SANTA ANA RIVER WATERMASTER

FOR

ORANGE COUNTY WATER DISTRICT

VS. CITY OF CHINO et al.

CASE NO. 117628 - COUNTY OF ORANGE

THIRTY-SECOND ANNUAL REPORT OF THE SANTA ANA RIVER WATERMASTER

FOR WATER YEAR

OCTOBER 1, 2001 - SEPTEMBER 30, 2002

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WATERMASTER
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April 30, 2003

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

Re: Watermaster Report for Water Year October 1, 2001 - September 30, 2002

Ladies and Gentlemen:

We have the honor of submitting herewith the Thirty-second Annual Report of the Santa Ana River Watermaster. We wish to point out that the supporting basic data heretofore presented as Appendices are bound separately.

The principal findings of the Watermaster for the water year 2001-02 are as follows:

At Prado

1	Base Flow at Prado	145,981 acre-feet
2	Annual Weighted TDS in Base and Storm Flows	587 mg/L
3	Annual Adjusted Base Flow	159,728 acre-feet
4	Cumulative Adjusted Base Flow	3,694,332 acre-feet
5	One-Half San Jacinto Watershed Discharge Reaching Prado Dam and Recharging Orange County Groundwater Basin	0 acre-feet
6	Cumulative Entitlement of OCWD	1,344,000 acre-feet
7	Cumulative Credit	2,350,332 acre-feet
8	One-Third of Cumulative Debit	0 acre-feet
9	Minimum Required Base Flow in 2002-03	34,000 acre-feet

At Riverside Narrows

1	Base Flow at Riverside Narrows	58,705 acre-feet
2	Annual Weighted TDS in Base Flow	606 mg/L
3	Annual Adjusted Base Flow	58,705 acre-feet
4	Cumulative Adjusted Base Flow	1,358,986 acre-feet
5	Cumulative Entitlement of IEUA and WMWD	488,000 acre-feet
6	Cumulative Credit	870,986 acre-feet
7	One-Third of Cumulative Debit	0 acre-feet
8	Minimum Required Base Flow in 2002-03	12,420 acre-feet

The above findings show that at the end of the 2001-02 water year, Inland Empire Utilities Agency (formerly Chino Basin Municipal Water District) and Western Municipal Water District have a cumulative credit of 2,350,332 acre-feet to their Base Flow obligation at Prado Dam. San Bernardino Valley Municipal Water District has a cumulative credit of 870,986 acre-feet to its Base Flow obligation at Riverside Narrows.

Based on these findings, the Watermaster concludes that there was full compliance with the provisions of the Stipulated Judgment in 2001-02.

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: Richard W. Atwater

Richard W. Atwater

Bill B. Dendy

Virginia Grebbien

Donald L. Harriger

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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.

CHAPTER I

WATERMASTER ACTIVITIES AND WATER CONDITIONS

Introduction

This Thirty-second Annual Report of the Santa Ana River Watermaster covers Water Year 2001-02. The annual report is required by the Stipulated Judgment (Judgment) in the case of Orange County Water District vs. City of Chino et al., entered by the court on April 17, 1969 (Case No. 117628-County of Orange). The Stipulated 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 to administer the provisions of the Judgment. The Watermaster's duty is to maintain a continuous accounting of each of the items listed in the letter of transmittal hereof and to report thereon annually for each water year to the court and the parties. The water year begins October 1 and ends the following September 30. The time for submission of the annual report is April 30, seven months after the end of the water year.

For the 2001-02 Water Year the Watermaster Committee consisted of Donald L. Harriger, Robert L. Reiter, Bill B. Dendy, Richard W. Atwater, and Virginia Grebbien. Mr. Harriger served as Chairman and Mr. Reiter served as Secretary/Treasurer. Chapter IV presents the history of Watermaster Committee membership.

Watermaster Service Expenses

In accordance with Paragraph 7(d) of the Stipulated 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.

Stream flow measurements and water quality data required by the Watermaster are, for the most part, furnished by the U.S. Geological Survey (USGS) through a cooperative monitoring program. The costs of the cooperative monitoring program for the 2001-02 Water Year, and each party's share of the costs, are set forth in Table 1.

TABLE 1
COSTS TO THE PARTIES AND USGS FOR MEASUREMENTS WHICH PROVIDE DATA USED BY THE SANTA ANA RIVER WATERMASTER

October 1, 2001 to September 30, 2002

	Total Cost	USGS Share	Parties' Share
USGS GAGING STATION			
Santa Ana River at MWD Crossing (Riverside Narrows)			
Surface Water Gage	$22,600	$11,300	$11,300
Water Quality Monitoring/TDS Sampling	9,300	4,650	4,650
Chino Creek at Schaefer	16,100	8,050	8,050
Cucamonga Creek at Mira Loma	16,100	8,050	8,050
Santa Ana River below Prado Dam			
Surface Water Gage	16,100	8,050	8,050
Water Quality Monitoring/TDS Sampling	17,850	8,925	8,925
Water Quality Conductance Program	1,800	0	1,800
TOTAL COST AND SHARES	$99,850	$49,025	$50,825
COST DISTRIBUTION AMONG PARTIES			
Inland Empire Utilities Agency	20%		$10,165
Orange County Water District	40%		$20,330
San Bernardino Valley Municipal Water District	20%		$10,165
Western Municipal Water District	20%		$10,165

The Watermaster annually adopts a budget for the costs of services other than those provided by the USGS. Table 2 shows the budget and actual expenses incurred for such services during the 2001-02 fiscal year as well as the budget adopted for the 2001-02 fiscal year. A financial review was performed by OCWD and is reported in Appendix C.

TABLE 2

WATERMASTER SERVICE BUDGET AND EXPENSES

Budget Item	July 1, 2001 to June 30, 2002 Budget	July 1, 2001 to June 30, 2002 Expenses[1]	July 1, 2002 to June 30, 2003 Budget
Support Services	$9,500.00	$1,971.00	$9,500.00
Reproduction of Annual Report	2,500.00	0.00	2,500.00
TOTAL	$12,000.00	$1,971.00	$12,000.00

(1) Expenses appear low because a portion of the expenses were paid after June 30, 2003 and will be expensed in 2002-03.

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 flow and quality for the Santa Ana River (River) at Prado Dam and at Riverside Narrows as well as stream flows for most tributaries; flow and quality of nontributary water entering the River; rainfall records at locations in or adjacent to the Watershed; and other data that may be used to support the Watermaster's determinations.

For Water Year 2001-02 the USGS provided flow and water quality data for the Santa Ana River at two gaging stations, "Santa Ana River Below Prado" (Prado) and "Santa Ana River at Metropolitan Water District (MWD) Crossing" (Riverside Narrows). The flow data at both stations consist of computed mean daily discharges, expressed in cubic feet per second (cfs), based on continuous recordings. The water quality data at Prado consist of daily maximum and minimum values for electrical conductivity (EC), measured as specific conductance and expressed in microsiemens per centimeter (μs/cm) based on a continuous recording, and twice-monthly measured values for total dissolved solids (TDS), expressed in milligrams per liter (mg/L). The water quality data at Riverside Narrows consist of twice-monthly values for both EC and TDS. The USGS also provided discharge data for other gaging stations for streams tributary to Prado, including, among others, the Santa Ana River at E Street in San Bernardino, Chino

Creek at Schaefer Avenue, Cucamonga Creek near Mira Loma, and Temescal Creek in the City of Corona (see Appendix A).

The 2001-02 daily mean discharge record at Prado is considered by the USGS to be a "good" record. 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, 365 cfs on November 27, 2001, and 157 cfs on September 15, 2002. The maximum and minimum daily mean EC values at Prado were 1030 µs/cm on February 14, 2002, and 518 µs/cm on November 25, 2001. The respective corresponding calculated TDS concentrations were 647 and 325 mg/L.

The 2001-02 daily mean discharge record at Riverside Narrows is considered by the USGS to be "poor". The maximum and minimum daily mean discharge values during the year were 612 cfs on November 24, 2001 and 59 cfs on August 17, 2002. The maximum and minimum daily mean EC values were 939 µs/cm on October 16, 2001 and 848 µs/cm on May 20, 2002. The respective corresponding measured TDS concentrations were 576 and 530 mg/L.

To assist in making its determinations each year the Watermaster refers to the rainfall records of many National Weather Service precipitation stations located in or near the Santa Ana River watershed. The record for Station 2146, located at the San Bernardino County Hospital, was used to define the hydrologic base period upon which the physical solution in the Judgment was based, and annual reports of the Watermaster have always presented the daily and total annual rainfall record at the station in order to provide a comparison with historical conditions.

During 2000-01 Station 2146 was destroyed when the hospital buildings were demolished. For many days of the year precipitation data were missing entirely and for many other days the reported data were clearly inconsistent with data from other nearby stations. The Watermaster decided that the record for Station 2146 for the entire year might be unreliable and decided to replace it with interpolated data. OCWD hydrogeologists Roy Herndon and Gwen Sharp obtained the records for three nearby stations (2357 at San Bernardino CDF, 2015 at Del Rosa Ranger Station and 2001B3 at San Bernardino County Flood Control District) and, using the method recommended by the U.S. Weather Service, estimated the precipitation at the location of the former Station 2146 for 2000-01. Using the same method for 2001-02, their estimate for precipitation at the location of the former station 2146 is 5.08 inches. The Watermaster agreed with their estimate.

The estimated 2001-02 rainfall total was 28% of the average of 17.98 inches per year 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 shows annual precipitation from 1934-35 through 2001-02.

Watermaster Determinations

Each year the Watermaster uses its long-established procedures to analyze the basic hydrologic and water quality data to determine, at Riverside Narrows and at Prado, Base Flow, Base Flow TDS, Adjusted Base Flow, 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 flow to be excluded from Base Flow, the relative amounts of Base Flow and Storm Flow and the relationships between EC and TDS concentrations.

During 2001-02 there were four sources of non-storm flow in the River at Prado that the Watermaster has not included in Base Flow: imported water, Arlington Desalter product water, High Groundwater Mitigation Project water, and WMWD Transfer Program water.

A total of 2,853 acre-feet of Nontributary Flow attributable to imported State Water Project water, purchased by OCWD and released at the OC-59 turnout from MWDSC's Foothill Feeder into San Antonio Creek, was calculated to have reached Prado with an estimated average TDS concentration of 271 mg/L.

At its Arlington Desalter in Riverside the Santa Ana Watershed Project Authority (SAWPA) produced and delivered to a channel tributary to the Santa Ana River between Riverside Narrows and Prado 6,200 acre-feet of water having an average TDS concentration of 377 mg/L.

SBVMWD produced 4,578 acre-feet of High Groundwater Mitigation Project water for delivery to the River just upstream of Riverside Narrows. After adjusting for losses the Watermaster determined that 4,533 acre-feet with a flow-weighted TDS of 505 mg/L reached Riverside Narrows and 4,442 acre-feet with a flow-weighted TDS of 515 mg/L reached Prado Dam.

Under agreements with Elsinore Valley Municipal Water District and OCWD, WMWD obtained and delivered to the Santa Ana River above Prado Dam 4,877 acre-feet of WMWD Transfer Program water for OCWD. The estimated flow-weighted average TDS of the water was 447 mg/L.

The Watermaster's determinations for the 2001-02 Water Year are explained in detail for Prado in Chapter II and for Riverside Narrows in Chapter III. A summary of annual determinations by the Watermaster for the period 1970-71 through 2001-02 is presented in Table 3. Note that the Base Flow obligations set forth in the Judgment at both Prado and Riverside Narrows have been met and cumulative credits have accrued to the Upper Area.

Upper Area Wastewater Discharges and Salt Exports

Although not used directly in the Watermaster's analyses and determinations, data on municipal wastewater discharged in the Upper Area are compiled annually because it is a major contributor to Base Flow in the River. The historical data on wastewater discharged are summarized in Table 4.

Similarly, while data on the amounts of high salinity water exported from the Upper Area to the ocean through SAWPA's Santa Ana Regional Interceptor (SARI) and IEUA's Non-Reclaimable Wastewater System (NRWS) are not used directly by the Watermaster, 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 5. The SARI first went into service in 1985-86. The NRWS has been in service since prior to 1970 but records of flow data prior to 1981-82 are missing.

Plate 2 is a map showing the locations of wastewater treatment plants and the SARI and NRWS pipelines.

