85	4.64
5	17.0	5.19	65.0	33.7	60.6	22.6	53.5	33.7	12.2	1.12	3.87	5.56
6	11.8	6.12	65.5	31.1	54.5	2.84	611	26.8	12.3	1.14	8.12	7.49
7	10.0	13.0	39.2	26.9	52.8	5.30	363	25.4	24.7	1.23	5.48	9.07
8	4.53	3.42	27.6	15.5	58.7	6.63	178	25.1	15.3	1.13	4.46	8.43
9	0.84	0.93	28.3	23.3	75.2	7.15	263	30.0	13.3	1.96	4.82	13.4
10	0.36	0.00	15.8	20.9	53.4	70.9	269	38.2	13.0	1.93	17.3	21.3
11	0.70	0.00	33.2	21.9	42.3	4.80	28.5	36.1	15.6	2.07	8.82	33.7
12	1.81	0.00	40.5	12.2	21.6	376	18.2	39.0	10.0	1.97	8.16	57.8
13	1.93	0.00	35.6	32.9	16.6	48.5	25.1	35.4	8.15	1.40	11.2	58.7
14	2.63	0.00	38.5	61.3	12.9	7.57	18.4	33.2	12.9	9.58	7.69	49.8
15	2.86	0.00	35.8	55.0	17.8	0.73	41.3	25.9	9.49	5.99	5.95	62.4
16	1.02	0.00	40.7	54.9	17.8	43.4	59.1	21.7	12.9	2.20	9.66	67.3
17	1.70	0.00	40.7	55.1	16.1	44.6	76.4	29.5	20.5	4.51	10.5	42.2
18	1.43	0.02	30.3	46.7	20.4	20.6	79.5	76.9	17.8	6.38	12.7	40.4
19	2.68	0.05	22.5	45.8	19.8	55.7	66.6	76.9	10.5	7.43	14.1	44.3
20	2.39	39.5	19.6	47.0	18.1	48.0	27.8	53.0	13.4	7.02	13.5	46.0
21	3.16	4.45	21.7	47.8	23.1	36.1	15.0	23.3	15.2	3.15	10.1	36.1
22	4.88	0.63	30.5	52.0	34.9	128	16.7	20.4	12.4	1.26	10.4	36.6
23	4.86	0.91	125	49.8	35.9	144	20.9	42.5	21.2	3.25	15.6	31.1
24	1.30	2.23	34.4	56.2	35.9	55.0	23.7	26.8	14.9	4.85	6.04	25.5
25	1.30	1.31	30.1	56.6	33.7	59.0	30.2	22.6	19.6	6.36	5.07	9.91
26	4.77	2.15	692	57.4	29.7	59.9	27.4	21.9	20.2	18.1	5.46	9.37
27	5.61	72.7	54.2	58.0	26.8	62.0	29.7	22.4	18.0	15.4	4.86	10.3
28	4.27	688	58.6	56.7	25.8	51.8	31.7	18.3	24.4	7.75	2.86	14.0
29	4.02	79.6	54.2	57.1	29.9	54.8	28.2	17.8	16.9	14.1	5.79	16.7
30	6.47	12.7	42.7	54.8		60.2	27.0	16.9	8.36	12.1	3.23	7.11
31	7.74		36.3	53.2		59.1		27.0		20.8	2.81	
Total	149	969	2,058	1,303	1,063	1,685	2,646	990	455	169	279	780
Mean	4.82	32.3	66.4	42.1	36.6	54.4	88.2	31.9	15.2	5.46	9.00	26.0
Max	17.0	688	692	61.3	75.2	376	611	76.9	29.1	20.8	22.0	67.3
Min	0.36	0.00	4.89	12.2	12.9	0.73	15.0	16.9	6.86	0.92	2.81	2.64
Ac-ft	296	1,921	4,081	2,586	2,108	3,343	5,249	1,963	903	336	553	1,548

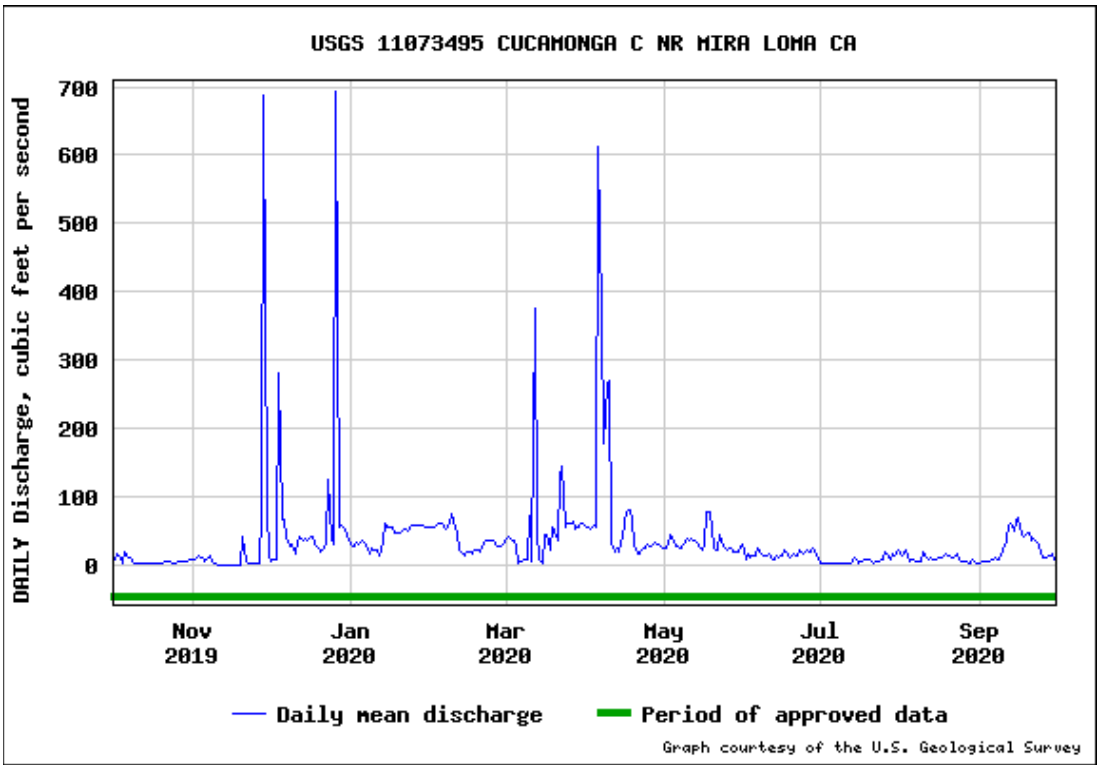
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1986 - 2020, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	39.3	39.8	63.3	87.4	97.8	61.8	42.7	32.8	27.8	26.2	25.5	30.2
Max	223	102	328	442	350	198	114	69.4	57.1	53.4	51.8	52.0
(WY)	(2005)	(2003)	(2011)	(2005)	(2005)	(1995)	(2006)	(2003)	(1992)	(2004)	(1992)	(1986)
Min	4.82	12.5	16.7	15.6	14.5	12.1	6.27	6.60	2.54	1.86	2.67	3.86
(WY)	(2020)	(2013)	(2014)	(2014)	(2016)	(2017)	(2013)	(2014)	(2017)	(2018)	(2015)	(2016)

SUMMARY STATISTICS

	Water Year 2020		Water Years 1986 - 2020	
Annual total	12,550			
Annual mean	34.3		47.6	
Highest annual mean			137.4	2005
Lowest annual mean			15.8	2013
Highest daily mean	692.0	Dec 26	5,200	Jan 09, 2005
Lowest daily mean	0.0	Nov 10	0.0	Jun 21, 2019
Annual 7-day minimum	0.0	Nov 10	0.0	Nov 10, 2019
Maximum peak flow	3,400[a]	Apr 06	17,300[a]	Oct 20, 2004
Maximum peak stage	4.09	Apr 06	6.58	Oct 20, 2004
Annual runoff (cfsm)	0.452		0.629	
Annual runoff (inches)	6.16		8.54	
10 percent exceeds	58.6		60.5	
50 percent exceeds	19.7		33.0	
90 percent exceeds	1.95		8.44	

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



USGS Water-Year Summary 2020

11060400 Warm Creek near San Bernardino, CA

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

DRAINAGE AREA - 11 mi².

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

SURFACE-WATER RECORDS

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

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

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

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

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

Suggested citation: U.S. Geological Survey, 2021, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed [March 8, 2021], https://nwis.waterdata.usgs.gov/nwis/wys_rpt?dv_ts_ids=&8060&adr_begin_date=2019-10-01&adr_end_date=2020-09-30&site_no=11060400&agency_cd=USGS

DISCHARGE, CUBIC FEET PER SECOND
YEAR 2019-10-01 to 2020-09-30
DAILY MEAN VALUES
[e, Value has been estimated.]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	2019	2019	2019	2020	2020	2020	2020	2020	2020	2020	2020	2020
1	0.70	0.52	0.65	0.50	0.40	12.8	0.51	0.43	0.05	0.00	0.00	0.14
2	0.80	0.52	0.41	0.71	0.29	0.96	0.46	0.37	0.04	0.00	0.00	0.13
3	0.82	0.58	0.54	0.30	0.81	0.57	0.44	0.34	0.03	0.00	0.00	0.11
4	0.78	0.65	69.2	0.27	0.38	0.26	0.37	0.17	0.01	0.00	0.00	0.13
5	0.72	0.69	1.47	0.27	0.54	0.27	0.42	0.33	0.06	0.00	0.00	0.58
6	0.70	0.63	4.93	0.28	0.50	0.20	128	0.39	0.18	0.01	0.00	0.24
7	0.73	0.63	16.0	0.67	0.50	0.17	38.8	0.37	0.28	0.00	0.00	0.34
8	0.74	0.63	11.2	0.41	0.48	0.16	11.9	0.31	0.10	0.00	0.00	0.44
9	0.80	0.63	2.46	1.00	4.77	0.42	65.5	0.37	0.17	0.61	0.60	0.23
10	0.67	0.58	0.95	0.57	0.46	41.9	33.0	0.37	0.06	0.00	0.19	0.27
11	0.36	0.68	0.67	0.34	0.28	0.98	1.83	0.31	0.01	0.01	0.10	0.12
12	0.41	0.69	0.46	0.28	1.10	154	3.92	0.38	0.01	0.02	0.04	0.39
13	0.40	0.59	0.37	0.27	0.29	21.6	2.44	0.33	0.01	0.03	0.03	0.06
14	0.41	0.38	1.89	0.27	0.14	1.02	1.19	0.23	0.00	0.04	0.00	0.05
15	0.42	0.38	0.69	0.27	0.14	0.11	1.71	0.23	0.00	0.05	0.27	0.22
16	0.39	0.37	0.27	1.35	0.15	4.92	0.93	0.17	0.01	0.04	0.20	0.04
17	0.36	0.38	0.39	4.42	0.14	17.5	0.82	0.13	0.02	0.00	0.06	0.03
18	0.38	0.38	0.28	0.63	0.13	1.14	0.78	0.14	0.01	0.00	0.05	0.06
19	0.36	0.38	0.61	0.27	0.12	51.3	0.55	0.35	0.00	0.00	0.23	0.03
20	e0.35	14.1	0.59	0.31	0.11	2.39	0.34	0.21	0.00	0.00	0.19	0.30
21	e0.16	2.86	0.52	0.69	0.12	0.92	0.24	0.20	0.00	0.00	0.05	0.00
22	0.15	0.56	0.43	0.27	3.03	12.2	0.05	0.13	0.41	0.00	0.04	0.00
23	0.17	0.41	25.2	0.24	5.33	74.2	0.00	0.15	1.07	0.00	0.04	0.12
24	0.31	0.61	3.42	0.25	0.43	2.61	0.09	0.11	1.05	0.00	0.03	0.25
25	0.45	2.55	5.29	0.26	0.11	1.48	0.53	0.32	1.05	0.00	0.19	0.07
26	0.46	1.01	78.8	0.29	0.13	1.05	0.57	0.40	1.05	0.00	0.08	0.30
27	0.45	13.8	0.20	0.28	0.29	0.92	0.50	1.38	1.05	0.72	0.05	0.65
28	0.44	121	0.38	0.30	0.27	0.92	0.37	0.07	1.05	0.75	0.57	1.14
29	0.51	5.66	0.82	0.23	0.27	0.89	0.50	0.07	1.05	2.37	0.09	0.77
30	0.65	0.87	0.75	0.29		1.16	0.54	0.07	0.90	0.05	0.41	0.65
31	0.51		0.55	0.40		0.53		0.09		0.00	0.53	
Total	15.6	174	230	16.9	21.7	410	297	8.92	9.73	4.70	4.04	7.86
Mean	.50	5.79	7.43	.54	.75	13.2	9.91	.29	.32	.15	.13	.26
Max	0.82	121	78.8	4.42	5.33	154	128	1.38	1.07	2.37	0.60	1.14
Min	0.15	0.37	0.20	0.23	0.11	0.11	0.00	0.07	0.00	0.00	0.00	0.00
Ac-ft	30.9	345	457	33.5	43.1	812	590	17.7	19.3	9.32	8.01	15.6