TABLE 3

SUMMARY OF FINDINGS AT PRADO

Water Year	Rainfall (in)[1]	Total Flow (ac-ft)[2]	Base Flow (ac-ft)	Weighted TDS (mg/L)[3]	Adjusted Base Flow (ac-ft)	Cumulative Credit (ac-ft)
1970-71	11.97	51,864	38,402	727	38,402	-3,598
1971-72	9.62	51,743	40,416	707	40,416	-5,182
1972-73	18.46	76,375	48,999	638	51,531	4,349
1973-74	12.72	63,620	43,106	633	45,513	7,862
1974-75	13.49	61,855	50,176	694	51,263	17,125
1975-76	15.86	59,209	45,627	635	48,098	23,223
1976-77	11.95	62,953	48,387	660	50,000	31,223
1977-78	30.47	252,837	58,501	383	73,955	63,178
1978-79	17.51	134,486	71,863	580	79,049	100,227
1979-80	30.93	527,760	82,509	351	106,505	164,732
1980-81	10.45	117,888	74,875[5]	728	74,875[5]	205,652[6]
1981-82	18.34	143,367	81,548	584	89,431	253,083
1982-83	32.36	425,938	111,692[5]	411	138,591[5]	353,036[6]
1983-84	10.81	178,395[4]	109,231[5]	627	115,876[5]	431,514[6]
1984-85	12.86	162,912	125,023[8]	617	133,670	523,184
1985-86	17.86	196,565	127,215[8]	567	141,315	622,499
1986-87	8.08	140,538	119,848	622	127,638	708,137
1987-88	13.78	170,279[9]	124,104[9]	582	136,308	802,445
1988-89	12.64	152,743[9]	119,572[9]	583	131,230	891,675
1989-90	8.53	144,483	119,149[10]	611	127,986	977,611
1990-91	15.48	191,321	111,151[11]	514	128,379	1,064,040
1991-92	16.54	193,225	106,948[11]	499	124,869	1,146,909
1992-93	30.92	568,677	128,068[11]	368	163,499	1,268,408
1993-94	11.62	158,241	111,186[11]	611	119,432	1,345,840
1994-95	25.14	424,017[4]	123,468[11]	415	152,792[5]	1,458,394[6]
1995-96	11.92	194,797	131,861[11]	514	152,299	1,568,693
1996-97	18.64	204,610	136,676[11]	514	157,861	1,684,554
1997-98	33.41	462,633[4]	155,711[11]	392	195,677	1,838,231
1998-99	8.02	182,310	158,637	581	174,369	1,970,600
1999-00	11.09	187,905	148,269[11]	527	169,644	2,098,244
2000-01	16.13	209,168	153,914[11]	525	176,360	2,232,604
2001-02	5.08	156,596	145,981[11]	587	159,728	2,350,332

TABLE 3 (Continued)

SUMMARY OF FINDINGS AT RIVERSIDE NARROWS

Water Year	Rainfall (in)[1]	Total Flow (ac-ft)[2]	Base Flow (ac-ft)	Weighted TDS (mg/L)[3]	Adjusted Base Flow (ac-ft)	Cumulative Credit (ac-ft)
1970-71	11.97	24,112	17,061	704	17,021	1,762
1971-72	9.62	22,253	16,157	712	16,017	2,529
1972-73	18.46	32,571	17,105	700	17,105	4,384
1973-74	12.72	24,494	16,203	700	16,203	5,337
1974-75	13.49	19,644	15,445	731	15,100	5,187
1975-76	15.86	26,540	17,263	723	16,977	6,914
1976-77	11.95	23,978	18,581	722	18,286	9,950
1977-78	30.47	181,760	22,360	726	21,941	16,641
1978-79	17.51	47,298	26,590	707	26,456	27,847
1979-80	30.93	253,817	25,549[7]	676	25,549	38,146
1980-81	10.45	34,278	19,764	715	19,550	42,446
1981-82	18.34	82,708	32,778	678	32,778	59,974
1982-83	32.36	279,645	57,128	610	57,128	101,852
1983-84	10.81	82,745	56,948	647	56,948	143,550
1984-85	12.86	78,771	69,772[8]	633	69,772	198,072
1985-86	17.86	99,258	68,220[8]	624	68,220	251,042
1986-87	8.08	77,752	59,808	649	59,808	295,600
1987-88	13.78	79,706	55,324	620	55,324	335,674
1988-89	12.64	62,376	52,259	607	52,259	372,683
1989-90	8.53	58,159	53,199	590	53,583	411,016
1990-91	15.48	73,790	45,041[11]	616	45,041	440,807
1991-92	16.54	71,427	40,306	620	40,306	465,863
1992-93	30.92	267,043	41,434	634	41,434	492,047
1993-94	11.62	45,006	31,278[11]	677	31,278	508,075
1994-95	25.14	243,411	45,562[11]	646	45,562	538,387
1995-96	11.92	81,786	54,548[11]	625	54,548	577,685
1996-97	18.64	104,518	62,618[11]	624	62,618	625,053
1997-98	33.41	214,375	65,013[11]	601	65,013	674,816
1998-99	8.02	76,294	73,094	603	73,094	732,660
1999-00	11.09	75,572	63,499	602	63,499	780,909
2000-01	16.13	75,331	61,872[11]	603	61,872	827,531
2001-02	5.08	59,434	58,705[11]	606	58,705	870,986

TABLE 3 (Continued)

(1) Measured at San Bernardino County Hospital, except was estimated for San Bernardino in 2000-01 and 2001-02.
(2) Excludes Nontributary Flow and Exchange Waters.
(3) For Base and Storm Flow at Prado and Base Flow only at Riverside Narrows.
(4) Includes San Jacinto Watershed discharges which passed Prado Dam totaling 16,090 acre-feet in 1980-81; 7,720 acre-feet in 1982-83; 12,550 acre-feet in 1983-84; 4,697 acre-feet in 1994-95; and 1,690 acre-feet in 1997-98.
(5) Excludes water discharged from the San Jacinto Watershed.
(6) Includes a credit for a portion of San Jacinto Watershed discharges totaling 8,045 acre-feet in 1980-81; 3,362 acre-feet in 1982-83; 4,602 acre-feet in 1983-84; and 1,762 acre-feet in 1994-95.
(7) Includes Rubidoux Wastewater in 1979-80 and subsequent years.
(8) Includes groundwater pumped from San Bernardino Basin and released to the river in accordance with Court Orders approving agreement and allowing temporary additional extractions of water from the San Bernardino Basin Area.
(9) Excludes Nontributary Flow released to San Antonio Creek by MWDSC under the Ontario/MWDSC Exchange Program.
(10) Excludes water discharged to Santa Ana River from Arlington Desalter in 1989-90 and subsequent years in accordance with an agreement between OCWD, WMWD, and Santa Ana Watershed Project Authority.
(11) Excludes groundwater pumped from San Bernardino, Colton, and Riverside Basins and discharged to the Santa Ana River to flow to OCWD under the Exchange Water agreements, High Groundwater Mitigation Project, and WMWD Transfer Program.

Note: For the years 1973-74 through 1979-80, a correction has been made for different losses of State Water Project water than assumed in reports published for these years. The values changed are Base Flow, weighted TDS, and Adjusted Base Flow. These changes, in turn, have changed the cumulative credit for these years. See Appendix C in the Twelfth Annual Report (1981-82).

TABLE 4

MUNICIPAL 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 Santa Ana River between Riverside Narrows and Prado Dam							Total Discharge to Surface Flow of the Santa Ana River (B + C)	Total Wastewater Discharged in Watershed (A + B + C)
												Inland Empire Utilities Agency						
	Redlands	Beaumont	Yucaipa	Subtotal (A)	San Bernardino	Colton	Rialto	RIX[1]	Subtotal (B)	Riverside	Corona	RP #1&4[2]	RP #2	CCWRF[3]	WRCR[4]	Subtotal (C)		
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	161,520	173,014
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	163,411	175,285
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	160,625	172,952
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	168,605	180,706
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	157,919	170,033

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

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

TABLE 5

HIGH SALINITY WATER EXPORTED FROM THE SANTA ANA RIVER WATERSHED

Water Year	Inland Empire Utility Agency Non-Reclaimable Wastewater North System acre-feet	Santa Ana Watershed Project Authority Santa Ana Regional Interceptor (SARI)[1] SARI Flow[2] acre-feet	Average TDS mg/L	Total Flow acre-feet
1970-71	NA	---	---	---
1971-72	NA	---	---	---
1972-73	NA	---	---	---
1973-74	NA	---	---	---
1974-75	NA	---	---	---
1975-76	NA	---	---	---
1976-77	NA	---	---	---
1977-78	NA	---	---	---
1978-79	NA	---	---	---
1979-80	NA	---	---	---
1980-81	NA	---	---	---
1981-82	4,236	NA	---	---
1982-83	4,651	NA	---	---
1983-84	4,142	NA	---	---
1984-85	2,346	NA	---	---
1985-86	2,995	2,791 [3]	---	---
1986-87	4,943	2,869 [3]	---	---
1987-88	5,177	2,948 [3]	---	---
1988-89	5,949	3,622 [3]	---	---
1989-90	5,240	7,393	1649	12,633
1990-91	2,847	7,340	1906	10,187
1991-92	3,421	6,457	2346	9,878
1992-93	3,774	5,277	2516	9,051
1993-94	3,764	7,860	2302	11,624
1994-95	4,131	8,656	1903	12,787
1995-96	3,863	9,597	2175	13,460
1996-97	4,191	10,225	2292	14,417
1997-98	4,575	8,210	2456	12,785
1998-99	3,666	4,305	2611	7,971
1999-00	4,272	7,711	2154	11,983
2000-01	5,075	8,205	2504	13,280
2001-02	4,297	8,385	3289	12,682

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 for 1985-86 through 1988-89 is partial flow.

NA = Data Not Available

CHAPTER II

BASE FLOW AT PRADO

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

Flow at Prado

During the 2001-02 Water Year, the flow of the Santa Ana River as measured at the USGS gaging station below Prado Dam amounted to 174,968 acre-feet. There was no water in storage behind the dam at the beginning or at the end of the water year. Inflow to the reservoir included 145,981 acre-feet of Base Flow and 10,615 acre-feet of Storm Flow, based on an adjusted Prado Reservoir storage-elevation curve described in the following section. Nontributary flows consisted of State Water Project water, Arlington Desalter discharge, WMWD Transfer Program water, and SBVMWD High Groundwater Mitigation Project (HGMP) water. Of the nontributary flow due to State Water Project water released to San Antonio Creek at turnout OC-59, 2,853 acre-feet were calculated to have reached Prado Reservoir during 2001-02. Arlington Desalter flows totaled 6,200 acre-feet. The WMWD Transfer Program and HGMP contributed 4,877 acre-feet and 4,442 acre-feet, respectively. The monthly components of flow of the Santa Ana River at Prado Dam for 2001-02 are listed in Table 6 and are shown graphically on Plate 4. Historical Base and Storm Flows of the Santa Ana River below Prado during the period 1934-35 through 2001-02 are presented on Plate 5.

Prado Reservoir Storage-Elevation Curve Adjustment

The Watermaster calculates inflow to Prado Reservoir by adjusting outflow data using change in reservoir storage. Reservoir storage is based on a storage-elevation curve last updated by the U.S. Army Corps of Engineers (ACOE) in 1988. The ACOE reports that sedimentation averaged about 200 acre-feet per year between 1969 and 1979. Such sedimentation affects the accuracy of the storage-elevation curve when the storage in the reservoir is low. This inaccuracy results in anomalies in the calculated inflow near the end of each period of reservoir storage.

In 1997, the Watermaster adjusted the Prado Reservoir storage-elevation curve to improve the calculated Santa Ana River inflow hydrograph from which Base Flow and Storm Flow are determined. Assuming an average sedimentation rate of 200 acre-feet per year from 1988 through 1996, the portion of the ACOE storage-elevation curve below elevation 520 feet was adjusted to include a 1,600 acre-foot reservoir storage loss. Elevation 520 feet represents the approximate maximum flood storage elevation attained behind Prado Dam in the last several years where most sedimentation would likely have occurred. The new storage-elevation curve was developed by distributing the 1,600 acre-foot storage loss until the curve produced inflow values without significant anomalies.

TABLE 6

COMPONENTS OF FLOW AT PRADO DAM
FOR WATER YEAR 2001-02
(acre-feet)

	USGS Measured Outflow	Storage Change (1)	Computed Inflow	WMWD Transfer Water (2)	SBVMWD HGMP Water (3)	San Antonio Creek (4)	Arlington Desalter	Storm Flow	Base Flow
2001									
October	13,474	0	13,474	0	0	0	548	0	12,926
November	14,983	2,700	17,683	0	178	0	570	3,625	13,310
December	18,016	(60)	17,956	323	419	0	581	2,465	14,168
2002									
January	16,750	(126)	16,624	398	670	0	498	1,360	13,698
February	16,209	(2,444)	13,765	28	92	0	379	334	12,932
March	16,536	389	16,925	405	822	0	515	1,730	13,453
April	16,074	31	16,105	616	954	0	551	935	13,049
May	14,590	(149)	14,441	650	1,002	0	560	166	12,063
June	12,649	(322)	12,327	571	305	0	521	0	10,930
July	11,693	(19)	11,674	641	0	441	521	0	10,071
August	13,605	0	13,605	637	0	2,412	438	0	10,118
September	10,389	0	10,389	608	0	0	518	0	9,263
Total	174,968	0	174,968	4,877	4,442	2,853	6,200	10,615	145,981

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

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

(3) HGMP water pumped from the Bunker Hill groundwater basin and discharged into the Santa Ana River, less 1% for evapotranspiration above Riverside Narrows and 2% evapotranspiration between Riverside Narrows and Prado Dam.

(4) State Water Project water released into San Antonio Creek from turnout OC-59 during 2001-02 and calculated to have reached Prado Dam in the 2001-02 Water Year.

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 the 2001-02 Water Year it included State Water Project water imported by OCWD and released to San Antonio Creek, water discharged to the river from the Arlington Desalter, WMWD Transfer Program water, and SBVMWD HGMP water. In the past it has included, and in the future may include, other water discharged to the river pursuant to the water exchanges or other such programs, as well as discharges of water from the San Jacinto River watershed to the Santa Ana River watershed.

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 (1972-73 only) and San Antonio Creek near the City of Upland.

During the 2001-02 Water Year, 2,945 acre-feet of State Water Project water was released into San Antonio Creek from the Foothill Feeder at turnout OC-59 near Upland. Total monthly deliveries and daily flow rates were provided by the MWDSC. Water loss between OC-59 and Prado Dam was calculated per the procedures set forth in the Twelfth Annual Report (1981-82), Appendix C. It was determined that of the OC-59 water released, a total of 2,853 acre-feet reached Prado Dam and 92 acre-feet (3.1%) was lost to evapotranspiration. A monthly summary of Nontributary Flow released from OC-59 into San Antonio Creek is contained in Appendix E.

Arlington Desalter

Groundwater flowing from the Arlington Basin has historically been a component of the Santa Ana River flow. This groundwater has been degraded through agricultural and other uses. Two parties to the Stipulated Judgment, WMWD and OCWD, as members of the Santa Ana Watershed Project Authority, constructed a groundwater cleanup project that is designed to reduce the poor quality underflow from the basin. This project is known as the Arlington Desalter and consists of five extraction wells and a treatment facility that reduces salinity. The capacity of the facility is approximately 6 million gallons per day (mgd). The facility began operations in July 1990, with OCWD buying the product water delivered through the Santa Ana River. The Watermaster determined that the flow and TDS of the water from this facility would be excluded from the computation of Base Flow and Adjusted Base at Prado. During the 2001-02 Water Year, 6,200 acre-feet of water discharged from the Arlington Desalter were determined to have reached Prado Dam. OCWD Operations provided daily discharge rates and electrical conductance of water discharged. A summary of Arlington Desalter discharges is contained in Appendix F.

High Groundwater Mitigation Project

In Water Years 1998-99 and 1999-00, a total of 5,712 acre-feet of HGMP water, pumped from the Bunker Hill Basin and purchased by OCWD, was determined to have percolated to storage in Colton and Riverside Basins. During the 2000-01 Water Year SBVMWD contracted with the Rapid Infiltration and Extraction (RIX) facility to discharge in excess of their requirements to compensate for a portion of the water that percolated in previous years. The RIX facility is described in the Twenty-sixth (1995-96) Annual Report. During Water Year 2000-01 RIX produced 2,788 acre-feet of HGMP water for delivery to the River just upstream of Riverside Narrows, of which 2,705 acre-feet was determined to have reached Prado Dam. The balance of HGMP water remaining in storage in the Colton and Riverside Basins was 2,924 acre-feet. The Watermaster determined that the flow and TDS of HGMP water reaching Riverside Narrows and Prado would be excluded from the computation of Base Flow and Adjusted Base Flow.

During Water Year 2001-02, 4,578 acre-feet of HGMP water was discharged to the Santa Ana River upstream of the Riverside Narrows via the Riverside Canal. Assuming 1% and 2% evapotranspiration losses above Riverside Narrows and between Riverside Narrows and Prado Dam, respectively, the Watermaster determined that 4,533 acre-feet reached Riverside Narrows and 4,442 acre-feet reached Prado Dam. Therefore, the Watermaster determined that the delivery of groundwater stored in the Colton and Riverside Basins is completed. A summary of the HGMP discharges is contained in Appendix D.

WMWD Transfer Program

In 2001, OCWD and WMWD entered into an agreement that provides for delivery of groundwater pumped primarily from the Bunker Hill Basin to OCWD via the Riverside Canal and Santa Ana River. During the 2001-02 Water Year, WMWD delivered 4,877 acre-feet to the Santa Ana River upstream of Riverside Narrows and Prado Dam. A summary of the WMWD Transfer Program discharges is contained in Appendix K.

San Jacinto Watershed Discharge

No stream flow or other discharges from the San Jacinto Watershed reached Prado Dam during the 2001-02 Water Year. The Watermaster previously determined that to the extent such discharges occur and are captured by OCWD, fifty percent of such captured water will be credited as Base Flow at Prado.

Storm Flow

Portions of storm flows are retained behind Prado Dam for flow regulation and for water conservation purposes. The ACOE owns the Dam, which has a spillway elevation of 543 feet above mean sea level, and operates it according to a flow release schedule with a buffer pool elevation of 494 feet until March 1 of each year. In 1994 an

agreement was signed by OCWD, ACOE, and the U.S. Fish and Wildlife Service, which provides that between March 1 and August 30 the pool would be raised, given sufficient flows, to elevation 497 feet. This elevation would be increased year by year, as additional biological habitat mitigation by OCWD comes on line, to a maximum elevation of 505 feet. On April 12, 1995, the ACOE, the U.S. Fish and Wildlife Service, and OCWD reached an agreement to accelerate immediately the raising of the seasonal water conservation pool to elevation 505 feet, in exchange for a $1 million contribution by OCWD to the U.S. Fish and Wildlife Service to be used to develop least Bell's vireo habitat by the removal of a non-native plant, *Arundo donax*. Storm flows captured within the reservoir for conservation are released following the storm to downstream groundwater recharge facilities. Monthly and annual quantities of Storm Flow are shown in Table 6.

During the 2001-02 Water Year, the maximum volume of water stored in Prado Reservoir reached 3,079 acre-feet on December 3, 2001. The maximum daily mean flow released from Prado Dam to the Santa Ana River was 365 cfs on November 27, 2001.

Base Flow

The Base Flow is affected by Nontributary Flow releases to San Antonio Creek, discharges from the Arlington Desalter, discharges of the HGMP and WMWD Transfer Program water, and discharges from the San Jacinto Watershed. Nontributary Flow releases to San Antonio Creek, Arlington Desalter discharges, HGMP water, and WMWD Transfer water affected the Base Flow during the 2001-02 Water Year. The general procedure used by the Watermaster to separate the 2001-02 flow components was the same as used for previous years and is fully described in the Fifth (1974-75) and the Twelfth (1981-82) Annual Reports. The monthly and annual quantities of Base Flow are shown in Table 6.

Water Quality Adjustments

The flow-weighted average TDS for the total flow passing Prado Dam, including Nontributary Flow released to San Antonio Creek, Arlington Desalter discharge, HGMP water, and WMWD Transfer Program water, was found to be 569 milligrams per liter (mg/L). This determination was based on records from a continuous monitoring device operated by the USGS for EC of the Santa Ana River flow below Prado Dam. This record was supplemented by twenty-four (24) grab samples for EC collected by the USGS and analyzed for TDS.

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

$$TDS = EC \times 0.627851$$

(where the units of TDS and EC are mg/L and microsiemens/centimeter, respectively)

Using the daily EC data, flow-weighted average daily values for TDS were calculated using the above equation. The plot of TDS on Plate 6 shows the daily average TDS concentration of the Santa Ana River flow passing Prado Dam. A summary of daily TDS and EC of the Santa Ana River below Prado Dam is contained in Appendix H.

At Prado Dam, the flow-weighted average annual TDS value of 569 mg/L represents the quality of the total flow including releases to San Antonio Creek, discharge from the Arlington Desalter, WMWD Transfer Program water, and delivered HGMP water. The Stipulated 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 Flow to San Antonio Creek

During the 2001-02 Water Year, 2,853 acre-feet of water released from OC-59 to San Antonio Creek were calculated to have reached Prado Dam. A flow-weighted average TDS of 271 mg/L was calculated for State Water Project water reaching Prado Dam. A summary of these calculations is contained in Appendix E.

Adjustment for Arlington Desalter Discharge

The amount of product water discharged to the Santa Ana River during the 2001-02 Water Year totaled 6,200 acre-feet. A conversion factor of 0.5849 was determined by regression analysis based on six (6) grab samples collected by the OCWD and analyzed for EC and TDS. Using daily EC and daily flow values, a flow-weighted average TDS of 377 mg/L was calculated. A summary of these calculations is contained in Appendix F.

Adjustment for High Groundwater Mitigation Project Discharge

During the 2001-02 Water Year SBVMWD discharged 4,578 acre-feet of HGMP water. A total of 4,442 acre-feet of discharge was determined to have reached Prado Dam this year. A flow-weighted average TDS of 515 mg/L was calculated for that water. A summary of the HGMP discharges is contained in Appendix D.

Adjustment for WMWD Transfer Program Discharge

During the 2001-02 Water Year, WMWD delivered 4,877 acre-feet to the Santa Ana River upstream of Riverside Narrows and Prado. A TDS of 447 mg/L was calculated for that water. A summary of the WMWD Transfer Program discharges is contained in Appendix D.

Adjustment for San Jacinto Watershed Discharge

No water discharged from the San Jacinto Watershed reached Prado Dam during the 2001-02 Water Year.

Flow Component	Annual Flow (acre-feet)	Average TDS (mg/L)	Annual Flow x Average TDS (acre-feet x mg/L)
1. Measured Outflow	174,968	569	99,556,792
2. Less Arlington Desalter	(6,200)	377	(2,337,400)
3. Less Nontributary Flow San Antonio Creek	(2,853)	271	(773,163)
4. Less High Groundwater Mitigation Project	(4,442)	515	2,287,630)
5. Less WMWD Transfer Program	(4,877)	447	(2,180,019)
6. Measured Outflow less lines 2 through 5	156,596		91,978,580
Average TDS in total Base and Storm Flow		91,978,580 ÷ 156,596 = 587 mg/L	

After adjusting for Nontributary Flow of OC-59 water to San Antonio Creek, Arlington Desalter discharges, HGMP water, and WMWD Transfer Program water, the weighted average annual TDS of Storm Flow and Base Flow for 2001-02 is 587 mg/L, as shown above.

Adjusted Base Flow at Prado

The Stipulated Judgment provides that the amount of Base Flow at Prado received during any year shall be subject to adjustment based on 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 weighted average annual TDS of 587 mg/L is less than 700 mg/L. Therefore, the Base Flow must be adjusted by the above equation for TDS less than 700 mg/L. Thus the Adjusted Base Flow is as follows:

$$(145{,}981 \text{ acre-feet}) + \frac{35}{42{,}000} (145{,}981 \text{ acre-feet}) (700 - 587) = 159{,}728 \text{ acre-feet}$$

Entitlement and Credit or Debit

Paragraph 5(c) of the Stipulated 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's findings concerning flow at Prado for 2001-02 required under the Stipulated Judgment are as follows:

1.	Measured Outflow at Prado	174,968 acre-feet
2.	Base Flow at Prado	145,981 acre-feet
3.	Annual Weighted TDS of Base and Storm Flow	587 mg/L
4.	Annual Adjusted Base Flow	159,728 acre-feet
5.	Cumulative Adjusted Base Flow	3,694,332 acre-feet
6.	Cumulative Entitlement of OCWD	1,344,000 acre-feet
7.	Cumulative Credit	2,350,332 acre-feet
8.	One-Third of Cumulative Debit	0 acre-feet
9.	Minimum Required Base Flow in 2002-03	34,000 acre-feet

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 Santa Ana River at Riverside Narrows amounted to 68,844 acre-feet, measured at the USGS gaging station near the MWD Crossing. Separated into its components, Base Flow was 58,705 acre-feet and Storm Flow was 2,999 acre-feet. Excluded from the Base Flow are 4,533 acre-feet of HGMP water and 4,877 acre-feet of WMWD Transfer Program water. Included in Base Flow are 2,270 acre-feet of wastewater from Rubidoux Community Services District that now bypasses the USGS gaging station. The Storm and Base Flow components of the flow of the Santa Ana River at Riverside Narrows for each month in the 2001-02 Water Year are listed in Table 7 and shown graphically on Plate 7. The components of flow of the Santa Ana River at Riverside Narrows during the period 1934-35 through 2001-02 are presented on Plate 8.

High Groundwater Mitigation Project

As mentioned in Chapter 2, the RIX Facility delivered a total of 2,760 acre-feet of High Groundwater Mitigation Project (HGMP) water during the 2001-02 Water Year. This water was a portion of the 5,712 acre-feet determined to have percolated to storage in Colton and Riverside Basins during previous Water Years 1998-99 and 1999-00. The Watermaster determined that HGMP water would be excluded from the computation of Santa Ana River Base Flow and Base Flow quality.

During Water Year 2001-02, 4,578 acre-feet of HGMP water was discharged to the Santa Ana River upstream of the Riverside Narrows via the Riverside Canal. Assuming 1% evapotranspiration losses above Riverside Narrows, the Watermaster determined that 4,533 acre-feet reached Riverside Narrows. Therefore, the Watermaster determined that the delivery of groundwater stored in the Colton and Riverside Barriers is completed. A summary of the HGMP discharges is contained in Appendix D.

WMWD Transfer Program

In 2001, OCWD and WMWD entered into an agreement that provides for delivery of groundwater pumped primarily from the Bunker Hill Basin to OCWD via the Riverside Canal and Santa Ana River. During the 2001-02 Water Year, WMWD delivered 4,877 acre-feet to the Santa Ana River upstream of Riverside Narrows and Prado Dam. A summary of the WMWD Transfer Program discharges is contained in Appendix K.

TABLE 7

COMPONENTS OF FLOW AT RIVERSIDE NARROWS
FOR WATER YEAR 2001-02
(acre-feet)

	Month	USGS Measured Flow	Storm Flow	SBVMWD HGMP Water[1]	WMWD Transfer Program[2]	Rubidoux Waste-water	Base Flow[3]
2001	October	5,008	0	0	0	195	5,203
	November	7,426	2,037	182	0	189	5,396
	December	6,371	382	428	323	194	5,432
2002	January	6,070	90	684	398	190	5,088
	February	4,879	3	93	28	170	4,925
	March	6,327	383	839	404	189	4,890
	April	6,520	104	973	616	183	5,010
	May	6,819	0	1,023	650	190	5,336
	June	5,490	0	311	571	190	4,798
	July	5,050	0	0	641	195	4,604
	August	4,570	0	0	638	194	4,126
	September	4,314	0	0	608	191	3,897
Total		68,844	2,999	4,533	4,877	2,270	58,705

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

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

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

Base Flow

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

April 1980, Rubidoux Community Services District made the first delivery of wastewater to the regional treatment plant at Riverside. Prior to that time, Rubidoux had discharged to the river upstream of the Riverside Narrows gaging station. Wastewater from Rubidoux during Water Year 2001-02, in the amount of 2,270 acre-feet, has been added to the Base Flow as measured at the gaging station. A summary of Rubidoux discharges is contained in Appendix I.

Water Quality

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

The flow-weighted quality of wastewater from Rubidoux was 664 mg/L. The Base Flow quality resulting from exclusion of the Nontributary Flow and inclusion of the Rubidoux wastewater is shown in the following table as 606 mg/L.