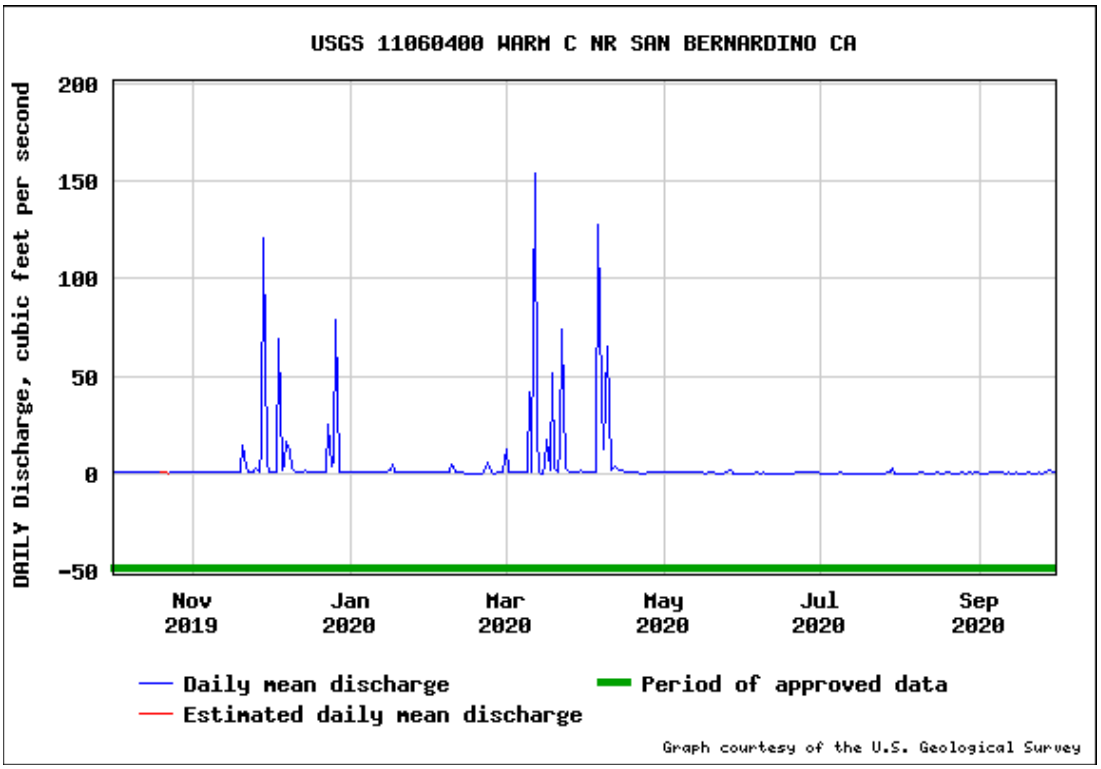
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1975 - 2020, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	5.28	6.79	9.97	13.7	25.9	22.1	10.2	7.82	5.70	5.00	4.84	4.68
Max	32.4	33.1	48.3	41.2	418	376	44.2	86.7	43.6	34.5	50.6	30.3
(WY)	(1984)	(1986)	(2011)	(1993)	(1978)	(1978)	(1986)	(1980)	(1980)	(1980)	(1983)	(1983)
Min	.011	.087	.14	.066	.72	.12	.049	.076	.008	.011	.002	.022
(WY)	(2015)	(1996)	(2018)	(2003)	(2002)	(2015)	(2018)	(2016)	(2015)	(2016)	(2016)	(2016)

SUMMARY STATISTICS

	Water Year 2020		Water Years 1975 - 2020	
Annual total	1,200			
Annual mean	3.28		10.1	
Highest annual mean			70.5	1978
Lowest annual mean			1.23	2002
Highest daily mean	154.0	Mar 12	3,400	Mar 01, 1978
Lowest daily mean	0.0	Apr 23	0.0	Nov 29, 1974
Annual 7-day minimum	0.0	Jul 17	0.0	Dec 07, 1974
Maximum peak flow	1,440[a]	Mar 12	8,500[a]	Mar 04, 1978
Maximum peak stage	2.65	Mar 12	4.88	Mar 04, 1978
Annual runoff (cfsm)	0.298		0.916	
Annual runoff (inches)	4.06		12.4	
10 percent exceeds	2.40		23.2	
50 percent exceeds	0.370		1.60	
90 percent exceeds	0.007		0.050	

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



USGS Water-Year Summary 2020

11065000 Lytle Creek at Colton, CA

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

DRAINAGE AREA - 186 mi².

REVISIONS HISTORY - WDR CA-83-1: Drainage area.

SURFACE-WATER RECORDS

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

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

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

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

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

Suggested citation: U.S. Geological Survey, 2021, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed [March 8, 2021], https://nwis.waterdata.usgs.gov/nwis/wys_rpt?dv_ts_ids=&8090&adr_begin_date=2019-10-01&adr_end_date=2020-09-30&site_no=11065000&agency_cd=USGS

DISCHARGE, CUBIC FEET PER SECOND
YEAR 2019-10-01 to 2020-09-30
DAILY MEAN VALUES
[e, Value has been estimated.]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	2019	2019	2019	2020	2020	2020	2020	2020	2020	2020	2020	2020
1	0.08	0.05	0.24	0.22	0.23	1.52	0.05	0.08	0.13	0.24	0.04	0.28
2	0.13	0.05	0.23	0.22	0.25	0.23	0.09	0.06	0.11	0.23	0.04	0.17
3	0.09	0.03	0.26	0.23	0.41	0.41	0.14	0.07	0.12	0.47	0.02	0.13
4	0.08	0.03	e40.8	0.24	0.18	0.20	0.16	0.06	0.18	0.10	0.04	0.27
5	0.06	0.12	0.93	0.23	0.18	0.12	0.09	0.09	0.18	0.05	0.02	0.12
6	0.04	0.36	2.46	0.26	0.14	0.16	e68.3	0.08	0.15	0.06	0.01	0.55
7	0.03	3.69	e4.24	0.35	0.16	0.19	e22.2	0.08	0.08	0.05	0.03	0.12
8	0.06	0.07	e2.48	0.43	0.24	0.21	9.16	0.12	0.10	0.04	0.02	0.08
9	0.15	0.07	0.24	1.12	0.17	0.22	25.3	0.22	0.10	0.07	0.02	0.09
10	0.14	0.05	0.17	0.27	0.21	17.0	e32.5	0.45	0.07	0.11	0.01	0.14
11	e0.60	0.06	0.16	0.23	0.16	0.12	0.05	0.52	0.11	0.04	0.02	0.15
12	0.13	0.26	0.64	0.24	0.12	52.6	0.22	0.15	0.26	0.03	0.02	0.12
13	0.04	0.61	1.36	18.3	0.11	e12.8	0.04	0.29	0.23	0.01	0.01	0.23
14	0.04	e1.43	0.64	e9.57	0.14	e0.49	0.11	0.35	0.27	0.02	0.14	0.16
15	0.08	e0.61	0.34	0.45	0.12	0.10	0.21	0.34	0.21	0.02	0.08	0.20
16	0.08	0.56	0.22	0.42	0.09	1.49	0.32	0.16	0.17	0.05	0.03	0.23
17	0.99	0.88	0.22	e1.04	0.11	e1.40	0.36	0.13	0.21	0.03	0.09	0.24
18	0.09	0.32	0.23	0.40	0.15	0.08	0.28	0.17	0.16	0.03	0.10	0.28
19	0.06	0.40	0.21	0.44	0.13	11.9	0.32	0.10	0.20	0.02	0.08	0.33
20	0.11	e1.31	0.38	0.41	0.07	0.16	0.27	0.06	0.08	0.03	0.12	0.24
21	0.15	e0.34	0.23	0.35	0.13	0.11	0.22	0.10	0.04	0.04	0.07	0.49
22	e0.25	0.16	0.26	0.35	0.41	4.01	0.14	0.11	0.05	0.03	0.16	0.55
23	0.32	0.16	e9.78	0.33	1.33	19.9	0.17	0.10	0.04	0.03	0.11	0.42
24	0.58	0.17	0.60	0.32	0.10	0.07	0.25	0.13	0.04	0.04	0.03	0.52
25	0.11	0.11	1.22	0.30	0.13	0.07	e0.28	0.09	0.06	0.06	0.07	0.58
26	0.08	0.03	e62.0	0.18	0.10	0.08	e0.29	0.10	0.03	0.02	0.09	0.41
27	0.30	2.68	0.61	0.17	0.13	e0.07	e0.27	0.08	0.03	0.03	0.06	0.53
28	0.26	82.1	0.28	0.12	0.11	0.08	e0.27	0.06	0.14	0.02	0.09	0.34
29	0.10	e5.63	0.20	0.30	0.10	0.08	e0.33	0.06	0.26	0.02	0.10	0.39
30	0.10	0.43	0.22	0.47		0.05	0.22	0.09	0.23	0.02	0.11	0.37
31	0.21		0.32	0.25		0.04		0.15		0.02	0.40	
Total	5.54	103	132	38.2	5.91	126	163	4.65	4.04	2.03	2.23	8.73
Mean	.18	3.43	4.26	1.23	.20	4.06	5.42	.15	.13	.065	.072	.29
Max	0.99	82.1	62.0	18.3	1.33	52.6	68.3	0.52	0.27	0.47	0.40	0.58
Min	0.03	0.03	0.16	0.12	0.07	0.04	0.04	0.06	0.03	0.01	0.01	0.08
Ac-ft	11.0	204	262	75.8	11.7	250	323	9.22	8.01	4.03	4.42	17.3

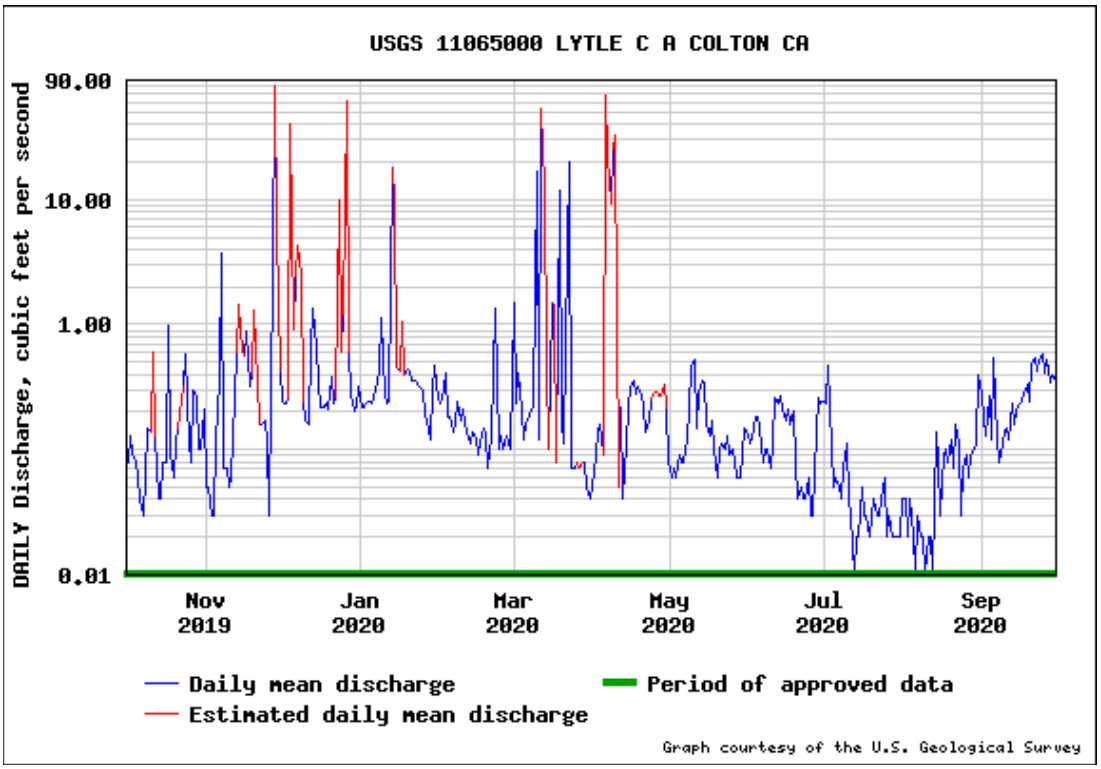
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1958 - 2020, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	2.00	3.58	9.35	18.7	26.3	14.4	3.80	3.21	1.82	1.16	.78	.63
Max	83.2	79.1	142	318	363	326	57.3	87.6	61.3	35.4	17.1	9.58
(WY)	(2005)	(1966)	(2011)	(1969)	(1980)	(1978)	(1969)	(1969)	(1978)	(1978)	(1969)	(1980)
Min	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
(WY)	(1958)	(1958)	(1959)	(1963)	(1961)	(1959)	(1961)	(1959)	(1958)	(1958)	(1958)	(1958)

SUMMARY STATISTICS

	Water Year 2020		Water Years 1958 - 2020	
Annual total	594.8			
Annual mean	1.63		7.07	
Highest annual mean			65.4	1969
Lowest annual mean			0.008	1977
Highest daily mean	82.1	Nov 28	5,040	Jan 25, 1969
Lowest daily mean	0.010	Jul 13	0.0	Oct 01, 1957
Annual 7-day minimum	0.019	Aug 05	0.0	Oct 01, 1957
Maximum peak flow	365[a,b]	Mar 12	17,500[a,b]	Mar 04, 1978
Maximum peak stage	2.85	Mar 12	14.80	Mar 04, 1978
Annual runoff (cfsm)	0.009		0.038	
Annual runoff (inches)	0.119		0.515	
10 percent exceeds	0.712		2.80	
50 percent exceeds	0.160		0.0	
90 percent exceeds	0.040		0.0	

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



USGS Water-Year Summary 2020

11057500 San Timoteo Creek near Loma Linda, CA

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

DRAINAGE AREA - 125 mi².