Flow Component	Annual Flow (acre-feet)	Average TDS (mg/L)	Annual Flow x Average TDS (acre-feet x mg/L)
1. Base Flow plus Nontributary Flow	65,845	585	38,519,325
2. Less High Groundwater Mitigation Project Water	(4,533)	505	(2,289,165)
3. Less WMWD Transfer	(4,877)	447	(2,180,019)
4. Plus Rubidoux Wastewater	2,270	664	1,507,280
5. Base Flow (line 1 less lines 2 and 3 plus line 4)	58,705		35,557,441
Average TDS of Base Flow		35,557,341 ÷ 58,705 = 606 mg/L	

Adjusted Base Flow at Riverside Narrows

The Stipulated Judgment provides that the amount of Base Flow at Riverside Narrows received 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 2001-02 was 606 mg/L. Therefore, no adjustment is necessary, and the Adjusted Base Flow for 2001-02 is 58,705 acre-feet.

Entitlement and Credit or Debit

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

The Watermaster's findings concerning flow at Riverside Narrows for 2001-02 required under the Stipulated Judgment are as follows:

1.	Base Flow at Riverside Narrows	58,705 acre-feet
2.	Annual Weighted TDS of Base Flow	606 mg/L
3.	Annual Adjusted Base Flow	58,705 acre-feet
4.	Cumulative Adjusted Base Flow	1,358,986 acre-feet
5.	Cumulative Entitlement of CBMWD and WMWD	488,000 acre-feet
6.	Cumulative Credit	870,986 acre-feet
7.	One-Third of Cumulative Debit	0 acre-feet
8.	Minimum Required Base Flow in 2001-02	12,420 acre-feet

CHAPTER IV

HISTORY AND SUMMARY OF THE JUDGMENT

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 Stipulated 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 total dissolved solids (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. OCWD is enjoined from exporting or "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 two officers: Chairman and Secretary/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 8 reflects the signatories to each annual report.

TABLE 8

HISTORY OF THE WATERMASTER COMMITTEE MEMBERSHIP

Water Year	SBVMWD	IEUA	WMWD	OCWD	OCWD
1969-70	Clinton O. Henning	William J. Carroll	Albert A. Webb, Secretary	Max Bookman, Chairman	John M. Toups
1970-71 through 1973-74	James C. Hanson	William J. Carroll	Albert A. Webb, Secretary	Max Bookman, Chairman	John M. Toups
1974-75 through 1977-78	James C. Hanson	William J. Carroll	Donald L. Harriger	Max Bookman, Chairman	John M. Toups, Secretary
1978-79 through 1981-82	James C. Hanson	William J. Carroll	Donald L. Harriger	Max Bookman, Chairman	William R. Mills, Jr., Secretary
1982-83 through 1983-84	James C. Hanson	William J. Carroll	Donald L. Harriger	Harvey O. Banks, Chairman	William R. Mills, Jr., Secretary
1984-85 through 1988-89	Robert L. Reiter	William J. Carroll	Donald L. Harriger	Harvey O. Banks, Chairman	William R. Mills, Jr., Secretary
1989-90 through 1994-95	Robert L. Reiter, Secretary/Treasurer	William J. Carroll	Donald L. Harriger	Harvey O. Banks, Chairman	William R. Mills, Jr.
1995-96	Robert L. Reiter, Secretary/Treasurer	William J. Carroll, Chairman	Donald L. Harriger	Bill B. Dendy	William R. Mills, Jr.
1996-97	Robert L. Reiter, Secretary/Treasurer	William J. Carroll	Donald L. Harriger	Bill B. Dendy	William R. Mills, Jr., Chairman
1997-98	Robert L. Reiter, Secretary/Treasurer	Robb D. Quincey	Donald L. Harriger	Bill B. Dendy	William R. Mills, Jr., Chairman
1998-99 through 2000-01	Robert L. Reiter, Secretary/Treasurer	Richard W. Atwater	Donald L. Harriger	Bill B. Dendy	William R. Mills, Jr., Chairman
2001-02	Robert L. Reiter, Secretary/Treasurer	Richard W. Atwater	Donald L. Harriger, Chairman	Bill B. Dendy	Virginia Grebbien

Santa Ana River Watershed

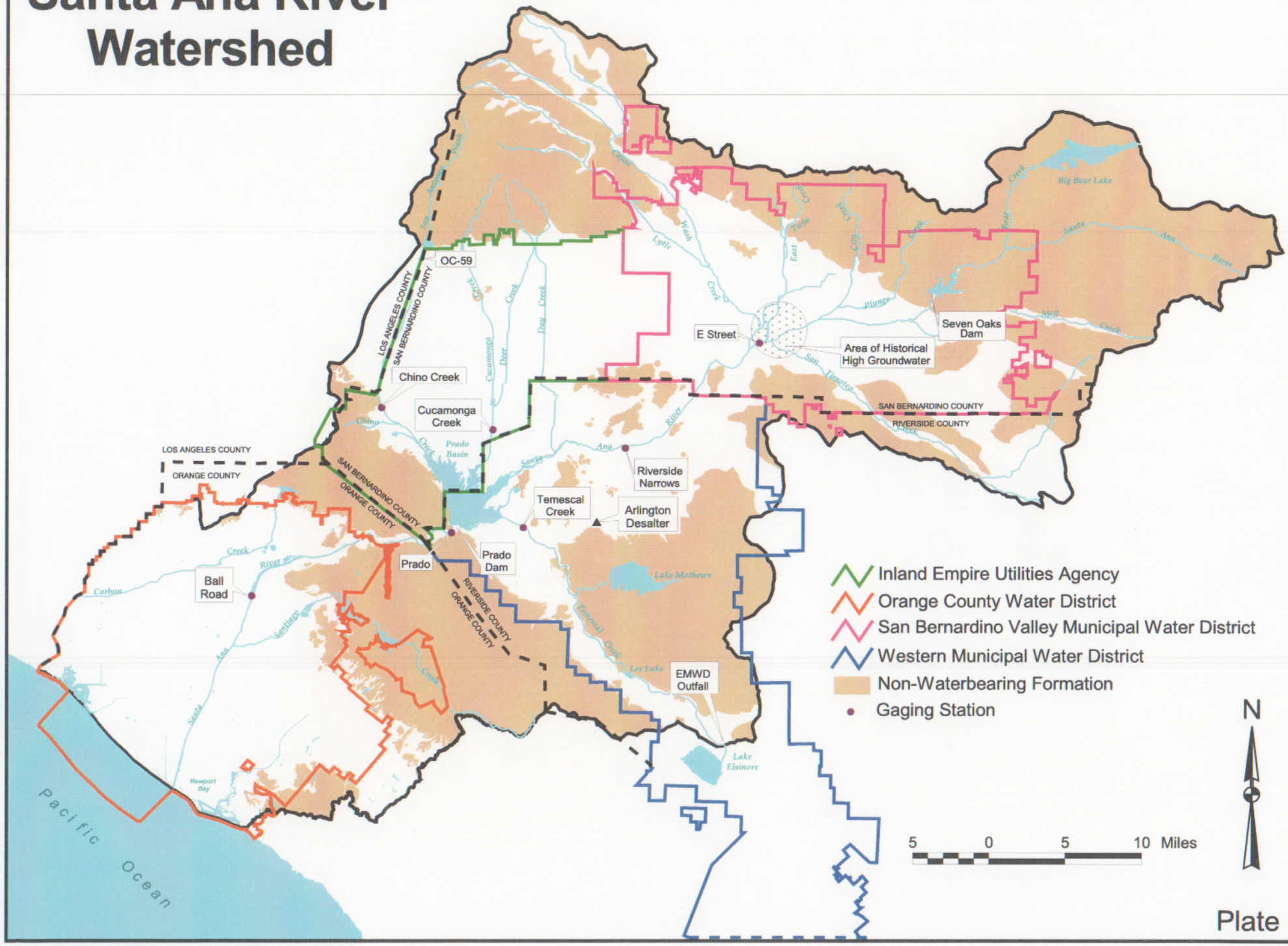


Plate 1

Santa Ana River Watershed Wastewater Treatment Plants and Salt Export Pipelines

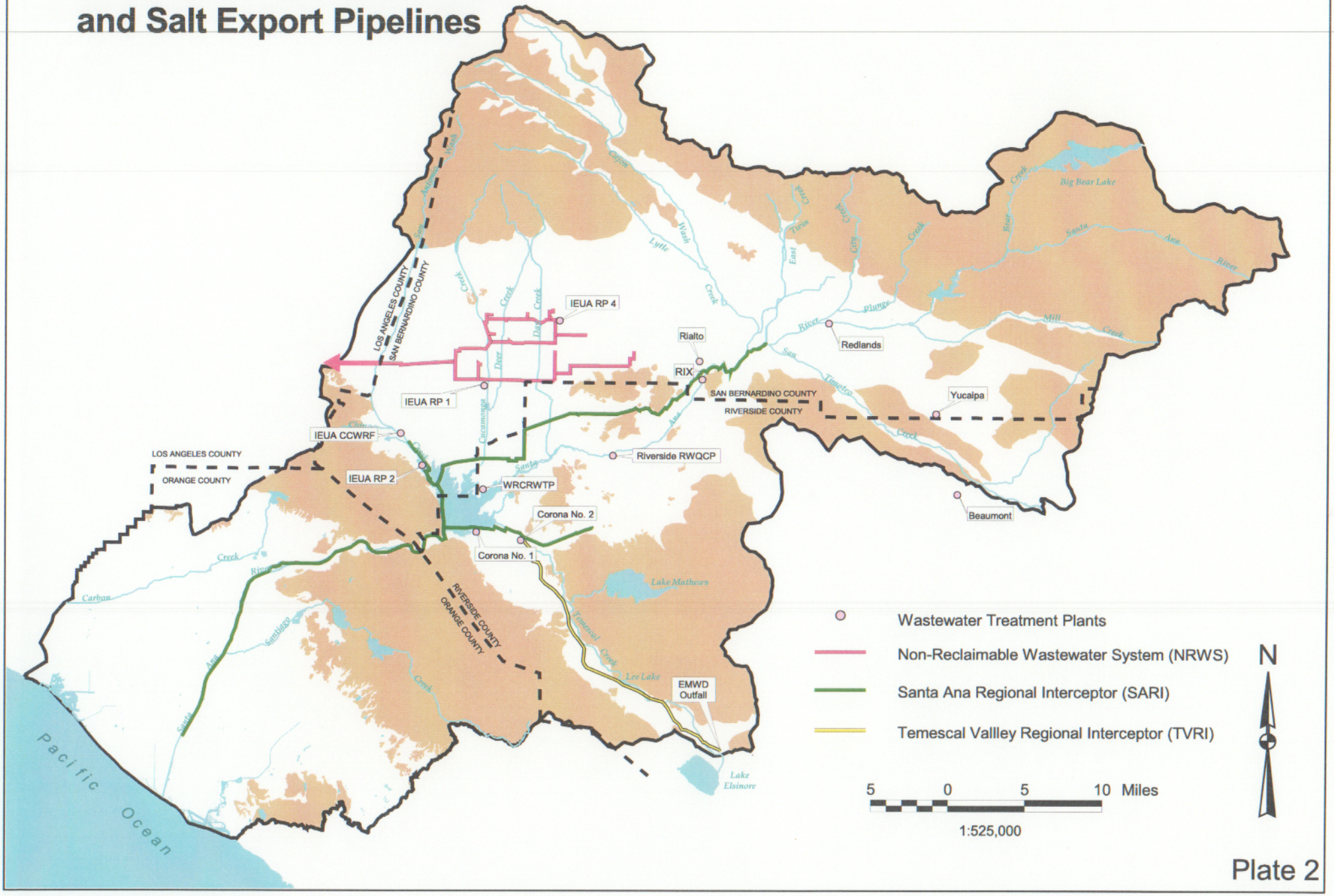


Plate 2

PRECIPITATION AT SAN BERNARDINO STARTING WITH 1934-35

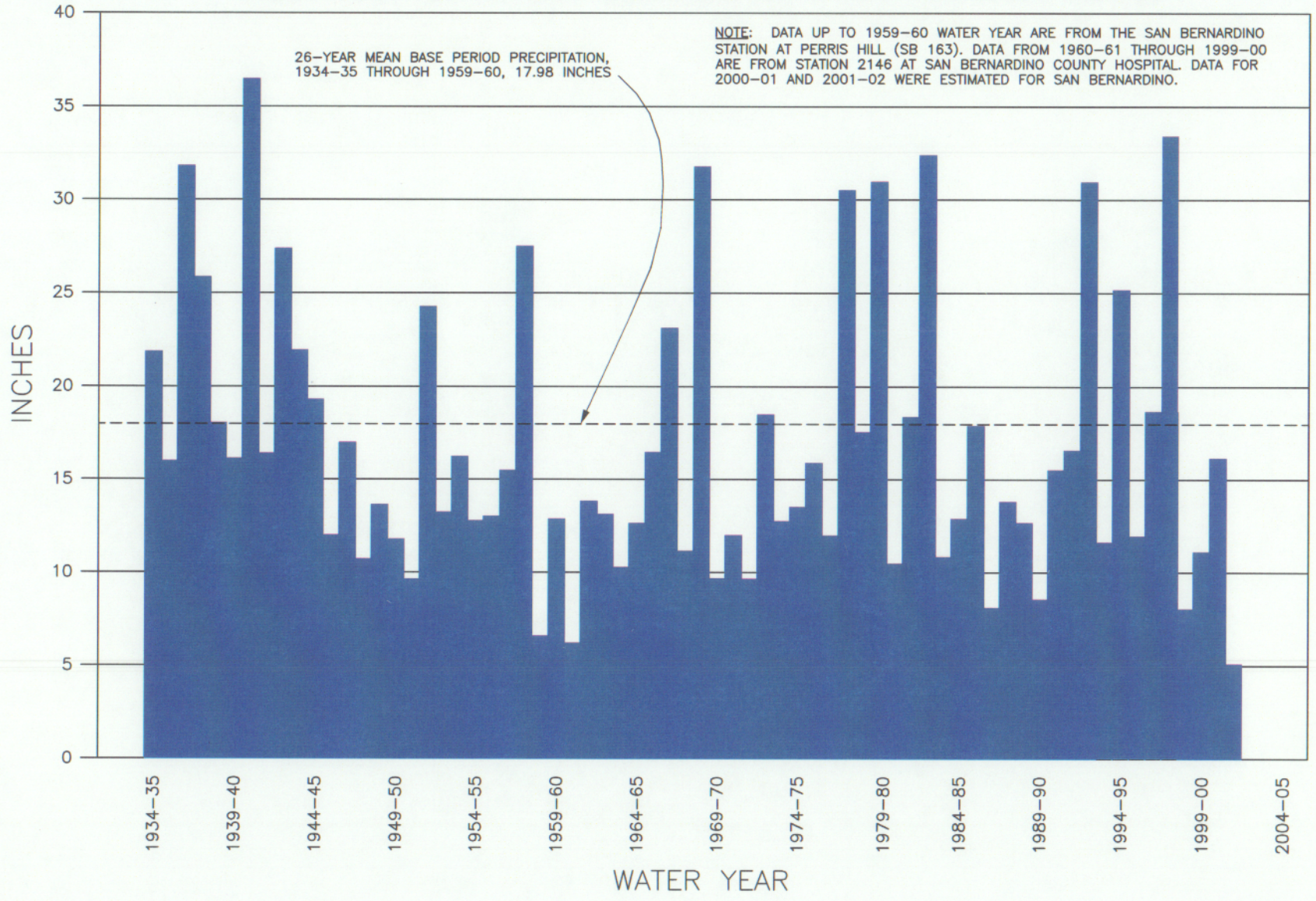
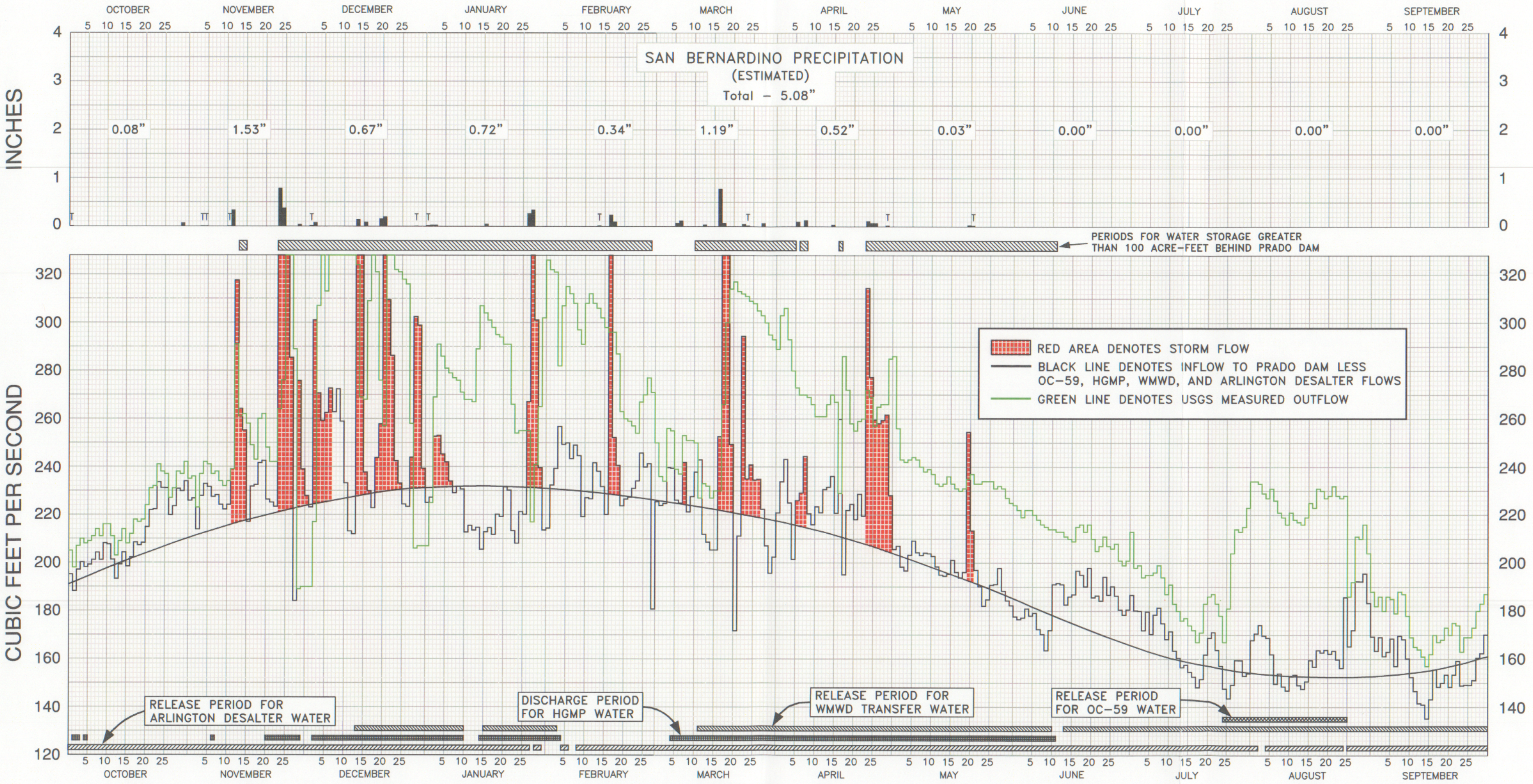


PLATE 3



DISCHARGE OF SANTA ANA RIVER AT PRADO DAM & SAN BERNARDINO PRECIPITATION
WATER YEAR 2001-02

Plate 4

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

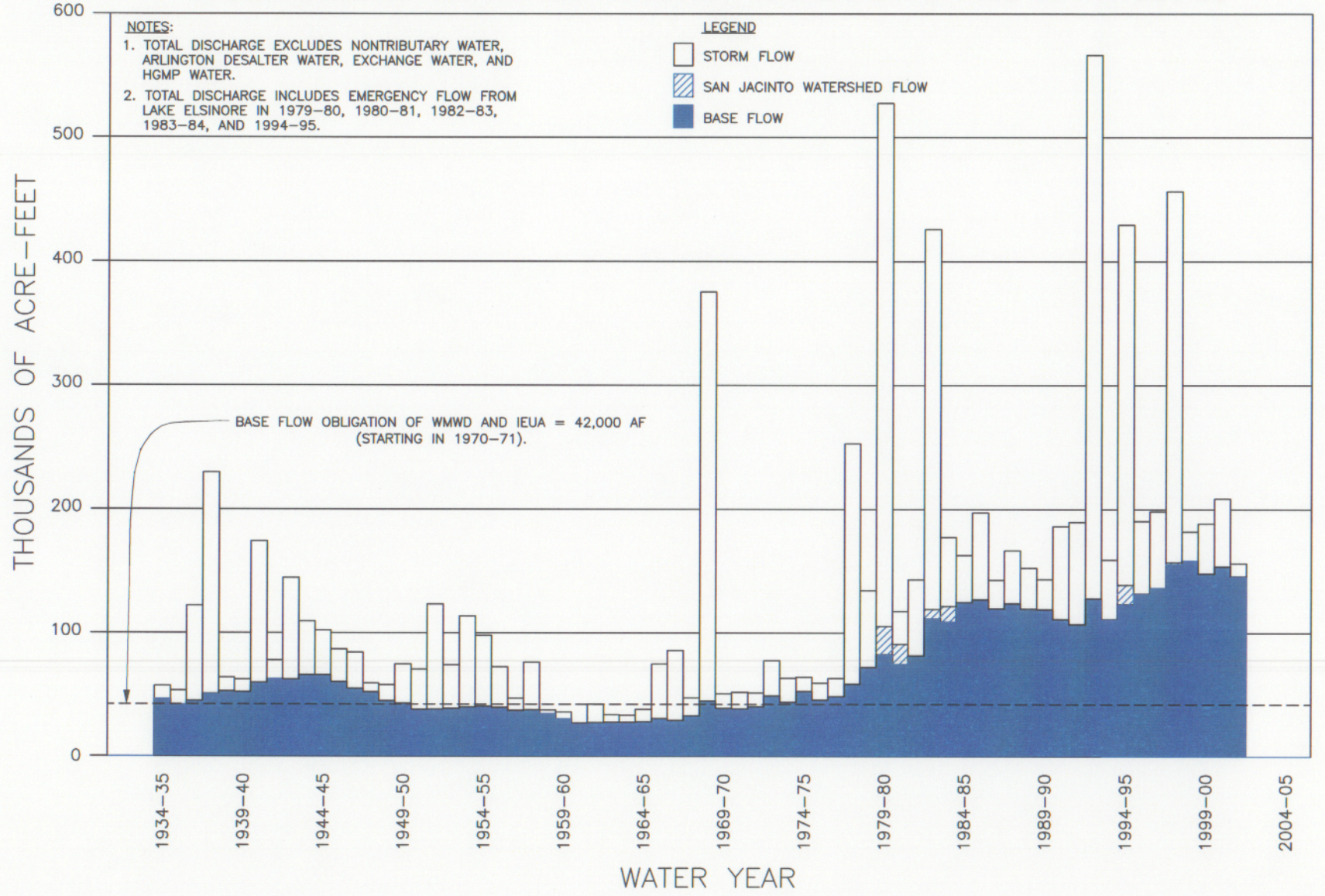
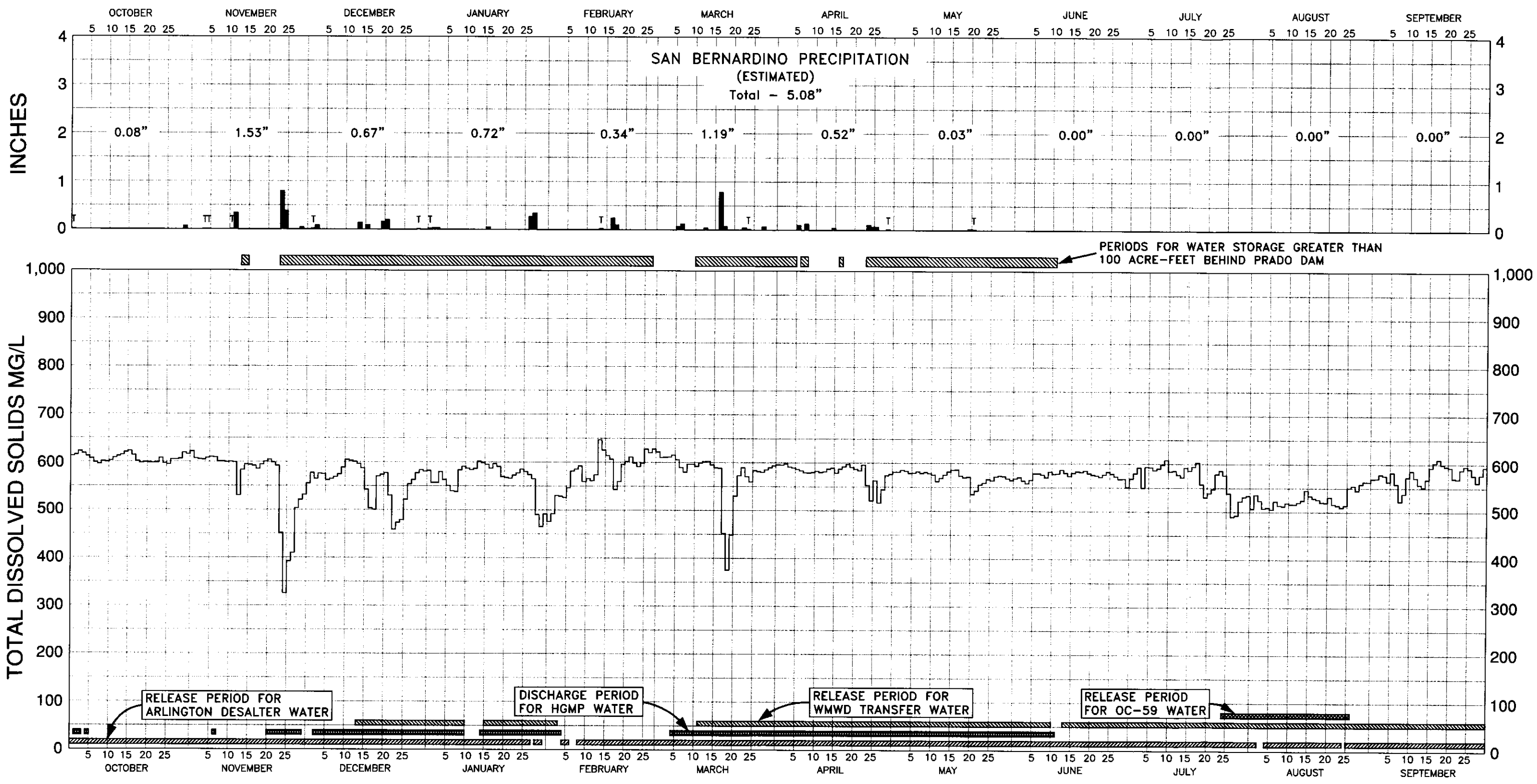