SURFACE-WATER RECORDS

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

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

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

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

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

Suggested citation: U.S. Geological Survey, 2021, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed [March 8, 2021], https://nwis.waterdata.usgs.gov/nwis/wys_rpt?dv_ts_ids=&8045&adr_begin_date=2019-10-01&adr_end_date=2020-09-30&site_no=11057500&agency_cd=USGS

DISCHARGE, CUBIC FEET PER SECOND
YEAR 2019-10-01 to 2020-09-30
DAILY MEAN VALUES
[e, Value has been estimated.]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	2019	2019	2019	2020	2020	2020	2020	2020	2020	2020	2020	2020
1	8.88	e1.33	52.5	8.90	14.7	12.7	9.57	4.05	3.07	1.32	0.11	0.15
2	7.38	e1.26	33.6	4.46	9.73	14.9	9.38	4.41	1.22	1.70	0.15	0.22
3	1.39	e1.21	24.6	14.5	11.4	7.71	9.78	4.89	1.26	0.10	0.17	0.35
4	0.33	e1.46	49.8	17.5	5.62	6.76	9.63	4.60	1.58	0.04	0.02	0.51
5	0.83	e1.72	43.9	5.53	7.44	5.54	10.2	5.15	2.18	0.09	0.02	0.15
6	4.74	e1.52	16.9	3.65	4.12	6.60	121	4.29	3.02	0.16	0.04	0.13
7	2.58	e1.37	17.0	4.01	4.91	5.66	194	4.54	3.19	0.02	0.01	0.20
8	1.16	e1.14	22.2	5.75	5.83	5.99	128	4.16	2.19	0.04	0.02	2.14
9	1.51	e0.87	19.1	11.4	14.1	7.31	73.6	5.54	1.37	0.11	0.46	2.34
10	e1.79	e0.94	11.2	13.3	39.3	61.4	116	4.98	1.66	0.12	2.33	1.52
11	e1.72	e1.48	11.9	11.2	18.0	31.2	55.4	5.52	0.87	0.04	0.10	2.61
12	e1.67	e1.89	6.11	12.0	14.8	246	19.3	5.25	0.99	0.06	0.22	4.37
13	e1.65	e1.74	36.8	15.1	14.4	102	35.4	6.29	0.03	0.16	0.06	3.94
14	e1.59	e1.75	97.6	10.9	14.3	73.1	16.1	5.07	0.59	0.01	0.37	5.19
15	e1.47	e1.64	64.0	11.8	15.2	42.7	12.2	6.12	1.05	1.08	0.44	1.87
16	e1.50	e1.62	55.0	8.82	15.2	43.4	10.6	6.23	0.53	0.49	0.26	1.41
17	e1.41	e1.58	40.9	7.12	14.3	45.1	8.68	4.15	0.71	0.58	0.09	1.55
18	e1.45	e3.35	52.9	9.40	12.5	38.5	8.41	5.57	0.94	0.22	0.11	1.26
19	e1.37	e9.57	19.0	10.5	12.0	40.4	7.11	5.95	0.96	0.17	0.07	1.27
20	e1.56	e40.0	11.8	6.20	8.40	35.2	8.02	5.72	0.71	0.11	0.36	0.84
21	e1.46	23.5	11.5	16.1	6.49	63.7	8.04	5.41	0.64	0.10	0.23	1.01
22	e1.44	9.76	17.6	36.3	17.9	21.7	7.53	4.91	0.97	0.12	0.07	0.69
23	e1.44	12.0	36.3	e20.5	22.9	68.1	6.30	4.10	0.63	0.17	0.18	0.59
24	e1.35	12.8	51.1	13.8	16.7	36.4	4.77	3.89	0.52	0.16	0.42	0.82
25	e1.31	17.5	30.2	15.2	8.98	21.7	5.16	4.51	0.95	0.20	0.07	0.94
26	e1.34	17.1	80.5	18.8	5.10	18.7	3.97	2.34	1.13	0.54	0.08	1.03
27	e1.32	32.5	37.9	18.2	7.18	22.7	4.57	3.32	2.39	0.10	0.28	2.23
28	e1.35	162	e15.4	11.1	6.30	11.9	3.16	2.71	1.67	0.05	0.31	3.19
29	e1.49	168	e12.0	13.9	7.26	15.6	3.36	2.14	0.64	0.01	0.18	2.27
30	e1.36	43.0	e7.69	11.1		11.7	4.27	2.45	1.43	0.00	0.33	1.76
31	e0.92		e12.1	9.07		10.6		2.67		0.09	0.20	
Total	60.8	576	999	376	355	1,135	914	141	39.1	8.16	7.76	46.5
Mean	1.96	19.2	32.2	12.1	12.2	36.6	30.5	4.55	1.30	.26	.25	1.55
Max	8.88	168	97.6	36.3	39.3	246	194	6.29	3.19	1.70	2.33	5.19
Min	0.33	0.87	6.11	3.65	4.12	5.54	3.16	2.14	0.03	0.00	0.01	0.13
Ac-ft	121	1,142	1,981	746	704	2,251	1,812	280	77.5	16.2	15.4	92.3

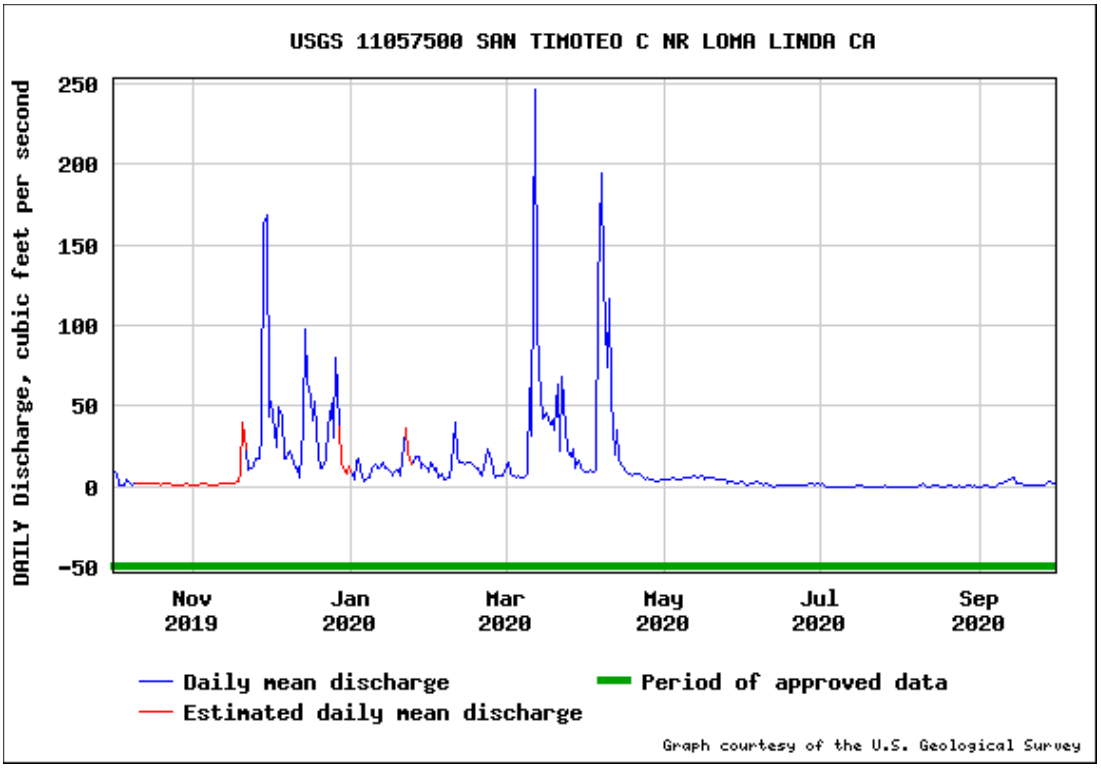
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1955 - 2020, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	2.05	3.16	7.33	14.7	14.7	8.50	3.90	2.30	1.29	.84	.81	.99
Max	39.8	19.2	76.2	124	186	53.7	30.5	23.4	7.37	6.82	3.06	4.95
(WY)	(2005)	(2020)	(2011)	(2005)	(1969)	(1991)	(2020)	(2019)	(2013)	(2015)	(2014)	(2015)
Min	.000	.000	.16	.079	.17	.000	.000	.000	.000	.000	.000	.000
(WY)	(1996)	(1996)	(1996)	(1972)	(1968)	(1997)	(1979)	(1996)	(1996)	(1995)	(1995)	(1995)

SUMMARY STATISTICS

	Water Year 2020		Water Years 1955 - 2020	
Annual total	4,658			
Annual mean	12.7		5.17	
Highest annual mean			25.3	2005
Lowest annual mean			0.447	2002
Highest daily mean	246.0	Mar 12	3,500	Feb 25, 1969
Lowest daily mean	0.0	Jul 30	0.0	Feb 04, 1968
Annual 7-day minimum	0.061	Aug 02	0.0	Apr 15, 1969
Maximum peak flow	1,180[a]	Mar 12	15,000	Feb 25, 1969
Maximum peak stage	3.00	Mar 12	8.50[b]	Feb 16, 1980
Annual runoff (cfsm)	0.102		0.040	
Annual runoff (inches)	1.39		0.540	
10 percent exceeds	36.3		7.15	
50 percent exceeds	4.22		0.790	
90 percent exceeds	0.150		0.0	

[a] All or part of the record affected by Urbanization, Mining, Agricultural changes, Channelization, or other
[b] Gage datum changed during this year



APPENDIX B

DAILY PRECIPITATION DATA
FOR SAN BERNARDINO

WATER YEAR 2019-20

TABLE B-1

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

	2019			2020								
Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	1.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.11	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.32	0.00	0.00	0.00	1.44	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.16	0.00	0.00	0.00	0.49	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00		0.00	0.00	0.37	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00		0.00	0.03	0.58	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00	0.68	0.39	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00	1.08	0.05	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.04	0.00	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.14	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.37	0.00	0.00	0.00	0.46	0.00	0.00	0.00	0.00	0.00	0.00
21	0.00	0.02	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
22	0.00	0.00	0.00	0.00	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23	0.00	0.00	0.34	0.00	0.11	0.38	0.00	0.00	0.00	0.00	0.00	0.00
24	0.00	0.00	0.00	0.00	0.01	0.43	0.00	0.00	0.00	0.00	0.00	0.00
25	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.00	0.00	0.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	1.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.01	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	0.00		0.00	0.00		0.00		0.00		0.00	0.00	
Total	0.00	2.21	2.79	0.19	0.31	3.90	3.34	0.00	0.00	0.00	0.00	0.00

Total Rainfall = 12.74 Inches

APPENDIX C

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

WATER YEAR 2019-20

SINCE 1933

ORANGE COUNTY WATER DISTRICT

ORANGE COUNTY'S GROUNDWATER AUTHORITY

March 23, 2021

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

Subject: Review of Fiscal Year 2019-20 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, 2020. This review includes examining supporting documentation that supports the amounts and disclosures in the financial statements. We have reviewed minutes of meetings, annual budgets as well as Bank of America Checking Accounts' transactions and statements, and have concluded that all transactions were properly recorded.

Best Regards,

ORANGE COUNTY WATER DISTRICT

Vishav Sharma
Finance Manager

CC: R. Fick

SANTA ANA RIVER WATERMASTER

NOTES TO FINANCIAL STATEMENTS

JUNE 30, 2020

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%

For WY 2019-20, $10,000 was budgeted but not collected as the contributions to cover the anticipated cost.

The Watermaster 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 as of June 30, 2020 consisted of the following:

Bank of America:	$4,500

All cash is fully insured by the FDIC.

SANTA ANA RIVER WATERMASTER

FINANCIAL STATEMENTS

JUNE 30, 2020

SANTA ANA RIVER WATERMASTER

STATEMENT OF ASSETS AND LIABILITIES ARISING FROM CASH TRANSACTIONS

JUNE 30, 2020

ASSETS

Cash in Bank Account	$ 4,500

LIABILITIES AND NET ASSETS

Total Net Assets	$ 4,500

SANTA ANA RIVER WATERMASTER

STATEMENT OF REVENUE AND EXPENSES ARISING FROM CASH TRANSACTIONS

FOR THE PERIOD JULY 1, 2019 - JUNE 30, 2020

	Actual	Budget	Variance - Favorable (Unfavorable)	
REVENUE COLLECTED:				
Water District Contributions				
Orange County Water District	$ -	$ 4,000	(4,000)	
Inland Empire Utilities Agency	-	2,000	(2,000)	
Western Municipal Water District	-	2,000	(2,000)	
San Bernardino Valley Municipal Water District	-	2,000	(2,000)	
TOTAL REVENUE COLLECTED	$ -	$ 10,000	$ (10,000)	(A)
EXPENSES PAID:				
Professional Engineering Services	$ -	$ -	0	(B)
Administrative Expenses:				
Auditing Services				
Reproduction of Annual Report	-	10,000	10,000	(C)
Bank service charges				
	$ -	$ 10,000	$ 10,000	
CHANGE IN NET ASSETS	$ -			
NET ASSETS - BEGINNING OF THE YEAR	$ 4,500			
NET ASSETS - END OF THE YEAR	$ 4,500			

(A) $10,000 revenue was budgeted but not collected for the fiscal year 2019-20
(B) No payment was made to IEUA during the FY 2019-2020 for the reproduction of annual report.
(C) No payment was made for the administrative expense of the WY 2019-20.