PLATE 5



DISSOLVED SOLIDS IN SANTA ANA RIVER BELOW PRADO DAM
WATER YEAR 2001-02

Plate 6

DISCHARGE OF SANTA ANA RIVER AT RIVERSIDE NARROWS & SAN BERNARDINO PRECIPITATION
WATER YEAR 2001-02

Plate 7

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

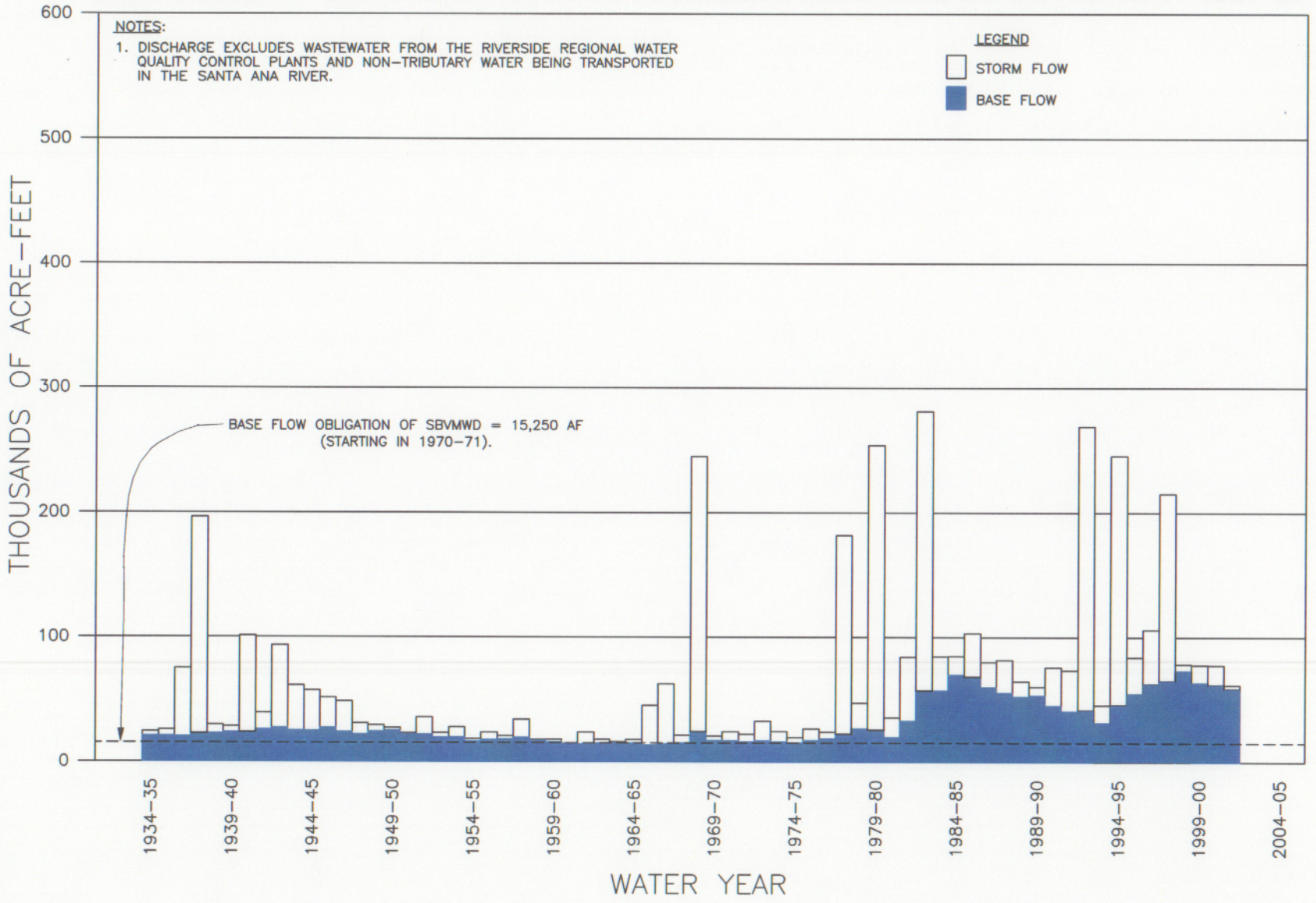


PLATE 8

SANTA ANA RIVER WATERMASTER

FOR

ORANGE COUNTY WATER DISTRICT

VS. CITY OF CHINO et al.

CASE NO. 117628 - COUNTY OF ORANGE

BASIC DATA

FOR THE

THIRTY-SECOND ANNUAL REPORT

OF THE

SANTA ANA RIVER WATERMASTER

FOR WATER YEAR

OCTOBER 1, 2001 - SEPTEMBER 30, 2002

APRIL 30, 2003

APPENDIX A

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

WATER YEAR 2001-02

11074000 SANTA ANA RIVER BELOW PRADO DAM, CA

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

DRAINAGE AREA.—1,490 mi^2, excludes 768 mi^2 above Lake Elsinore

WATER-DISCHARGE 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 since August 1944. Datum of gage is approximately 449 ft above sea level (levels by U.S. Army Corps of Engineers). Prior to Mar. 18, 1940, at about same site at various datums

REMARKS.—Records good. Flow regulated since 1940 by Prado Flood-Control Reservoir, capacity, 196,200 acre-ft Natural streamflow affected by extensive ground-water withdrawals, diversion for irrigation, discharges of treated effluent, and return flow from irrigated areas. Releases of imported water are made to the basin by the California Water Project at times in some years, via San Antonio Creek from Rialto Pipeline below San Antonio Dam. During the current year, the California Water Project released 2,940 acre-ft to the basin. See schematic diagram of Santa Ana River Basin.

EXTREMES FOR PERIOD OF RECORD.—Maximum discharge, 7,440 ft^3/s, Feb. 21, 1980, gage height, 6.88 ft; maximum gage height, 7.29 ft, Jan. 19, 1993; minimum daily, 2.4 ft^3/s, July 29 to Aug. 3, Sept. 20, 1978 (result of gate closure)

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

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	205	235	190	207	326	250	289	286	224	213	234	188
2	198	236	190	225	322	236	303	256	222	198	234	182
3	207	223	217	269	321	234	306	243	219	199	233	186
4	210	237	307	291	282	256	293	242	222	194	229	180
5	208	242	330	286	307	255	280	243	222	195	227	186
6	209	241	313	281	315	239	273	244	220	195	231	185
7	211	237	337	279	312	237	270	243	218	196	226	179
8	214	238	332	277	308	253	270	240	216	199	221	188
9	211	234	333	276	297	251	269	238	215	194	219	187
10	216	232	331	271	291	251	266	239	214	187	216	178
11	216	234	343	268	308	250	261	237	214	191	221	169
12	211	239	349	268	312	227	261	233	213	183	218	165
13	203	291	344	267	308	233	261	232	213	180	217	164
14	209	261	324	289	306	232	266	233	211	176	216	161
15	214	262	269	307	302	227	270	236	210	177	219	157
16	208	258	268	304	298	230	267	233	209	174	225	162
17	212	249	309	301	296	230	229	231	215	172	223	170
18	218	243	328	298	296	266	286	230	216	167	231	167
19	217	260	321	295	287	300	272	231	213	171	230	168
20	218	262	276	294	263	314	258	235	216	183	227	173
21	224	248	257	291	260	317	255	237	210	186	228	170
22	231	242	331	291	259	313	259	233	205	187	232	175
23	232	242	329	266	257	312	260	233	207	183	228	174
24	241	264	322	254	254	311	272	234	211	178	227	163
25	238	276	321	255	267	309	269	234	207	167	228	169
26	237	335	318	255	270	308	257	234	206	181	186	169
27	227	365	316	255	277	305	265	231	208	204	192	173
28	231	289	258	217	271	303	266	232	201	214	211	180
29	238	189	206	241	---	300	266	231	199	213	210	183
30	237	190	207	265	---	295	285	227	201	215	216	187
31	242	---	207	302	---	293	---	225	---	223	204	---
TOTAL	6793	7554	9083	8445	8172	8337	8104	7356	6377	5895	6859	5238
MEAN	219.1	251.8	293.0	272.4	291.9	268.9	270 1	237.3	212.6	190.2	221.3	174.6
MAX	242	365	349	307	326	317	306	286	224	223	234	188
MIN	198	189	190	207	254	227	229	225	199	167	186	157
AC-FT	13470	14980	18020	16750	16210	16540	16070	14590	12650	11690	13600	10390

11074000 SANTA ANA RIVER BELOW PRADO DAM, CA—Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1941 - 2002, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	110.6	139.1	204.3	318.3	409.2	391.4	247.1	178.9	146.9	121.2	99.29	94.60
MAX	344	322	709	3543	2733	2556	1101	915	736	446	352	372
(WY)	1984	1997	1967	1993	1998	1980	1980	1998	1983	1998	1983	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	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1941 - 2002	
ANNUAL TOTAL	109749		88213			
ANNUAL MEAN	300.7		241.7		204.1	
HIGHEST ANNUAL MEAN					789	1993
LOWEST ANNUAL MEAN					36.4	1961
HIGHEST DAILY MEAN	4780	Feb 13	365	Nov 27	6440	Feb 23 1980
LOWEST DAILY MEAN	167	Aug 21	157	Sep 15	2 4	Jul 29 1978
ANNUAL SEVEN-DAY MINIMUM	176	Aug 15	164	Sep 12	3.0	Sep 24 1973
MAXIMUM PEAK FLOW			457	Nov 1	7440	Feb 21 1980
MAXIMUM PEAK STAGE			3.71	Nov 1	7.29	Jan 19 1993
ANNUAL RUNOFF (AC-FT)	217700		175000		147800	
10 PERCENT EXCEEDS	416		308		350	
50 PERCENT EXCEEDS	233		234		125	
90 PERCENT EXCEEDS	184		184		39	

11066460 SANTA ANA RIVER AT MWD CROSSING, NEAR ARLINGTON, CA

LOCATION.—Lat 33°58'07", long 117°26'51", in NE 1/4 SW 1/4 sec.30, T.2 S., R 5 W, Riverside County, Hydrologic Unit 18070203, on left bank, at MWD pipeline crossing, 0.8 mi downstream from Union Pacific Railroad Bridge, 1 1 mi upstream from bridge on Van Buren Boulevard, and 3.3 mi north of Arlington.

DRAINAGE AREA.—852 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.—March 1970 to current year.

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

GAGE.—Water-stage recorder and crest-stage gage. Elevation of gage is 685 ft above sea level, 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 MWD 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.

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

EXTREMES FOR PERIOD OF RECORD.—Maximum discharge, 31,300 ft^3/s, Feb. 24, 1998, gage height, 14 69 ft, on basis of area-velocity study, maximum gage height, 20.23 ft, site and datum then in use, Mar. 4, 1978; minimum daily, 15 ft^3/s, Sept. 7, 8, 1980.

EXTREMES OUTSIDE PERIOD OF RECORD.—Maximum discharge since at least 1927, 100,000 ft^3/s, Mar. 2, 1938, on basis of slope-area measurement at site 1.1 mi downstream. Flood of Jan. 22, 1862, 320,000 ft^3/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 CURRENT YEAR.—Peak discharges greater than base discharge of 1,500 ft^3/s, or maximum:

Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov. 24	2245	3,440	9.74

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	94	81	93	92	112	79	107	110	104	79	71	76
2	85	89	90	94	109	83	106	107	107	82	67	78
3	90	83	96	86	105	79	108	104	112	78	68	81
4	76	92	106	95	91	86	122	113	108	78	73	78
5	87	82	99	94	86	82	114	113	108	87	80	74
6	85	96	95	92	88	84	124	117	109	86	80	72
7	87	90	88	92	88	95	120	117	107	82	78	73
8	81	84	98	99	89	95	111	122	107	86	77	77
9	86	84	83	97	79	90	120	120	110	85	78	76
10	84	85	91	88	84	93	106	117	103	84	79	70
11	85	90	84	91	86	88	107	121	76	81	81	65
12	73	97	96	84	84	97	108	120	e73	80	81	66
13	84	169	81	93	85	100	109	117	e77	81	78	72
14	80	97	128	98	79	93	108	118	98	83	73	71
15	77	94	121	89	82	86	110	113	91	83	67	72
16	83	98	94	112	91	96	104	103	87	83	68	72
17	80	96	107	110	84	102	118	108	82	81	59	70
18	78	e91	105	98	87	297	109	108	81	83	74	66
19	75	e89	98	112	87	109	101	108	81	83	76	75
20	70	e88	90	87	84	118	101	101	78	82	80	75
21	82	87	202	109	86	113	101	113	93	80	75	71
22	83	88	114	98	85	101	101	101	93	84	78	73
23	81	90	104	100	87	111	103	101	89	85	84	64
24	77	612	111	96	85	98	127	107	98	80	79	67
25	79	383	114	93	84	92	116	109	96	86	73	69
26	78	125	104	97	84	100	108	105	91	86	68	73
27	76	146	101	96	82	96	107	106	73	80	62	74
28	77	139	106	161	87	109	102	118	82	80	62	79
29	80	103	108	103	---	103	101	101	75	79	74	76
30	86	96	105	105	---	112	108	111	79	84	77	70
31	86	---	100	99	---	103	---	109	---	75	84	---
TOTAL	2525	3744	3212	3060	2460	3190	3287	3438	2768	2546	2304	2175
MEAN	81.45	124.8	103.6	98.71	87.86	102.9	109.6	110.9	92.27	82.13	74.32	72.50
MAX	94	612	202	161	112	297	127	122	112	87	84	81
MIN	70	81	81	84	79	79	101	101	73	75	59	64
AC-FT	5010	7430	6370	6070	4880	6330	6520	6820	5490	5050	4570	4310

e Estimated.