APPENDIX D

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

WATER YEAR 2019-20

There was no discharge of OC-59 water to Santa Ana River during the 2019-20 water year.

APPENDIX E

WATER QUALITY AND DISCHARGE FROM THE SAN JACINTO WATERSHED

WATER YEAR 2019-20

TABLE E-1

SAN JACINTO WATERSHED DISCHARGE CALCULATIONS
WATER YEAR 2019-20
October 2019

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	3.1	3.1	0.0	0.0	0.0	0.0	0.0
2	2.9	2.9	0.0	0.0	0.0	0.0	0.0
3	1.8	1.8	0.0	0.0	0.0	0.0	0.0
4	2.7	2.7	0.0	0.0	0.0	0.0	0.0
5	2.6	2.6	0.0	0.0	0.0	0.0	0.0
6	2.8	2.8	0.0	0.0	0.0	0.0	0.0
7	3.4	3.4	0.0	0.0	0.0	0.0	0.0
8	3.5	3.5	0.0	0.0	0.0	0.0	0.0
9	5.7	5.7	0.0	0.0	0.0	0.0	0.0
10	6.6	6.6	0.0	0.0	0.0	0.0	0.0
11	4.9	4.9	0.0	0.0	0.0	0.0	0.0
12	5.7	5.7	0.0	0.0	0.0	0.0	0.0
13	6.5	6.5	0.0	0.0	0.0	0.0	0.0
14	7.5	7.5	0.0	0.0	0.0	0.0	0.0
15	6.9	6.9	0.0	0.0	0.0	0.0	0.0
16	9.1	9.1	0.0	0.0	0.0	0.0	0.0
17	9.0	9.0	0.0	0.0	0.0	0.0	0.0
18	7.0	7.0	0.0	0.0	0.0	0.0	0.0
19	5.4	5.4	0.0	0.0	0.0	0.0	0.0
20	4.6	4.6	0.0	0.0	0.0	0.0	0.0
21	5.2	5.2	0.0	0.0	0.0	0.0	0.0
22	4.9	4.9	0.0	0.0	0.0	0.0	0.0
23	4.2	4.2	0.0	0.0	0.0	0.0	0.0
24	3.4	3.4	0.0	0.0	0.0	0.0	0.0
25	3.3	3.3	0.0	0.0	0.0	0.0	0.0
26	2.4	2.4	0.0	0.0	0.0	0.0	0.0
27	1.7	1.7	0.0	0.0	0.0	0.0	0.0
28	1.6	1.6	0.0	0.0	0.0	0.0	0.0
29	1.3	1.3	0.0	0.0	0.0	0.0	0.0
30	1.6	1.6	0.0	0.0	0.0	0.0	0.0
31	1.2	1.2	0.0	0.0	0.0	0.0	0.0
Total (cfs)	132.4	132.4	0.0	0.0	0.0	0.0	0.0
(acre-feet)	263.0	263.0	0.0	0.0	0.0	0.0	0.0

TABLE E-1 (continued)

SAN JACINTO WATERSHED DISCHARGE CALCULATIONS
WATER YEAR 2019-20
November 2019

Day	[1] Temescal Creek Flow	[2] Temescal Creek Base Flow	[3] Scalped Storm Flow	[4] EMWD Discharge to Temescal Creek	[5] San Jacinto Watershed Outflow At Prado	[6] Santa Ana River Flow Lost to the Ocean	[7] San Jacinto Outflow Recharged by OCWD
1	1.4	1.4	0.0	0.0	0.0	0.0	0.0
2	1.9	1.9	0.0	0.0	0.0	0.0	0.0
3	2.0	2.0	0.0	0.0	0.0	0.0	0.0
4	2.8	2.8	0.0	0.0	0.0	0.0	0.0
5	3.1	3.1	0.0	0.0	0.0	0.0	0.0
6	3.6	3.6	0.0	0.0	0.0	0.0	0.0
7	3.0	3.0	0.0	0.0	0.0	0.0	0.0
8	2.9	2.9	0.0	0.0	0.0	0.0	0.0
9	3.7	3.7	0.0	0.0	0.0	0.0	0.0
10	3.6	3.6	0.0	0.0	0.0	0.0	0.0
11	4.0	4.0	0.0	0.0	0.0	0.0	0.0
12	3.9	3.9	0.0	0.0	0.0	0.0	0.0
13	4.5	4.5	0.0	0.0	0.0	0.0	0.0
14	4.2	4.2	0.0	0.0	0.0	0.0	0.0
15	4.0	4.0	0.0	0.0	0.0	0.0	0.0
16	5.0	5.0	0.0	0.0	0.0	0.0	0.0
17	5.9	5.9	0.0	0.0	0.0	0.0	0.0
18	5.9	5.9	0.0	0.0	0.0	0.0	0.0
19	6.6	6.6	0.0	0.0	0.0	0.0	0.0
20	18.2	5.1	13.1	0.0	0.0	0.0	0.0
21	3.7	3.7	0.0	0.0	0.0	0.0	0.0
22	3.3	3.3	0.0	0.0	0.0	0.0	0.0
23	2.4	2.4	0.0	0.0	0.0	0.0	0.0
24	2.2	2.2	0.0	0.0	0.0	0.0	0.0
25	2.3	2.3	0.0	0.0	0.0	0.0	0.0
26	1.8	1.8	0.0	0.0	0.0	0.0	0.0
27	34.3	2.1	32.2	0.0	0.0	0.0	0.0
28	548.0	2.4	545.6	0.0	0.0	0.0	0.0
29	56.2	2.8	53.4	0.0	0.0	0.0	0.0
30	8.4	3.1	5.3	0.0	0.0	0.0	0.0
Total (cfs)	752.7	103.1	649.6	0.0	0.0	0.0	0.0
(acre-feet)	1,493.0	205.0	1,288.0	0.0	0.0	0.0	0.0

TABLE E-1 (continued)

SAN JACINTO WATERSHED DISCHARGE CALCULATIONS
WATER YEAR 2019-20
December 2019

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	2.9	2.9	0.0	0.0	0.0	0.0	0.0
2	3.0	3.0	0.0	0.0	0.0	0.0	0.0
3	2.3	2.3	0.0	0.0	0.0	0.0	0.0
4	262.0	2.3	259.7	0.0	0.0	0.0	0.0
5	4.2	2.4	1.8	0.0	0.0	0.0	0.0
6	13.0	2.4	10.6	0.0	0.0	0.0	0.0
7	4.6	2.4	2.2	0.0	0.0	0.0	0.0
8	4.4	2.5	1.9	0.0	0.0	0.0	0.0
9	2.5	2.5	0.0	0.0	0.0	0.0	0.0
10	1.9	1.9	0.0	0.0	0.0	0.0	0.0
11	1.8	1.8	0.0	0.0	0.0	0.0	0.0
12	1.8	1.8	0.0	0.0	0.0	0.0	0.0
13	1.9	1.9	0.0	0.0	0.0	0.0	0.0
14	2.6	2.6	0.0	0.0	0.0	0.0	0.0
15	3.2	3.2	0.0	0.0	0.0	0.0	0.0
16	1.9	1.9	0.0	0.0	0.0	0.0	0.0
17	1.9	1.9	0.0	0.0	0.0	0.0	0.0
18	1.8	1.8	0.0	0.0	0.0	0.0	0.0
19	1.9	1.9	0.0	0.0	0.0	0.0	0.0
20	2.2	2.2	0.0	0.0	0.0	0.0	0.0
21	2.0	2.0	0.0	0.0	0.0	0.0	0.0
22	2.0	2.0	0.0	0.0	0.0	0.0	0.0
23	137.0	2.1	134.9	0.0	0.0	0.0	0.0
24	4.3	2.2	2.1	0.0	0.0	0.0	0.0
25	12.2	2.4	9.8	0.0	0.0	0.0	0.0
26	475.0	2.6	472.4	0.0	0.0	0.0	0.0
27	6.3	2.8	3.5	0.0	0.0	0.0	0.0
28	4.0	3.0	1.0	0.0	0.0	0.0	0.0
29	3.2	3.2	0.0	0.0	0.0	0.0	0.0
30	3.1	3.1	0.0	0.0	0.0	0.0	0.0
31	3.0	3.0	0.0	0.0	0.0	0.0	0.0
Total (cfs)	973.6	73.8	899.8	0.0	0.0	0.0	0.0
(acre-feet)	1,931.0	146.0	1,785.0	0.0	0.0	0.0	0.0

TABLE E-1 (continued)

SAN JACINTO WATERSHED DISCHARGE CALCULATIONS
WATER YEAR 2019-20
January 2020

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	2.8	2.8	0.0	0.0	0.0	0.0	0.0
2	2.9	2.9	0.0	0.0	0.0	0.0	0.0
3	2.8	2.8	0.0	2.3	0.0	0.0	0.0
4	2.6	2.6	0.0	0.0	0.0	0.0	0.0
5	2.7	2.7	0.0	0.0	0.0	0.0	0.0
6	2.8	2.8	0.0	0.0	0.0	0.0	0.0
7	3.3	3.3	0.0	0.0	0.0	0.0	0.0
8	4.0	4.0	0.0	13.5	0.0	0.0	0.0
9	3.5	3.5	0.0	37.5	0.0	0.0	0.0
10	4.8	4.8	0.0	50.4	0.0	0.0	0.0
11	3.1	3.1	0.0	54.5	0.0	0.0	0.0
12	3.2	3.2	0.0	54.5	0.0	0.0	0.0
13	3.2	3.2	0.0	39.1	0.0	0.0	0.0
14	3.4	3.4	0.0	39.4	0.0	0.0	0.0
15	3.7	3.7	0.0	53.4	0.0	0.0	0.0
16	3.3	3.3	0.0	47.1	0.0	0.0	0.0
17	8.4	3.5	4.9	35.8	0.0	0.0	0.0
18	3.7	3.7	0.0	57.0	0.0	0.0	0.0
19	3.6	3.6	0.0	56.0	0.0	0.0	0.0
20	3.8	3.8	0.0	53.9	0.0	0.0	0.0
21	19.6	3.8	0.0	51.4	0.0	0.0	0.0
22	32.9	3.8	10.0	53.4	13.0	0.0	13.0
23	35.9	8.3	0.0	46.6	28.7	0.0	28.7
24	35.3	8.2	0.0	48.5	31.0	0.0	31.0
25	34.9	9.2	0.0	43.3	30.1	0.0	30.1
26	33.0	8.6	0.0	42.5	28.6	0.0	28.6
27	33.0	9.6	0.0	45.4	27.2	0.0	27.2
28	34.0	10.5	0.0	8.1	27.3	0.0	27.3
29	35.1	11.0	0.0	0.0	28.1	0.0	28.1
30	31.9	11.0	0.0	0.0	26.9	0.0	26.9
31	22.9	11.0	0.0	0.0	20.7	0.0	20.7
Total (cfs)	419.9	161.4	14.9	933.5	261.4	0.0	261.4
(acre-feet)	833.0	320.0	30.0	1,852.0	518.0	0.0	518.0

TABLE E-1 (continued)

SAN JACINTO WATERSHED DISCHARGE CALCULATIONS
WATER YEAR 2019-20
February 2020

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	14.1	11.0	0.0	0.0	11.7	0.0	11.7
2	11.3	10.1	0.0	0.0	5.9	0.0	5.9
3	8.7	8.7	0.0	0.0	3.2	0.0	3.2
4	6.6	6.6	0.0	0.0	1.0	0.0	1.0
5	6.4	6.4	0.0	0.0	0.0	0.0	0.0
6	7.0	7.0	0.0	0.0	0.0	0.0	0.0
7	6.7	6.7	0.0	0.0	0.0	0.0	0.0
8	6.4	6.4	0.0	0.0	0.0	0.0	0.0
9	19.3	6.5	12.8	0.0	0.0	0.0	0.0
10	10.9	5.6	5.3	0.0	0.0	0.0	0.0
11	6.7	4.7	2.0	41.8	0.0	0.0	0.0
12	4.1	4.1	0.0	40.8	0.0	0.0	0.0
13	3.0	3.0	0.0	32.4	0.0	0.0	0.0
14	2.8	2.8	0.0	34.0	0.0	0.0	0.0
15	4.1	3.0	0.0	32.6	0.6	0.0	0.6
16	15.0	3.0	0.0	35.5	6.6	0.0	6.6
17	20.4	3.8	0.0	40.0	14.8	0.0	14.8
18	21.8	4.8	0.0	36.9	18.2	0.0	18.2
19	22.3	5.8	0.0	22.2	19.0	0.0	19.0
20	22.4	5.9	0.0	19.6	19.3	0.0	19.3
21	21.9	5.8	0.0	0.0	19.1	0.0	19.1
22	18.0	6.1	0.0	0.0	15.4	0.0	15.4
23	12.7	5.4	7.3	0.0	10.0	0.0	10.0
24	8.7	4.5	4.2	0.0	6.7	0.0	6.7
25	5.7	4.5	1.2	0.0	3.9	0.0	3.9
26	3.9	3.9	0.0	0.0	1.9	0.0	1.9
27	3.1	3.1	0.0	0.0	0.8	0.0	0.8
28	1.6	1.6	0.0	0.0	0.2	0.0	0.2
29	1.2	1.2	0.0	0.0	0.0	0.0	0.0
Total (cfs)	296.7	151.9	32.8	335.7	158.0	0.0	158.0
(acre-feet)	588.0	301.0	65.0	666.0	313.0	0.0	313.0