11066460 SANTA ANA RIVER AT MWD CROSSING, NEAR ARLINGTON, CA—Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1970 - 2002, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	62.02	80.54	102.6	227.7	281.7	307.8	145.1	118.0	79.58	55.03	54.33	55.69
MAX	194	259	292	1839	1411	1806	604	666	351	145	233	129
(WY)	1988	1984	1984	1993	1980	1995	1983	1983	1983	1983	1983	1976
MIN	20.5	21.2	23.3	24.7	23.1	23.7	23.1	22.3	20.2	16.8	17.9	18.0
(WY)	1974	1975	1974	1972	1972	1972	1971	1972	1981	1981	1981	1974

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1970 - 2002	
ANNUAL TOTAL	39791		34709			
ANNUAL MEAN	109.0		95.09		131.1	
HIGHEST ANNUAL MEAN					416	1983
LOWEST ANNUAL MEAN					29.0	1975
HIGHEST DAILY MEAN	1960	Jan 11	612	Nov 24	11500	Mar 2 1983
LOWEST DAILY MEAN	56	Aug 23	59	Aug 17	15	Sep 7 1980
ANNUAL SEVEN-DAY MINIMUM	62	Aug 22	70	Sep 10	16	Jul 1 1981
MAXIMUM PEAK FLOW			3440	Nov 24	31300	Feb 24 1998
MAXIMUM PEAK STAGE			9.74	Nov 24	20.23	Mar 4 1978
ANNUAL RUNOFF (AC-FT)	78930		68850		94980	
10 PERCENT EXCEEDS	123		113		189	
50 PERCENT EXCEEDS	87		89		69	
90 PERCENT EXCEEDS	69		74		23	

11059300 SANTA ANA RIVER AT E STREET, NEAR SAN BERNARDINO, CA

LOCATION —Lat 34°03'54", long 117°17'58", in San Bernardino Grant, San Bernardino County, Hydrologic Unit 18070203, 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, 26 mi downstream from Big Bear Lake, and 2.8 mi south of San Bernardino.

DRAINAGE AREA.—541 mi^2.

WATER-DISCHARGE 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 sea level, from topographic map Prior to Nov. 10, 1950, water-stage recorder on right bank 0.4 mi upstream at datum 964.50 ft above sea level. Nov 11, 1950, to September 1954, water-stage recorder on both banks 0.4 mi upstream at datum 964.50 ft above sea level October 1966 to September 1976, water-stage recorder on right bank 0.4 mi upstream at datum 954.50 ft above sea level. October 1976 to September 1977, gage was removed for channel construction. October 1977 to Jan. 28, 1981, water-stage recorder on right bank, 0.5 mi upstream at elevation 950 ft above sea level, from topographic map

REMARKS —Records poor. Flow partly regulated by Big Bear Lake (station 11049000) and, since November 1999, by Seven Oaks Flood-Control Reservoir, capacity, 145,600 acre-ft. Natural flow of stream affected by ground-water withdrawals and diversion for domestic use and irrigation upstream from station. Effluent from sewage reclamation plant 1 0 mi upstream caused sustained flow past gage from 1967 to Mar. 21, 1996. See schematic diagram of Santa Ana River Basin.

EXTREMES FOR PERIOD OF RECORD.—Maximum discharge, 28,000 ft^3/s, Feb. 25, 1969, gage height, 11.9 ft, site and datum then in use; no flow for many days many years prior to 1967 and since Mar. 21, 1996.

EXTREMES FOR CURRENT YEAR.—Peak discharges greater than base discharge of 1,000 ft^3/s, from rating curve extended above 5,930 ft^3/s, on basis of critical-depth computations, or maximum:

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov. 24	1800	2,670	5.21	Mar. 17	2345	1,140	4.62

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	2.5	0.70	3.4	1.7	0.00	0.00	0 00	0.00	0.00	0.00	0.00
2	0.00	0.84	0.00	3.5	1.6	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.32	0.92	0.69	4.8	0.04	0.10	0.00	0 00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	2.6	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.16	0.00	4.5	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	2.9	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	2.2	0 00	3.9	0.00	0 00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.35	0.00	5.2	0.00	0 00	0 00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.18	0.00	0.22	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0 00
11	0 00	0.00	0.81	0.00	0.00	0.00	0.00	0 00	0.00	0.00	0.00	0.00
12	0.00	11	0.64	0.00	0.00	1.6	0.00	0 00	0.00	0.00	0.00	0.00
13	0.00	5.0	0.10	0.00	0.00	5.3	0 00	0 00	0.00	0.00	0.00	0.00
14	0.00	0.92	17	0.40	0.00	5 8	0.00	0.00	0.00	0.00	0.00	0.00
15	0.00	1.1	9.2	0.01	0.90	3.5	0.00	0.00	0.00	0.00	0.00	0.00
16	0.00	0.73	6.2	0.00	0.03	0.00	0 00	0.00	0.00	0.00	0.00	0.00
17	0.00	0.66	4.4	0.00	2.9	47	0.00	0.00	0.00	0.00	0 00	0.00
18	0.51	0.47	3.9	0.00	0.36	54	0.00	0.00	0.00	0.00	0.00	0.00
19	0.94	0.53	3.6	0.00	2.0	1.2	0.00	0.00	0.00	0.00	0.00	0.00
20	2.1	1.1	4.8	0.00	5.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	0.64	2.1	26	0.00	5.4	0.00	0.00	0.00	0.00	0.00	0 00	0.00
22	0.50	0.83	3.9	0.94	2.9	0.00	0 00	0.00	0.00	0.00	0.00	0 00
23	0.31	0.65	2.2	2.2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	0.14	251	1.2	2.2	0.00	0.00	1 1	0.00	0.00	0.00	0.00	0.00
25	0.24	15	0.29	1.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	0.12	1.3	0.09	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	0.00	1.2	0.87	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	0.00	0.02	0.00	25	0.00	0.00	0 00	0.00	0.00	0.00	0.00	0.00
29	0.47	0.81	0.22	5.5	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	1.5	1.3	1.6	2.9	---	0.00	0.00	0.00	0 00	0.00	0.00	0.00
31	1.8	---	2.3	2.7	---	0.00	---	0 00	---	0.00	0.00	---
TOTAL	9.59	300.14	90.71	68.17	23.05	127.88	1.21	0.00	0.00	0.00	0.00	0.00
MEAN	0.309	10.00	2.926	2.199	0.823	4.125	0.040	0.000	0.000	0.000	0.000	0.000
MAX	2.1	251	26	25	5.4	54	1.1	0.00	0 00	0.00	0.00	0.00
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0 00	0.00	0.00	0.00	0.00
AC-FT	19	595	180	135	46	254	2.4	0.00	0.00	0.00	0 00	0.00

11059300 SANTA ANA RIVER AT E STREET, NEAR SAN BERNARDINO, CA—Continued

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

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	.88	3.47	20.9	23.7	20.6	37.4	27.2	11.3	2.39	.93	.87	.63
MAX	3.35	21.3	117	109	72.2	183	237	145	31.2	9 87	8.37	6.32
(WY)	1942	1945	1946	1943	1945	1943	1941	1941	1941	1940	1940	1939
MIN	.000	.007	.000	1.90	2.41	1.70	1.14	.14	.000	.000	.000	.000
(WY)	1951	1952	1951	1948	1942	1951	1951	1942	1950	1950	1942	1948

SUMMARY STATISTICS	WATER YEARS 1939 - 1954		
ANNUAL MEAN	12.7		
HIGHEST ANNUAL MEAN	56.6		1941
LOWEST ANNUAL MEAN	.78		1951
HIGHEST DAILY MEAN	2350	Jan 23	1943
LOWEST DAILY MEAN	.00	Jun 19	1940
ANNUAL SEVEN-DAY MINIMUM	.00	Sep 10	1940
ANNUAL RUNOFF (AC-FT)	9190		
10 PERCENT EXCEEDS	16		
50 PERCENT EXCEEDS	1.0		
90 PERCENT EXCEEDS	.00		

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

MEAN	33.9	43.3	77.4	158	232	253	132	103	63.9	40.8	36.8	34.6
MAX	117	191	469	1327	2096	1279	742	707	339	162	160	75.0
(WY)	1984	1984	1967	1993	1980	1980	1980	1983	1983	1969	1983	1983
MIN	12.4	13.2	14.8	13.2	11.6	10.6	12 5	9.35	13.0	9.08	9.97	9.93
(WY)	1968	1972	1970	1972	1968	1972	1972	1967	1971	1967	1967	1967

SUMMARY STATISTICS	WATER YEARS 1967 - 1995		
ANNUAL MEAN	100		
HIGHEST ANNUAL MEAN	441		1980
LOWEST ANNUAL MEAN	17.2		1968
HIGHEST DAILY MEAN	14800	Feb 25	1969
LOWEST DAILY MEAN	6.4	Jul 13	1967
ANNUAL SEVEN-DAY MINIMUM	8.1	Sep 16	1967
MAXIMUM PEAK FLOW	28000	Feb 25	1969
MAXIMUM PEAK STAGE	11.90	Feb 25	1969
ANNUAL RUNOFF (AC-FT)	72490		
10 PERCENT EXCEEDS	165		
50 PERCENT EXCEEDS	35		
90 PERCENT EXCEEDS	14		

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1996 - 2002, BY WATER YEAR (WY)

MEAN	11.40	20.64	19.71	64.41	165.3	37.84	36.59	63.14	18.10	5.386	10.71	13.00
MAX	38.1	56.2	42.6	230	729	114	190	430	116	20.9	66.1	75.8
(WY)	1996	1997	1998	1997	1998	1998	1998	1998	1998	1999	1998	1998
MIN	0.31	0.67	1.16	2.20	0.82	0.10	0.000	0.000	0.000	0.000	0.000	0.000
(WY)	2002	2001	2001	2002	2002	1997	1997	1996	1996	1996	1996	1996

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1996 - 2002	
ANNUAL TOTAL	3757.67		620.75			
ANNUAL MEAN	10.29		1.701		38.10	
HIGHEST ANNUAL MEAN					152	1998
LOWEST ANNUAL MEAN					1.70	2002
HIGHEST DAILY MEAN	756	Jan 11	251	Nov 24	5050	Feb 24 1998
LOWEST DAILY MEAN	0.00	Jan 13	0.00	Oct 1	0.00	Mar 22 1996
ANNUAL SEVEN-DAY MINIMUM	0.00	Jan 13	0 00	Oct 4	0 00	Mar 22 1996
MAXIMUM PEAK FLOW			2670	Nov 24	21100	Feb 23 1998
MAXIMUM PEAK STAGE			5 21	Nov 24	7.70	Feb 23 1998
ANNUAL RUNOFF (AC-FT)	7450		1230		27600	
10 PERCENT EXCEEDS	13		2.2		53	
50 PERCENT EXCEEDS	0.00		0.00		1 5	
90 PERCENT EXCEEDS	0.00		0.00		0.00	

11072100 TEMESCAL CREEK ABOVE MAIN STREET, AT CORONA, CA

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

DRAINAGE AREA.—224 mi^2, excludes 768 mi^2 above Lake Elsinore

PERIOD OF RECORD.—October 1980 to July 1983, February 1984 to current year 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").

GAGE.—Water-stage recorder and concrete-lined flood-control channel. Elevation of gage is 600 ft above sea level, from topographic map. October 1980 to July 1983 at site 500 ft downstream at different datum.

REMARKS.—Records fair except for estimated daily discharges, which are poor. 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

EXTREMES FOR PERIOD OF RECORD.—Maximum discharge, 4,720 ft^3/s, Mar. 1, 1983, gage height, 11 67 ft, site and datum then in use, on basis of slope-conveyance study; minimum daily, 0.27 ft^3/s, Sept. 25, 1981.

EXTREMES OUTSIDE PERIOD OF RECORD.—Maximum discharge, 8,850 ft^3/s, Feb 25, 1969, gage height, 8.17 ft, from floodmark, at old site (station 11072200) 1.2 mi downstream on basis of slope-area measurement of peak flow

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e13	14	13	9 5	1.2	9.4	11	11	13	15	14	13
2	e13	14	13	10	1.4	8 9	12	12	13	13	10	11
3	e14	14	21	14	1.1	8.3	11	14	13	12	3.1	12
4	15	15	12	10	1.2	7.4	12	14	13	15	3.6	13
5	15	13	12	11	3.5	7 9	12	13	13	16	5.2	14
6	15	14	13	11	2.1	9.1	14	14	13	15	7.6	16
7	14	15	13	10	1.9	11	13	13	12	15	14	16
8	14	16	13	11	1.9	13	12	12	12	15	13	13
9	15	14	12	12	4.3	11	11	12	13	15	14	15
10	14	14	15	11	13	11	6.9	11	13	14	15	16
11	14	15	15	12	13	11	15	11	13	15	16	15
12	15	49	14	12	13	11	13	11	14	15	15	14
13	14	17	14	10	14	10	10	11	17	15	15	13
14	14	13	36	11	14	9.5	14	11	15	15	15	14
15	14	13	14	14	15	11	14	13	16	14	13	15
16	15	13	14	15	15	11	15	13	13	14	14	16
17	15	13	13	15	21	17	15	13	13	14	13	15
18	15	12	12	15	15	22	14	13	13	13	12	14
19	15	12	13	14	15	8.6	12	13	14	16	13	12
20	16	12	18	15	15	5.0	13	15	15	17	14	16
21	15	13	50	16	16	14	13	13	17	16	16	19
22	15	13	15	15	16	9.7	16	12	17	13	15	17
23	15	14	13	15	14	9.5	16	12	17	14	14	12
24	12	101	12	15	15	10	39	13	18	13	15	15
25	12	25	12	16	15	8.4	13	14	19	15	8.0	16
26	12	22	13	15	13	8.5	17	15	22	15	9.2	16
27	12	20	12	9.7	11	10	12	15	21	15	17	18
28	11	17	11	17	11	13	11	14	19	13	16	17
29	11	27	26	4.4	---	12	11	13	18	13	15	15
30	13	15	18	3.0	---	12	11	12	17	15	15	14
31	14	---	11	1.5	---	11	---	12	---	15	15	---
TOTAL	431	579	493	370.1	292.6	331.2	408.9	395	456	450	394.7	442
MEAN	13.90	19.30	15.90	11.94	10.45	10.68	13.63	12.74	15.20	14.52	12.73	14.73
MAX	16	101	50	17	21	22	39	15	22	17	17	19
MIN	11	12	11	1.5	1.1	5.0	6.9	11	12	12	3.1	11
AC-FT	855	1150	978	734	580	657	811	783	904	893	783	877

e Estimated.