TABLE E-1 (continued)

SAN JACINTO WATERSHED DISCHARGE CALCULATIONS
WATER YEAR 2019-20
March 2020

Day	[1] Temescal Creek Flow	[2] Temescal Creek Base Flow	[3] Scalped Storm Flow	[4] EMWD Discharge to Temescal Creek	[5] San Jacinto Watershed Outflow At Prado	[6] Santa Ana River Flow Lost to the Ocean	[7] San Jacinto Outflow Recharged by OCWD
1	1.9	1.2	0.7	0.0	0.0	0.0	0.0
2	2.5	1.2	1.3	0.0	0.0	0.0	0.0
3	1.1	1.1	0.0	0.0	0.0	0.0	0.0
4	1.1	1.1	0.0	0.0	0.0	0.0	0.0
5	1.0	1.0	0.0	0.0	0.0	0.0	0.0
6	1.2	1.2	0.0	0.0	0.0	0.0	0.0
7	1.0	1.0	0.0	0.0	0.0	0.0	0.0
8	1.0	1.0	0.0	0.0	0.0	0.0	0.0
9	1.1	1.1	0.0	0.0	0.0	0.0	0.0
10	141.0	1.0	140.0	0.2	0.0	0.0	0.0
11	11.0	1.7	9.3	0.0	0.0	0.0	0.0
12	529.0	2.3	526.7	27.1	0.0	0.0	0.0
13	89.4	3.0	72.8	56.2	0.0	0.0	0.0
14	60.6	3.0	15.9	53.0	13.9	0.0	13.9
15	59.3	3.1	1.6	52.6	33.6	0.0	33.6
16	90.6	3.1	34.7	56.2	38.2	20.2	18.0
17	93.1	3.2	35.5	58.8	37.5	40.3	0.0
18	62.7	3.2	2.0	59.4	39.5	60.5	0.0
19	116.0	3.3	53.6	58.7	41.9	40.3	1.5
20	68.0	3.3	5.7	58.6	43.5	40.3	3.1
21	62.1	3.4	0.0	53.2	44.5	40.3	4.2
22	127.0	3.4	67.7	48.9	44.9	60.5	0.0
23	257.0	3.4	202.5	66.4	44.2	65.5	0.0
24	74.7	3.4	13.7	58.7	44.8	40.8	3.9
25	69.9	3.4	4.0	57.9	46.5	32.8	13.7
26	66.2	3.4	4.5	57.8	46.4	30.2	16.1
27	65.2	3.4	3.9	51.9	44.8	1.5	43.2
28	65.0	3.4	6.8	54.8	43.9	0.5	43.3
29	64.7	3.4	8.0	50.7	44.9	7.6	37.3
30	60.9	3.4	4.8	51.8	44.0	15.1	28.9
31	58.9	3.4	4.3	38.4	41.3	2.5	38.8
Total (cfs)	2,304.2	77.5	1,219.8	1,071.5	737.7	499.1	299.5
(acre-feet)	4,570.0	154.0	2,420.0	2,125.0	1,463.0	990.0	594.0

TABLE E-1 (continued)

SAN JACINTO WATERSHED DISCHARGE CALCULATIONS
WATER YEAR 2019-20
April 2020

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	56.0	3.4	7.5	37.3	38.4	0.0	38.4
2	51.5	3.4	10.2	21.8	33.7	0.0	33.7
3	52.2	3.4	19.2	15.6	30.8	0.0	30.8
4	50.6	3.4	28.5	16.0	29.5	0.0	29.5
5	46.2	3.4	27.0	18.7	25.8	0.0	25.8
6	266.0	3.4	245.2	25.3	18.8	104.4	0.0
7	244.0	3.4	218.6	43.8	16.7	425.0	0.0
8	140.0	3.4	102.0	57.8	22.1	497.9	0.0
9	303.0	3.4	248.8	51.5	30.1	508.9	0.0
10	504.0	3.4	445.9	62.6	40.6	550.6	0.0
11	188.0	3.4	127.6	67.0	49.1	550.5	0.0
12	141.0	3.4	72.8	66.9	53.0	526.8	0.0
13	118.0	3.4	47.6	66.4	54.0	518.0	0.0
14	102.0	3.4	31.9	63.4	54.0	496.0	0.0
15	91.1	3.4	22.8	65.9	52.2	494.0	0.0
16	87.1	3.4	19.1	61.0	49.4	484.9	0.0
17	86.4	3.4	19.6	59.5	49.4	481.9	0.0
18	84.0	3.4	20.4	55.4	49.2	471.8	0.0
19	80.0	3.4	19.2	57.1	46.8	462.8	0.0
20	76.7	3.4	17.0	54.4	45.8	480.2	0.0
21	71.3	3.4	12.2	58.1	44.5	496.0	0.0
22	72.3	3.4	12.7	49.8	43.0	489.8	0.0
23	73.5	3.4	16.2	37.4	43.2	257.6	0.0
24	69.9	3.4	22.9	37.7	39.5	0.0	39.5
25	68.7	3.4	27.8	22.7	31.8	0.0	31.8
26	65.8	3.4	32.2	35.8	25.9	0.0	25.9
27	65.4	3.4	32.7	37.5	21.6	0.0	21.6
28	72.1	3.4	32.0	27.3	20.7	0.0	20.7
29	74.1	3.4	38.3	25.7	22.5	0.0	22.5
30	69.0	3.4	39.1	30.0	21.0	0.0	21.0
Total (cfs)	3,469.9	102.0	2,016.8	1,329.6	1,102.4	8,297.1	340.9
(acre-feet)	6,882.0	202.0	4,000.0	2,637.0	2,187.0	16,457.0	676.0

TABLE E-1 (continued)

SAN JACINTO WATERSHED DISCHARGE CALCULATIONS
WATER YEAR 2019-20
May 2020

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	64.7	3.4	33.5	0.0	18.1	0.0	18.1
2	56.6	3.4	38.2	0.0	16.4	0.0	16.4
3	44.9	3.3	41.6	0.0	12.3	0.0	12.3
4	38.9	3.3	35.6	0.0	6.7	0.0	6.7
5	31.7	31.7	0.0	0.0	3.3	0.0	3.3
6	31.2	31.2	0.0	0.0	1.2	0.0	1.2
7	30.7	30.7	0.0	0.0	0.2	0.0	0.2
8	27.2	27.2	0.0	0.0	0.0	0.0	0.0
9	26.4	26.4	0.0	0.0	0.0	0.0	0.0
10	26.3	26.3	0.0	0.0	0.0	0.0	0.0
11	26.7	26.7	0.0	0.0	0.0	0.0	0.0
12	25.3	25.3	0.0	0.0	0.0	0.0	0.0
13	27.3	27.3	0.0	0.0	0.0	0.0	0.0
14	27.2	27.2	0.0	0.0	0.0	0.0	0.0
15	26.3	26.3	0.0	0.0	0.0	0.0	0.0
16	26.7	26.7	0.0	0.0	0.0	0.0	0.0
17	25.0	25.0	0.0	0.0	0.0	0.0	0.0
18	24.3	24.3	0.0	0.0	0.0	0.0	0.0
19	24.6	24.6	0.0	0.0	0.0	0.0	0.0
20	24.2	24.2	0.0	0.0	0.0	0.0	0.0
21	22.4	22.4	0.0	0.0	0.0	0.0	0.0
22	17.1	17.1	0.0	0.0	0.0	0.0	0.0
23	15.8	15.8	0.0	0.0	0.0	0.0	0.0
24	15.2	15.2	0.0	0.0	0.0	0.0	0.0
25	14.1	14.1	0.0	0.0	0.0	0.0	0.0
26	13.2	13.2	0.0	0.0	0.0	0.0	0.0
27	11.0	11.0	0.0	0.0	0.0	0.0	0.0
28	9.7	9.7	0.0	0.0	0.0	0.0	0.0
29	9.4	9.4	0.0	0.0	0.0	0.0	0.0
30	8.5	8.5	0.0	0.0	0.0	0.0	0.0
31	5.1	5.1	0.0	0.0	0.0	0.0	0.0
Total (cfs)	777.6	585.9	148.9	0.0	58.1	0.0	58.1
(acre-feet)	1,542.0	1,162.0	295.0	0.0	115.0	0.0	115.0

TABLE E-1 (continued)

SAN JACINTO WATERSHED DISCHARGE CALCULATIONS
WATER YEAR 2019-20
June 2020

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	5.2	5.2	0.0	0.0	0.0	0.0	0.0
2	3.5	3.5	0.0	0.0	0.0	0.0	0.0
3	2.9	2.9	0.0	0.0	0.0	0.0	0.0
4	2.9	2.9	0.0	0.0	0.0	0.0	0.0
5	2.2	2.2	0.0	0.0	0.0	0.0	0.0
6	2.3	2.3	0.0	0.0	0.0	0.0	0.0
7	2.6	2.6	0.0	0.0	0.0	0.0	0.0
8	2.7	2.7	0.0	0.0	0.0	0.0	0.0
9	2.3	2.3	0.0	0.0	0.0	0.0	0.0
10	2.8	2.8	0.0	0.0	0.0	0.0	0.0
11	3.4	3.4	0.0	0.0	0.0	0.0	0.0
12	4.1	4.1	0.0	0.0	0.0	0.0	0.0
13	4.1	4.1	0.0	0.0	0.0	0.0	0.0
14	3.4	3.4	0.0	0.0	0.0	0.0	0.0
15	4.0	4.0	0.0	0.0	0.0	0.0	0.0
16	6.1	6.1	0.0	0.0	0.0	0.0	0.0
17	6.2	6.2	0.0	0.0	0.0	0.0	0.0
18	7.0	7.0	0.0	0.0	0.0	0.0	0.0
19	7.2	7.2	0.0	0.0	0.0	0.0	0.0
20	7.3	7.3	0.0	0.0	0.0	0.0	0.0
21	7.1	7.1	0.0	0.0	0.0	0.0	0.0
22	8.5	8.5	0.0	0.0	0.0	0.0	0.0
23	7.7	7.7	0.0	0.0	0.0	0.0	0.0
24	7.1	7.1	0.0	0.0	0.0	0.0	0.0
25	5.2	5.2	0.0	0.0	0.0	0.0	0.0
26	3.2	3.2	0.0	0.0	0.0	0.0	0.0
27	4.0	4.0	0.0	0.0	0.0	0.0	0.0
28	3.8	3.8	0.0	0.0	0.0	0.0	0.0
29	3.2	3.2	0.0	0.0	0.0	0.0	0.0
30	3.2	3.2	0.0	0.0	0.0	0.0	0.0
Total (cfs)	135.1	135.1	0.0	0.0	0.0	0.0	0.0
(acre-feet)	268.0	268.0	0.0	0.0	0.0	0.0	0.0

TABLE E-1 (continued)

SAN JACINTO WATERSHED DISCHARGE CALCULATIONS
WATER YEAR 2019-20
July 2020

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	4.4	4.4	0.0	0.0	0.0	0.0	0.0
2	6.1	6.1	0.0	0.0	0.0	0.0	0.0
3	4.1	4.1	0.0	0.0	0.0	0.0	0.0
4	2.5	2.5	0.0	0.0	0.0	0.0	0.0
5	2.2	2.2	0.0	0.0	0.0	0.0	0.0
6	2.6	2.6	0.0	0.0	0.0	0.0	0.0
7	2.2	2.2	0.0	0.0	0.0	0.0	0.0
8	2.1	2.1	0.0	0.0	0.0	0.0	0.0
9	2.2	2.2	0.0	0.0	0.0	0.0	0.0
10	1.6	1.6	0.0	0.0	0.0	0.0	0.0
11	1.9	1.9	0.0	0.0	0.0	0.0	0.0
12	2.0	2.0	0.0	0.0	0.0	0.0	0.0
13	1.2	1.2	0.0	0.0	0.0	0.0	0.0
14	1.2	1.2	0.0	0.0	0.0	0.0	0.0
15	1.0	1.0	0.0	0.0	0.0	0.0	0.0
16	1.2	1.2	0.0	0.0	0.0	0.0	0.0
17	1.2	1.2	0.0	0.0	0.0	0.0	0.0
18	1.1	1.1	0.0	0.0	0.0	0.0	0.0
19	1.1	1.1	0.0	0.0	0.0	0.0	0.0
20	1.2	1.2	0.0	0.0	0.0	0.0	0.0
21	1.5	1.5	0.0	0.0	0.0	0.0	0.0
22	1.6	1.6	0.0	0.0	0.0	0.0	0.0
23	1.8	1.8	0.0	0.0	0.0	0.0	0.0
24	1.4	1.4	0.0	0.0	0.0	0.0	0.0
25	1.6	1.6	0.0	0.0	0.0	0.0	0.0
26	2.1	2.1	0.0	0.0	0.0	0.0	0.0
27	1.6	1.6	0.0	0.0	0.0	0.0	0.0
28	1.7	1.7	0.0	0.0	0.0	0.0	0.0
29	3.1	3.1	0.0	0.0	0.0	0.0	0.0
30	3.4	3.4	0.0	0.0	0.0	0.0	0.0
31	2.7	2.7	0.0	0.0	0.0	0.0	0.0
Total (cfs)	65.6	65.6	0.0	0.0	0.0	0.0	0.0
(acre-feet)	130.0	130.0	0.0	0.0	0.0	0.0	0.0

TABLE E-1 (continued)

SAN JACINTO WATERSHED DISCHARGE CALCULATIONS
WATER YEAR 2019-20
August 2020

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	3.0	3.0	0.0	0.0	0.0	0.0	0.0
2	3.0	3.0	0.0	0.0	0.0	0.0	0.0
3	5.0	5.0	0.0	0.0	0.0	0.0	0.0
4	4.1	4.1	0.0	0.0	0.0	0.0	0.0
5	2.5	2.5	0.0	0.0	0.0	0.0	0.0
6	2.4	2.4	0.0	0.0	0.0	0.0	0.0
7	2.1	2.1	0.0	0.0	0.0	0.0	0.0
8	2.2	2.2	0.0	0.0	0.0	0.0	0.0
9	2.4	2.4	0.0	0.0	0.0	0.0	0.0
10	1.5	1.5	0.0	0.0	0.0	0.0	0.0
11	1.4	1.4	0.0	0.0	0.0	0.0	0.0
12	1.2	1.2	0.0	0.0	0.0	0.0	0.0
13	2.2	2.2	0.0	0.0	0.0	0.0	0.0
14	2.0	2.0	0.0	0.0	0.0	0.0	0.0
15	1.7	1.7	0.0	0.0	0.0	0.0	0.0
16	1.0	1.0	0.0	0.0	0.0	0.0	0.0
17	1.2	1.2	0.0	0.0	0.0	0.0	0.0
18	2.7	2.7	0.0	0.0	0.0	0.0	0.0
19	1.9	1.9	0.0	0.0	0.0	0.0	0.0
20	1.5	1.5	0.0	0.0	0.0	0.0	0.0
21	2.0	2.0	0.0	0.0	0.0	0.0	0.0
22	1.8	1.8	0.0	0.0	0.0	0.0	0.0
23	1.1	1.1	0.0	0.0	0.0	0.0	0.0
24	1.7	1.7	0.0	0.0	0.0	0.0	0.0
25	1.5	1.5	0.0	0.0	0.0	0.0	0.0
26	2.4	2.4	0.0	0.0	0.0	0.0	0.0
27	2.4	2.4	0.0	0.0	0.0	0.0	0.0
28	1.1	1.1	0.0	0.0	0.0	0.0	0.0
29	1.3	1.3	0.0	0.0	0.0	0.0	0.0
30	1.1	1.1	0.0	0.0	0.0	0.0	0.0
31	1.1	1.1	0.0	0.0	0.0	0.0	0.0
Total (cfs)	62.4	62.4	0.0	0.0	0.0	0.0	0.0
(acre-feet)	124.0	124.0	0.0	0.0	0.0	0.0	0.0

TABLE E-1 (continued)

SAN JACINTO WATERSHED DISCHARGE CALCULATIONS
WATER YEAR 2019-20
September 2020

Day	[1] Temescal Creek Flow	[2] Temescal Creek Base Flow	[3] Scalped Storm Flow	[4] EMWD Discharge to Temescal Creek	[5] San Jacinto Watershed Outflow At Prado	[6] Santa Ana River Flow Lost to the Ocean	[7] San Jacinto Outflow Recharged by OCWD
1	1.2	1.2	0.0	0.0	0.0	0.0	0.0
2	1.6	1.6	0.0	0.0	0.0	0.0	0.0
3	1.3	1.3	0.0	0.0	0.0	0.0	0.0
4	1.3	1.3	0.0	0.0	0.0	0.0	0.0
5	1.5	1.5	0.0	0.0	0.0	0.0	0.0
6	1.5	1.5	0.0	0.0	0.0	0.0	0.0
7	2.5	2.5	0.0	0.0	0.0	0.0	0.0
8	1.3	1.3	0.0	0.0	0.0	0.0	0.0
9	2.2	2.2	0.0	0.0	0.0	0.0	0.0
10	1.2	1.2	0.0	0.0	0.0	0.0	0.0
11	1.0	1.0	0.0	0.0	0.0	0.0	0.0
12	1.2	1.2	0.0	0.0	0.0	0.0	0.0
13	1.1	1.1	0.0	0.0	0.0	0.0	0.0
14	1.5	1.5	0.0	0.0	0.0	0.0	0.0
15	2.0	2.0	0.0	0.0	0.0	0.0	0.0
16	1.9	1.9	0.0	0.0	0.0	0.0	0.0
17	2.0	2.0	0.0	0.0	0.0	0.0	0.0
18	2.1	2.1	0.0	0.0	0.0	0.0	0.0
19	1.3	1.3	0.0	0.0	0.0	0.0	0.0
20	0.9	0.9	0.0	0.0	0.0	0.0	0.0
21	1.5	1.5	0.0	0.0	0.0	0.0	0.0
22	2.4	2.4	0.0	0.0	0.0	0.0	0.0
23	2.6	2.6	0.0	0.0	0.0	0.0	0.0
24	2.6	2.6	0.0	0.0	0.0	0.0	0.0
25	2.0	2.0	0.0	0.0	0.0	0.0	0.0
26	2.5	2.5	0.0	0.0	0.0	0.0	0.0
27	2.2	2.2	0.0	0.0	0.0	0.0	0.0
28	2.1	2.1	0.0	0.0	0.0	0.0	0.0
29	2.2	2.2	0.0	0.0	0.0	0.0	0.0
30	1.8	1.8	0.0	0.0	0.0	0.0	0.0
Total (cfs)	52.4	52.4	0.0	0.0	0.0	0.0	0.0
(acre-feet)	104.0	104.0	0.0	0.0	0.0	0.0	0.0

TABLE E-1 (continued)

SAN JACINTO WATERSHED DISCHARGE CALCULATIONS
WATER YEAR 2019-20

FOOTNOTES

(1) USGS measured flow of Temescal Creek above Main St. at Corona, which can be found in Appendix
(2) Temescal base flow was assumed to be the flow present when there are no sources of non-tributary flow and there has been no precipitation to cause storm flow.
(3) Temescal Creek flow attributed to storm events.
(4) Eastern Municipal Water District wastewater discharge to Temescal Creek at Wasson Canyon.
(5) Flow in Temescal Creek at Corona attributed to EMWD discharge of wastewater to Temescal Creek.
(6) Due to apparent inaccuracies and inconsistencies in the 5th Street stream gage readings, OCWD determined beginning in WY2018/19 to calculate Santa Ana River flow lost to the ocean as follows: 1 when Prado outflow is less than 1,000 cfs, the Prado and Imperial gages are typically within 5% of each other, and the loss to the ocean of Prado outflow is presumed to be zero, with OCWD capturing outflow is greater than or equal to 1,000 cfs, the Prado and Imperial gages typically differ by more tha 5%, and all such Prado outflow and 2) when Prado losses to the ocean are calculated as Prado discharge minus OCWD's measured capture.
(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 An River flow lost to the ocean, San Jacinto watershed outflow recharged by OCWD was calculated as the difference between the two.

TABLE E-2

SUMMARY OF SAN JACINTO WATERSHED DISCHARGE
WATER YEAR 2019-20

MONTHLY TOTALS
(ACRE-FEET)

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
2019				
October	0	0	0	0
November	0	0	0	0
December	0	0	0	0
2020				
January	1,852	518	0	518
February	666	313	0	313
March	2,125	1,463	990	594
April	2,637	2,187	16,457	676
May	0	115	0	115
June	0	0	0	0
July	0	0	0	0
August	0	0	0	0
September	0	0	0	0
Total	7,280	4,596	17,447	2,216

TABLE E-3

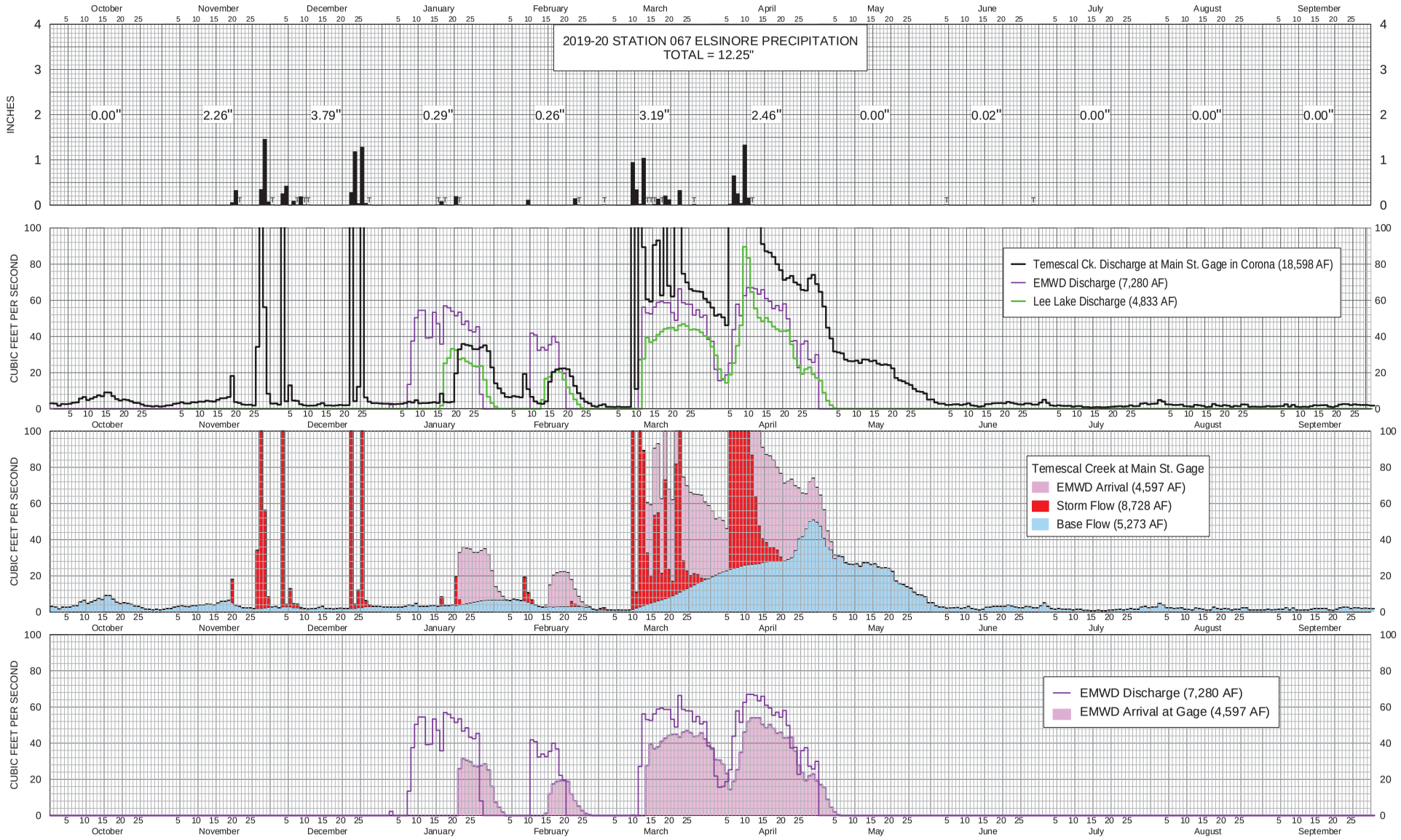
SUMMARY OF FLOW-WEIGHTED AVERAGE TDS
OF SAN JACINTO WATERSHED DISCHARGE
CALCULATED TO REACH PRADO RESERVOIR
WATER YEAR 2019-20

Month	EMWD Discharge to Temescal Creek (acre-feet) [1]	EMWD Discharge TDS (mg/L) [2]	EMWD Discharge x TDS [3]	San Jacinto Watershed Outflow At Prado (acre-feet)	EMWD Flow at Prado Reservoir x TDS [4]
2019					
October	0	---	---	0	0
November	0	---	---	0	0
December	0	---	---	0	0
2020					
January	1,852	663	1,227,876	518	343,434
February	666	688	458,208	313	215,344
March	2,125	676	1,436,500	1,463	988,988
April	2,637	715	1,885,455	2,187	1,563,705
May	0	---	---	115	0
June	0	---	---	0	0
July	0	---	---	0	0
August	0	---	---	0	0
September	0	---	---	0	0
Total	7,280		5,008,039	4,596	3,111,471

Flow-weighted TDS of EMWD Discharge [3] = 688 mg/L

Flow-weighted TDS of San Jacinto Watershed Outflow At Prado [4] = 677 mg/L

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



WATER YEAR 2019-20 PROVISIONAL DISCHARGE OF TEMESCAL CREEK AT MAIN STREET IN CORONA, EMWD DISCHARGE, AND ELSINORE PRECIPITATION

APPENDIX F

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

WATER YEAR 2019-20

TABLE F-1

WATER QUALITY SAMPLES BELOW PRADO DAM
WATER YEAR 2019-20

Date	TDS (mg/L)	EC (um/cm)	TDS/EC Ratio	Source
10/7/2019	563	1140	0.4939	USGS
10/22/2019	684	1150	0.5948	USGS
10/22/2019	694	1140	0.6088	USGS
11/7/2019	678	1140	0.5947	USGS
11/7/2019	663	1130	0.5867	USGS
11/19/2019	700	1180	0.5932	USGS
12/9/2019	244	440	0.5545	USGS
12/16/2019	427	723	0.5906	USGS
12/16/2019	470	761	0.6176	USGS
1/6/2020	443	750	0.5907	USGS
1/6/2020	458	726	0.6309	USGS
1/23/2020	635	1040	0.6106	USGS
1/23/2020	615	1050	0.5857	USGS
2/3/2020	685	1170	0.5855	USGS
2/3/2020	681	1100	0.6191	USGS
2/19/2020	677	1140	0.5939	USGS
2/26/2020	663	1100	0.6027	USGS
3/4/2020	646	1090	0.5927	USGS
3/4/2020	663	1080	0.6139	USGS
3/17/2020	278	459	0.6057	USGS
3/17/2020	308	493	0.6247	USGS
4/1/2020	441	730	0.6041	USGS
4/14/2020	308	513	0.6004	USGS
4/28/2020	415	690	0.6014	USGS
5/4/2020	448	745	0.6013	USGS
5/13/2020	456	772	0.5907	USGS
5/19/2020	452	786	0.5751	USGS
5/28/2020		8		USGS
6/2/2020		867		USGS
6/10/2020	559	918	0.6089	USGS
6/19/2020		1010		USGS
6/24/2020	639	1050	0.6086	USGS
7/14/2020	755	1210	0.6240	USGS
7/16/2020	754	1210	0.6231	USGS
7/30/2020	704	1140	0.6175	USGS
8/12/2020	686	1150	0.5965	USGS
8/12/2020	712	1140	0.6246	USGS
8/24/2020	678	1100	0.6164	USGS
9/4/2020	712	1160	0.6138	USGS
9/16/2020	694	1120	0.6196	USGS
9/22/2020	688	1140	0.6035	USGS

TABLE F-2

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2019-20

October 2019

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	93	1,110	671	62,671
2	90	1,120	677	60,930
3	92	1,110	671	61,531
4	85	1,130	683	57,714
5	80	1,150	695	55,739
6	83	1,150	695	57,546
7	86	1,140	689	59,392
8	76	1,170	707	53,661
9	75	1,150	695	52,125
10	70	1,150	695	48,581
11	63	1,160	701	44,163
12	63	1,160	701	43,953
13	71	1,170	707	50,056
14	80	1,160	701	55,870
15	80	1,150	695	55,809
16	80	1,150	695	55,531
17	80	1,140	689	54,982
18	84	1,130	683	57,304
19	87	1,120	677	59,102
20	88	1,100	665	58,653
21	88	1,100	665	58,254
22	85	1,080	652	55,355
23	84	1,080	652	55,029
24	80	1,080	652	51,899
25	74	1,090	658	48,560
26	77	1,080	652	50,074
27	83	1,090	658	54,482
28	85	1,060	640	54,080
29	87	1,090	658	56,983
30	86	1,080	652	56,137
31	84	1,090	658	55,535
Total	2,517			1,701,699
		Monthly Flow-weighted TDS =	676 mg/L	

(1) TDS = EC :0.6041

TABLE F-2 (continued)

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2019-20

November 2019

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	84	1,100	665	55,528
2	74	1,110	671	49,855
3	85	1,110	671	57,035
4	96	1,090	658	63,036
5	95	1,100	665	63,441
6	96	1,100	665	64,040
7	109	--- [2]		
8	104	--- [2]		
9	94	1,140	689	65,042
10	93	1,140	689	64,353
11	96	1,140	689	65,868
12	102	1,140	689	70,278
13	106	1,130	683	72,398
14	94	1,130	683	64,339
15	72	1,160	701	50,192
16	73	1,180	713	52,192
17	80	1,160	701	56,080
18	86	1,150	695	59,770
19	78	1,140	689	53,398
20	73	1,120	677	49,421
21	184	921	556	102,304
22	170	1,100	665	113,050
23	124	1,100	665	82,460
24	126	1,100	665	83,790
25	136	1,080	652	88,672
26	133	1,080	652	86,716
27	156	905	547	85,332
28	236	669	404	95,344
29	242	450	272	65,824
30	239	453	274	65,486
Total	3,536			1,945,242
		Monthly Flow-weighted TDS =	585 mg/L	
Total	3,323 [3]			

(1) TDS = EC :0.6041

(2) Equipment malfunction, thus EC data are missing for 11/07/2019 and 11/08/2019.
Missing EC are excluded in the monthly flow-weighted TDS calculation.

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

TABLE F-2 (continued)

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2019-20

December 2019

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	241	464	280	67,480
2	394	473	286	112,684
3	369	500	302	111,438
4	270	556	336	90,720
5	366	521	315	115,290
6	417	458	277	115,509
7	418	445	269	112,442
8	418	457	276	115,368
9	418	450	272	113,696
10	416	490	296	123,136
11	413	528	319	131,747
12	448	548	331	148,288
13	470	537	324	152,280
14	466	551	333	155,178
15	461	581	351	161,811
16	487	732	442	215,254
17	502	706	426	213,852
18	537	619	374	200,838
19	550	634	383	210,650
20	537	721	436	234,132
21	518	780	471	243,978
22	498	837	506	251,988
23	369	850	513	189,297
24	311	684	413	128,443
25	289	784	474	136,986
26	296	547	330	97,680
27	400	288	174	69,600
28	399	367	222	88,578
29	398	409	247	98,306
30	469	466	282	132,258
31	510	498	301	153,510
Total	13,055			4,492,417
		Monthly Flow-weighted TDS =	344 mg/L	

(1) TDS = EC :0.6041

TABLE F-2 (continued)

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2019-20

January 2020

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	504	497	300	151,200
2	512	502	303	155,136
3	512	521	315	161,280
4	505	542	327	165,135
5	498	560	338	168,324
6	500	676	408	204,000
7	502	579	350	175,700
8	494	566	342	168,948
9	388	568	343	133,084
10	261	597	361	94,221
11	261	620	375	97,875
12	260	639	386	100,360
13	383	668	404	154,732
14	451	705	426	192,126
15	445	757	457	203,365
16	422	789	477	201,294
17	408	844	510	208,080
18	401	905	547	219,347
19	391	940	568	222,088
20	385	984	594	228,690
21	378	1,040	628	237,384
22	371	1,070	646	239,666
23	386	1,080	652	251,672
24	385	1,110	671	258,335
25	367	1,150	695	255,065
26	340	1,210	731	248,540
27	311	1,220	737	229,207
28	196	1,200	725	142,100
29	172	1,180	713	122,636
30	165	1,170	707	116,655
31	162	1,180	713	115,506
Total	11,716			5,621,751
		Monthly Flow-weighted TDS =	480 mg/L	

(1) TDS = EC :0.6041

TABLE F-2 (continued)

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2019-20

February 2020

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	159	1,180	713	113,367
2	167	1,170	707	118,069
3	172	1,160	701	120,572
4	161	1,160	701	112,861
5	155	1,140	689	106,795
6	149	1,160	701	104,449
7	151	1,160	701	105,851
8	154	1,160	701	107,954
9	165	1,140	689	113,685
10	166	1,130	683	113,378
11	149	1,140	689	102,661
12	124	1,190	719	89,156
13	121	1,200	725	87,725
14	123	1,210	731	89,913
15	129	1,200	725	93,525
16	135	1,200	725	97,875
17	138	1,200	725	100,050
18	144	1,190	719	103,536
19	145	1,160	701	101,645
20	130	1,160	701	91,130
21	133	1,160	701	93,233
22	141	1,140	689	97,149
23	149	1,080	652	97,148
24	205	1,090	658	134,890
25	183	1,100	665	121,695
26	169	1,110	671	113,399
27	169	1,100	665	112,385
28	160	1,100	665	106,400
29	154	1,110	671	103,334
Total	4,400	Monthly Flow-weighted TDS =	694 mg/L	3,053,830

(1) TDS = EC :0.6041

TABLE F-2 (continued)

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2019-20

March 2020

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	151	1,110	671	101,321
2	165	1,080	652	107,580
3	151	1,090	658	99,358
4	144	1,100	665	95,760
5	137	1,110	671	91,927
6	139	1,110	671	93,269
7	136	1,100	665	90,440
8	140	1,090	658	92,120
9	148	1,070	646	95,608
10	154	790	477	73,458
11	184	476	288	52,992
12	177	516	312	55,224
13	248	379	229	56,792
14	336	394	238	79,968
15	335	387	234	78,390
16	333	403	243	80,919
17	334	506	306	102,204
18	331	551	333	110,223
19	328	505	305	100,040
20	329	581	351	115,479
21	328	559	338	110,864
22	327	548	331	108,237
23	315	639	386	121,590
24	312	589	356	111,072
25	274	563	340	93,160
26	222	579	350	77,700
27	234	595	359	84,006
28	239	629	380	90,820
29	248	650	393	97,464
30	239	676	408	97,512
31	238	709	428	101,864
Total	7,376			2,867,361
		Monthly Flow-weighted TDS =	389 mg/L	

(1) TDS = EC :0.6041

TABLE F-2 (continued)

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2019-20

April 2020

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	245	--- [2]		
2	259	756	457	118,363
3	274	753	455	124,670
4	285	754	455	129,675
5	291	760	459	133,569
6	360	724	437	157,320
7	671	594	359	240,889
8	748	510	308	230,384
9	762	529	320	243,840
10	784	518	313	245,392
11	792	423	256	202,752
12	795	436	263	209,085
13	762	472	285	217,170
14	744	503	304	226,176
15	738	526	318	234,684
16	737	517	312	229,944
17	740	518	313	231,620
18	733	531	321	235,293
19	727	557	336	244,272
20	743	581	351	260,793
21	759	575	347	263,373
22	756	603	364	275,184
23	521	649	392	204,232
24	242	717	433	104,786
25	222	736	445	98,790
26	217	733	443	96,131
27	240	720	435	104,400
28	266	710	429	114,114
29	272	695	420	114,240
30	297	691	417	123,849
Total	15,982			5,414,990
		Monthly Flow-weighted TDS =	344 mg/L	
Total	15,737 [3]			

(1) TDS = EC x 0.6041

(2) Equipment malfunction thus EC data are missing for 04/01/2020.
Missing EC are excluded in the monthly flow-weighted TDS calculation.

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

TABLE F-2 (continued)

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2019-20

May 2020

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	308	708	428	131,824
2	304	723	437	132,848
3	301	748	452	136,052
4	257	763	461	118,477
5	263	774	468	123,084
6	262	780	471	123,402
7	261	781	472	123,192
8	261	780	471	122,931
9	260	776	469	121,940
10	260	778	470	122,200
11	258	777	469	121,002
12	258	778	470	121,260
13	257	775	468	120,276
14	255	786	475	121,125
15	255	797	481	122,655
16	252	794	480	120,960
17	249	804	486	121,014
18	266	808	488	129,808
19	287	796	481	138,047
20	287	794	480	137,760
21	284	798	482	136,888
22	283	797	481	136,123
23	282	798	482	135,924
24	282	810	489	137,898
25	281	819	495	139,095
26	280	828	500	140,000
27	279	834	504	140,616
28	279	826	499	139,221
29	277	830	501	138,777
30	274	838	506	138,644
31	270	846	511	137,970
Total	8,432			4,031,013
		Monthly Flow-weighted TDS=	478 mg/L	

(1) TDS = EC :0.6041

TABLE F-2 (continued)

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2019-20

June 2020

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	266	853	515	136,990
2	243	860	520	126,360
3	189	874	528	99,792
4	171	879	531	90,801
5	170	882	533	90,610
6	170	900	544	92,480
7	173	917	554	95,842
8	180	911	550	99,000
9	185	932	563	104,155
10	186	939	567	105,462
11	194	944	570	110,580
12	202	951	574	115,948
13	205	972	587	120,335
14	208	975	589	122,512
15	218	978	591	128,838
16	223	986	596	132,908
17	224	996	602	134,848
18	226	1,000	604	136,504
19	226	1,020	616	139,216
20	226	1,020	616	139,216
21	226	1,030	622	140,572
22	225	1,040	628	141,300
23	224	1,060	640	143,360
24	223	1,070	646	144,058
25	222	1,090	658	146,076
26	220	1,100	665	146,300
27	218	1,120	677	147,586
28	214	1,130	683	146,162
29	228	1,150	695	158,460
30	279	1,170	707	197,253
Total	6,364			3,833,524
		Monthly Flow-weighted TDS =	602 mg/L	

(1) TDS = EC :0.6041

TABLE F-2 (continued)

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2019-20

July 2020

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	295	1,190	719	212,105
2	290	1,200	725	210,250
3	277	1,210	731	202,487
4	255	--- [2]		
5	203	--- [2]		
6	101	--- [2]		
7	86	--- [2]		
8	77	--- [2]		
9	76	--- [2]		
10	76	--- [2]		
11	77	--- [2]		
12	77	--- [2]		
13	74	--- [2]		
14	80	--- [2]		
15	78	--- [2]		
16	75	--- [2]		
17	72	--- [2]		
18	75	--- [2]		
19	75	--- [2]		
20	79	--- [2]		
21	82	--- [2]		
22	79	--- [2]		
23	78	--- [2]		
24	80	--- [2]		
25	80	--- [2]		
26	78	--- [2]		
27	77	--- [2]		
28	72	--- [2]		
29	66	--- [2]		
30	67	--- [2]		
31	69	1,180	713	49,268
Total	3,327			674,110
		Monthly Flow-weighted TDS =	724 mg/L	
Total	931 [3]			

(1) TDS = EC :0.6041

(2) Equipment malfunction, thus EC data are missing for the July 4-30, 2020 period.
Missing EC are excluded in the monthly flow-weighted TDS calculation.

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

TABLE F-2 (continued)

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2019-20

August 2020

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	68	1,150	695	47,399
2	65	1,160	701	45,565
3	75	1,130	683	51,362
4	74	1,130	683	50,269
5	76	1,130	683	52,045
6	71	1,150	695	49,276
7	74	1,150	695	51,569
8	74	1,140	689	51,124
9	69	1,150	695	48,233
10	75	1,150	695	52,403
11	74	1,130	683	50,201
12	74	1,120	677	50,301
13	72	1,120	677	48,406
14	68	1,130	683	46,717
15	66	1,130	683	45,283
16	66	1,130	683	44,737
17	70	1,120	677	47,119
18	71	1,110	671	47,373
19	73	1,120	677	49,624
20	74	1,100	665	49,144
21	72	1,090	658	47,047
22	67	1,120	677	45,562
23	68	1,120	677	45,833
24	69	1,110	671	46,098
25	67	1,130	683	45,966
26	64	1,140	689	44,303
27	61	1,150	695	42,673
28	53	1,160	701	37,013
29	58	1,170	707	41,147
30	66	1,200	725	47,850
31	67	1,160	701	47,177
Total	2,142			1,421,638
		Monthly Flow-weighted TDS =	664 mg/L	

(1) TDS = EC :0.6041

TABLE F-2 (continued)

SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2019-20

September 2020

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	71	1,160	701	49,421
2	72	1,150	695	50,110
3	74	1,140	689	51,055
4	73	1,140	689	50,297
5	70	1,140	689	48,023
6	68	1,140	689	46,576
7	64	1,140	689	43,889
8	69	1,160	701	48,089
9	77	1,130	683	52,250
10	87	1,100	665	57,523
11	77	1,110	671	51,734
12	79	1,120	677	53,348
13	77	1,130	683	52,523
14	77	1,120	677	51,994
15	87	1,120	677	58,967
16	117	1,110	671	78,507
17	97	1,100	665	64,239
18	71	1,120	677	48,338
19	70	1,130	683	47,810
20	70	1,130	683	47,469
21	72	1,120	677	48,947
22	72	1,120	677	48,947
23	74	1,120	677	49,895
24	70	1,130	683	47,878
25	71	1,120	677	48,338
26	73	1,110	671	49,050
27	73	1,120	677	49,624
28	77	1,110	671	51,399
29	78	1,110	671	52,539
30	77	1,100	665	51,272
Total	2,282			1,550,047
		Monthly Flow-weighted TDS =	679 mg/L	

(1) TDS = EC :0.6041

TABLE F-3

ANNUAL SUMMARY OF FLOW-WEIGHTED TDS BELOW PRADO DAM
WATER YEAR 2019-20

Month	Monthly Flow [1] (cfs-days)	Monthly Flow-weighted TDS[1] (mg/L)	Monthly Flow x TDS
2019			
October	2,517	676	1,701,699
November	3,323 [1]	585	1,945,242
December	13,055	344	4,492,417
2020			
January	11,716	480	5,621,751
February	4,400	694	3,053,600
March	7,376	389	2,867,361
April	15,737 [1]	344	5,414,990
May	8,432	478	4,031,013
June	6,364	602	3,833,524
July	931 [1]	724	674,110
August	2,142	664	1,421,638
September	2,282	679	1,550,047
Total	78,274 [1]		36,607,392
	Yearly Flow-weighted TDS[1] =	468	

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

APPENDIX G

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

WATER YEAR 2019-20

TABLE G-1

QUANTITY AND QUALITY OF WASTEWATER FROM RUBIDOUX
DISCHARGED BELOW THE RIVERSIDE NARROWS GAGING STATION
WATER YEAR 2019-20

Month	Discharge (acre -feet)	TDS (mg/L)	Discharge xTDS
2019			
October	178	946	168,388
November	152	762	115,824
December	155	772	119,660
2020			
January	151	786	118,686
February	142	806	114,452
March	157	753	118,221
April	156	767	119,652
May	161	767	123,487
June	158	788	124,504
July	165	795	131,175
August	167	702	117,234
September	160	751	120,160
Total	1,902		1,491,443

$$\text{Flow-weighted TDS} = \frac{1{,}491{,}443}{1{,}902} = 784 \text{ mg/L}$$

APPENDIX H

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

WATER YEAR 2019-20

TABLE H-1

WATER QUALITY SAMPLES AT RIVERSIDE NARROWS
WATER YEAR 2019-20

	Date Sampled	EC (microsiemens/cm)	TDS (mg/L)	Source of Data	Ratio	Monthly Average TDS
2019	10/01/19	1032	694	C of R	0.67	
	10/06/19	1024	632	C of R	0.62	
	10/07/19	1020	620	USGS	0.61	
	10/08/19	1037	616	C of R	0.59	
	10/13/19	1010	607	C of R	0.60	
	10/15/19	1023	632	C of R	0.62	
	10/20/19	1004	605	C of R	0.60	
	10/22/19	1019	623	C of R	0.61	
	10/22/19	1040	627	USGS	0.60	
	10/27/19	979	597	C of R	0.61	
	10/30/19	1014	606	C of R	0.60	***624***
	11/03/19	990	587	C of R	0.59	
	11/05/19	1002	596	C of R	0.59	
	11/07/19	1020	627	USGS	0.61	
	11/10/19	989	592	C of R	0.60	
	11/12/19	1000	606	C of R	0.61	
	11/17/19	989	618	C of R	0.62	
	11/19/19	1008	609	C of R	0.60	
	11/19/19	1020	627	USGS	0.61	
	11/24/19	991	600	C of R	0.61	
	11/26/19	1020	626	C of R	0.61	***609***
	12/01/19	1020	628	C of R	0.62	
	12/03/19	990	614	C of R	0.62	
	12/08/19	997	616	C of R	0.62	
	12/09/19	837	502	USGS	0.60	
	12/10/19	1007	622	C of R	0.62	
	12/15/19	1029	614	C of R	0.60	
	12/16/19	980	610	USGS	0.62	
	12/17/19	1038	617	C of R	0.59	
	12/22/19	1009	609	C of R	0.60	
	12/24/19	980	582	C of R	0.59	
	12/29/19	1026	633	C of R	0.62	
	12/31/19	1028	632	C of R	0.61	***607***

TABLE H-1 (continued)

WATER QUALITY SAMPLES AT RIVERSIDE NARROWS
WATER YEAR 2019-20

	Date Sampled	EC (microsiemens/cm)	TDS (mg/L)	Source of Data		Ratio	Monthly Average TDS
2020	01/05/20	1024	615	C of R		0.60	
	01/06/20	1000	627	USGS		0.63	
	01/07/20	1025	620	C of R		0.60	
	01/12/20	975	610	C of R		0.63	
	01/14/20	988	611	C of R		0.62	
	01/19/20	1021	628	C of R		0.62	
	01/21/20	1029	631	C of R		0.61	
	01/23/20	975	606	C of R		0.62	
	01/26/20	989	600	C of R		0.61	
	01/28/20	984	597	C of R		0.61	***615***
	02/02/20	1007	611	C of R		0.61	
	02/03/20	990	615	USGS		0.62	
	02/04/20	1040	622	C of R		0.60	
	02/09/20	1012	614	C of R		0.61	
	02/11/20	1025	582	C of R		0.57	
	02/16/20	1004	604	C of R		0.60	
	02/18/20	1007	620	C of R		0.62	
	02/19/20	993	621	C of R		0.63	
	02/19/20	980	596	USGS		0.61	
	02/23/20	1004	610	C of R		0.61	
	02/25/20	1002	618	C of R		0.62	***610***
	03/01/20	994	575	C of R		0.58	
	03/03/20	1016	600	C of R		0.59	
	03/04/20	949	606	USGS		0.64	
	03/05/20	1033	632	C of R		0.61	
	03/08/20	1008	607	C of R		0.60	
	03/10/20	987	582	C of R		0.59	
	03/15/20	1003	609	C of R		0.61	
	03/17/20	1018	634	C of R		0.62	
	03/17/20	284	266	USGS	*	0.94	
	03/22/20	1025	618	C of R		0.60	
	03/24/20	998	558	C of R		0.56	
	03/29/20	1035	607	C of R		0.59	
	03/31/20	1035	598	C of R		0.58	***602***

TABLE H-1 (continued)

WATER QUALITY SAMPLES AT RIVERSIDE NARROWS
WATER YEAR 2019-20

Date Sampled	EC (microsiemens/cm)	TDS (mg/L)	Source of Data		Ratio	Monthly Average TDS
04/05/20	1035	610	C of R		0.59	
04/07/20	967	576	C of R		0.60	
04/07/20	270	173	USGS	*	0.64	
04/12/20	1050	613	C of R		0.58	
04/14/20	1062	620	C of R		0.58	
04/19/20	1059	645	C of R		0.61	
04/21/20	1056	600	C of R		0.57	
04/21/20	973	609	USGS		0.63	
04/26/20	1049	644	C of R		0.61	
04/28/20	1064	644	C of R		0.61	***618***
05/03/20	1054	617	C of R		0.59	
05/05/20	1060	616	C of R		0.58	
05/07/20	905	635	USGS		0.70	
05/10/20	1048	617	C of R		0.59	
05/12/20	1043	626	C of R		0.60	
05/17/20	1044	627	C of R		0.60	
05/19/20	1045	631	C of R		0.60	
05/20/20	905	643	USGS		0.71	
05/24/20	1041	639	C of R		0.61	
05/26/20	1032	644	C of R		0.62	
05/31/20	1048	641	C of R		0.61	***631***
06/02/20	1054	653	C of R		0.62	
06/07/20	1030	628	C of R		0.61	
06/09/20	1063	651	C of R		0.61	
06/14/20	1049	646	C of R		0.62	
06/16/20	1046	663	C of R		0.63	
06/21/20	1032	659	C of R		0.64	
06/23/20	1018	623	C of R		0.61	
06/24/20	1000	628	USGS		0.63	
06/28/20	999	619	C of R		0.62	
06/30/20	1011	588	C of R		0.58	***636***
07/05/20	1005	626	C of R		0.62	
07/07/20	1023	610	C of R		0.60	
07/07/20	997	625	USGS		0.63	

TABLE H-1 (continued)

WATER QUALITY SAMPLES AT RIVERSIDE NARROWS
WATER YEAR 2019-20

Date Sampled	EC (microsiemens/cm)	TDS (mg/L)	Source of Data	Ratio	Monthly Average TDS
07/12/20	1013	579	C of R	0.57	
07/14/20	1013	604	C of R	0.60	
07/16/20	1014	617	C of R	0.61	
07/19/20	1040	604	C of R	0.58	
07/20/20	997	625	USGS	0.63	
07/26/20	964	631	C of R	0.65	
07/28/20	1023	618	C of R	0.60	***614***
08/02/20	1059	634	C of R	0.60	
08/04/20	1016	638	C of R	0.63	
08/07/20	1010	628	USGS	0.62	
08/09/20	1030	636	C of R	0.62	
08/01/20	1045	606	C of R	0.58	
08/16/20	1035	663	C of R	0.64	
08/18/20	1043	650	C of R	0.62	
08/23/20	1043	649	C of R	0.62	
08/24/20	1020	618	USGS	0.61	
08/25/20	1052	660	C of R	0.63	
08/30/20	1023	659	C of R	0.64	***640***
09/01/20	1020	682	C of R	0.67	
09/06/20	1014	628	C of R	0.62	
09/08/20	1026	638	C of R	0.62	
09/09/20	1020	636	USGS	0.62	
09/13/20	1005	595	C of R	0.59	
09/15/20	1012	592	C of R	0.58	
09/20/20	1008	603	C of R	0.60	
09/21/20	1020	652	USGS	0.64	
09/22/20	1000	546	C of R	0.55	
09/27/20	994	610	C of R	0.61	
09/29/20	999	611	C of R	0.61	***618***
Max	1064	694		0.94	640
Min	270	173		0.55	602

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

TABLE H-2

ANNUAL SUMMARY OF FLOW-WEIGHTED TDS AT RIVERSIDE NARROWS
WATER YEAR 2019-20

	Month	Stream Flow [1] (acre-feet)	Monthly Average TDS [2] (mg/L)	Monthly Flow x TDS
2019	October	1,860	624	1,160,640
	November	2,170	609	1,321,530
	December	2,985	607	1,811,895
2020	January	3,210	615	1,974,150
	February	3,013	610	1,837,930
	March	3,246	602	1,954,092
	April	3,141	618	1,941,138
	May	2,786	631	1,757,966
	June	2,229	636	1,417,644
	July	1,755	614	1,077,570
	August	1,786	640	1,143,040
	September	2,013	618	1,244,034
	Total Stream Flow	30,194		18,641,629

$$\text{Flow-weighted TDS} = \frac{18{,}641{,}629}{30{,}194} = 617 \text{ mg/L}$$

(1) USGS measured flow minus storm flow.

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