11072100 TEMESCAL CREEK ABOVE MAIN STREET, AT CORONA, CA—Continued

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

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	7.62	15.1	23.8	23.0	14.5	40.9	13.1	12.0	9.35	7.15	6.45	6.99
MAX	16.1	55.9	126	116	25.5	237	39.3	43.7	30 0	10.9	13.4	11.3
(WY)	1986	1981	1981	1981	1981	1983	1983	1983	1983	1985	1990	1985
MIN	2.36	4.67	2.53	7.01	7.42	6.26	4.02	3.77	1.12	1.20	1.79	1.09
(WY)	1985	1987	1982	1989	1982	1990	1989	1982	1982	1982	1982	1981

SUMMARY STATISTICS	WATER YEARS 1981 - 1990	
ANNUAL MEAN	12.4	
HIGHEST ANNUAL MEAN	33.7	1981
LOWEST ANNUAL MEAN	6.10	1987
HIGHEST DAILY MEAN	1720	Mar 1 1983
LOWEST DAILY MEAN	.27	Sep 25 1981
ANNUAL SEVEN-DAY MINIMUM	56	Sep 23 1981
MAXIMUM PEAK FLOW	4720	Mar 1 1983
MAXIMUM PEAK STAGE	11.67	Mar 1 1983
ANNUAL RUNOFF (AC-FT)	8990	
10 PERCENT EXCEEDS	27	
50 PERCENT EXCEEDS	6.1	
90 PERCENT EXCEEDS	2.7	

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1991 - 2002, BY WATER YEAR (WY)

MEAN	12.26	14.43	16.42	42.13	86.66	63.12	35.99	22.50	15.48	13.44	12.20	12.62
MAX	16.3	24.3	26.4	161	351	349	190	100	34.3	24.9	20.1	15.1
(WY)	1997	1994	1993	1995	1993	1995	1995	1995	1995	1993	1993	1994
MIN	6.22	5.55	9.35	11.9	10.5	5.19	2.89	3.24	7.33	3.56	6.98	7.08
(WY)	1996	1996	1999	2002	2002	2001	1991	1992	1992	1994	1994	1995

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1991 - 2002	
ANNUAL TOTAL	5543.6		5043.5			
ANNUAL MEAN	15.19		13.82		28.60	
HIGHEST ANNUAL MEAN					81.8	1995
LOWEST ANNUAL MEAN					12.8	1999
HIGHEST DAILY MEAN	287	Feb 12	101	Nov 24	2090	Feb 24 1998
LOWEST DAILY MEAN	1.3	Mar 12	1 1	Feb 3	0.34	Jul 3 1992
ANNUAL SEVEN-DAY MINIMUM	1.5	Mar 11	1.7	Jan 31	0.89	Jan 13 1992
MAXIMUM PEAK FLOW			875	Nov 24	3660	Feb 24 1998
MAXIMUM PEAK STAGE			4 52	Nov 24	6.54	Feb 24 1998
ANNUAL RUNOFF (AC-FT)	11000		10000		20720	
10 PERCENT EXCEEDS	20		17		40	
50 PERCENT EXCEEDS	12		14		13	
90 PERCENT EXCEEDS	2.6		10		4.5	

11073495 CUCAMONGA CREEK NEAR MIRA LOMA, CA

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

DRAINAGE AREA.—75.8 mi^2

PERIOD OF RECORD —January 1968 to July 1977, January 1979 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 and concrete-lined flood-control channel. Elevation of gage is 660 ft above sea level, from topographic map. Prior to July 1977 at site 100 ft downstream at different datum.

REMARKS.—Records poor. 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.

EXTREMES FOR PERIOD OF RECORD.—Maximum discharge, 16,100 ft^3/s, Feb. 27, 1983, gage height, 7.85 ft, from floodmark, on basis of slope-conveyance study of peak flow; prior to operation of Plant No. 1, no flow for most of some years; minimum daily, since 1985, 2.5 ft^3/s, June 6, 1987.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	47	40	49	46	39	38	46	38	47	44	51	48
2	42	37	71	45	36	38	47	40	48	41	50	52
3	43	40	111	46	39	44	46	40	46	42	50	51
4	44	46	47	44	41	49	47	43	46	42	52	54
5	41	41	40	43	43	37	48	46	43	40	48	54
6	39	39	45	42	42	40	48	40	41	45	43	47
7	40	38	51	43	43	42	47	40	42	50	44	50
8	39	40	38	44	46	34	49	37	43	46	42	64
9	39	39	39	42	48	36	44	38	43	44	42	52
10	37	45	44	40	44	41	40	38	45	44	46	43
11	37	44	46	37	46	41	39	39	43	46	52	39
12	34	86	43	41	51	39	43	44	46	37	48	41
13	40	69	37	41	47	36	46	41	47	42	46	41
14	48	44	105	45	44	45	53	44	42	41	47	34
15	40	45	37	39	45	39	55	43	43	41	45	36
16	38	42	35	38	43	39	45	44	45	41	43	45
17	38	42	39	38	83	164	42	44	47	39	43	49
18	38	45	39	38	39	107	46	48	49	37	45	51
19	38	48	40	39	42	40	46	51	44	40	41	52
20	39	42	46	43	48	42	49	86	40	37	43	52
21	40	41	167	46	43	44	55	49	41	34	47	49
22	42	43	37	44	44	43	56	47	41	35	45	50
23	37	39	38	34	34	74	52	44	46	34	43	48
24	38	565	39	54	37	48	97	45	42	39	46	47
25	52	69	38	47	47	45	44	46	52	38	52	52
26	45	51	39	44	45	41	59	46	46	40	53	52
27	45	49	43	151	39	41	53	50	41	42	51	51
28	44	46	39	227	41	45	50	50	42	45	52	50
29	45	51	37	40	---	44	48	43	46	43	50	45
30	42	43	46	40	---	40	39	46	46	47	53	44
31	48	---	50	41	---	44	---	43	---	50	49	---
TOTAL	1279	1909	1575	1602	1239	1500	1479	1393	1333	1286	1462	1443
MEAN	41.26	63.63	50.81	51.68	44.25	48.39	49.30	44.94	44.43	41.48	47.16	48.10
MAX	52	565	167	227	83	164	97	86	52	50	53	64
MIN	34	37	35	34	34	34	39	37	40	34	41	34
AC-FT	2540	3790	3120	3180	2460	2980	2930	2760	2640	2550	2900	2860

11073495 CUCAMONGA CREEK NEAR MIRA LOMA, CA—Continued

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

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	.021	1.15	1.55	18.2	4.65	1.91	1.35	.065	.001	.000	.000	.11
MAX	.19	6.07	7.91	149	30.7	7.94	13.1	54	.007	000	.000	1.03
(WY)	1972	1971	1972	1969	1969	1969	1969	1977	1969	1968	1968	1976
MIN	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
(WY)	1969	1969	1970	1975	1972	1972	1968	1968	1968	1968	1968	1968

SUMMARY STATISTICS	WATER YEARS 1968 - 1977	
ANNUAL TOTAL		
ANNUAL MEAN	2.73	
HIGHEST ANNUAL MEAN	16.8	1969
LOWEST ANNUAL MEAN	.16	1976
HIGHEST DAILY MEAN	2600	Jan 25 1969
LOWEST DAILY MEAN	.00	Feb 1 1968
ANNUAL SEVEN-DAY MINIMUM	.00	Feb 1 1968
MAXIMUM PEAK FLOW	9100	Jan 25 1969
MAXIMUM PEAK STAGE	7.08	Jan 25 1969
ANNUAL RUNOFF (AC-FT)	1980	
10 PERCENT EXCEEDS	.10	
50 PERCENT EXCEEDS	.00	
90 PERCENT EXCEEDS	.00	

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

MEAN	3.49	11.3	7.69	34.1	65.0	46.3	12.1	3.43	.48	.37	1.47	1.08
MAX	11.1	27.9	24.7	149	216	205	63.4	19.8	2.30	1.22	6.99	3.45
(WY)	1984	1983	1984	1983	1980	1983	1983	1983	1983	1983	1983	1983
MIN	.091	.002	.006	1.67	1.29	2.44	.056	.063	.008	.019	009	.011
(WY)	1981	1980	1980	1984	1984	1984	1981	1979	1979	1981	1979	1979

SUMMARY STATISTICS	WATER YEARS 1979 - 1984	
ANNUAL TOTAL		
ANNUAL MEAN	17.5	
HIGHEST ANNUAL MEAN	53.4	1983
LOWEST ANNUAL MEAN	1.51	1981
HIGHEST DAILY MEAN	2530	Mar 1 1983
LOWEST DAILY MEAN	.00	Feb 6 1979
ANNUAL SEVEN-DAY MINIMUM	.00	Feb 6 1979
MAXIMUM PEAK FLOW	16100	Feb 27 1983
MAXIMUM PEAK STAGE	7.85	Feb 27 1983
ANNUAL RUNOFF (AC-FT)	12700	
10 PERCENT EXCEEDS	10	
50 PERCENT EXCEEDS	.13	
90 PERCENT EXCEEDS	.01	

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1986 - 2002, BY WATER YEAR (WY)

MEAN	35.79	39.16	43.93	77.18	93.43	62.20	40.76	33.34	33.51	31.78	32.21	36.30
MAX	52.9	65.7	83.0	265	304	198	65.5	63.0	57.1	46.5	51.8	52.0
(WY)	1988	1997	1993	1993	1998	1995	2001	1998	1992	2001	1992	1986
MIN	20.4	23.4	21.0	26.1	34.9	25.3	20.5	18.5	18.1	19.3	18.5	16 4
(WY)	1987	1989	1987	1989	1989	1988	1987	1988	1988	1987	1987	1988

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1986 - 2002	
ANNUAL TOTAL	22129		17500			
ANNUAL MEAN	60.63		47 95		46.38	
HIGHEST ANNUAL MEAN					71.4	1993
LOWEST ANNUAL MEAN					26.6	1987
HIGHEST DAILY MEAN	1180	Feb 12	565	Nov 24	2490	Feb 20 1996
LOWEST DAILY MEAN	26	Jan 3	34	Oct 12	2.5	Jun 6 1987
ANNUAL SEVEN-DAY MINIMUM	38	Oct 6	37	Jul 17	12	Aug 25 1988
MAXIMUM PEAK FLOW			7390	Nov 24	10400	Jan 7 1993
MAXIMUM PEAK STAGE			4.77	Nov 24	5.40	Jan 7 1993
ANNUAL RUNOFF (AC-FT)	43890		34710		33600	
10 PERCENT EXCEEDS	60		52		53	
50 PERCENT EXCEEDS	44		44		34	
90 PERCENT EXCEEDS	38		38		20	

11073360 CHINO CREEK AT SCHAEFER AVENUE, NEAR CHINO, CA

LOCATION.—Lat 34°00'14", long 117°43'34", in Santa Ana del Chino Grant, San Bernardino County, Hydrologic Unit 18070203, on right bank, 300 ft downstream from old Schaefer Avenue Bridge, 0 8 mi downstream from San Antonio Creek, and 1 5 mi southwest of Chino

DRAINAGE AREA.—48.9 mi^2.

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

REVISED RECORDS.—WDR CA-84-1: 1983(M). WDR CA-95-1: 1992, 1993.

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

REMARKS.—Records fair above 10 ft^3/s and poor below Since 1997, due to construction in area of gage, Schaefer Avenue no longer extends to the Chino Creek crossing. The Schaefer Avenue Bridge, however, remains. Flow mostly regulated by San Antonio Flood-Control Reservoir, capacity, 7,700 acre-ft. Natural streamflow affected by extensive ground-water withdrawals, diversions for power, domestic use, irrigation, and return flow from irrigated areas. Releases of imported water are made to the basin by the California Water Project at times in some years, via San Antonio Creek from Rialto Pipeline below San Antonio Dam, at a site approximately 11 mi upstream. During the current year, 2,940 acre-ft was released. See schematic diagram of Santa Ana River Basin.

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

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

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.2	1.9	2.1	2.6	2.0	2.0	2.2	2.3	1.9	1.9	56	1.7
2	1.3	1.8	2.4	2.4	2.3	1.8	2.4	1.9	1.8	1.9	55	1.7
3	1.4	1.8	17	2.5	2.9	2.2	2.5	2.0	2.0	1 8	59	1.8
4	1.4	3.0	2.3	2.8	2.2	2.0	2.5	2.9	2.2	1.9	60	1.8
5	2.1	1.9	1.9	3.4	1.7	1.9	1.8	2.2	2.1	2.3	63	1.8
6	1.8	2.1	2.1	3.6	e1.6	2.1	2 0	1.9	2.1	1.8	61	1.8
7	1.7	1.9	1.9	3.3	e1.6	3.8	2.1	2.4	2.0	1.6	52	1.6
8	1.9	1.8	2.4	3.1	e1.7	2.2	2.1	1.7	2.0	2.8	53	1.6
9	1.8	1.3	1.9	2.5	1.8	2.0	2.0	1.7	1.9	1.9	52	1.5
10	1.7	1.4	2.0	1.8	1.8	2.1	2.8	1.9	1.9	2.8	54	1.5
11	2.1	2.6	1.7	1.8	1.8	2.2	1.8	1.7	2.1	3.7	52	1.6
12	1.6	23	1.6	2.1	2.0	2.3	1.9	1.7	2.1	1.6	53	1.6
13	1.8	2.9	1.7	1.9	4.7	2.0	1.7	1 8	2.3	1.5	50	1.7
14	1.5	2.2	38	2.7	1.6	2.0	1.7	2.0	2.3	1.3	52	1.8
15	1.6	2.2	2.5	1.7	1.5	2.2	1.9	1.9	1.9	1.8	51	1.8
16	2.3	2.4	2.8	1.7	1.4	1.8	1.9	2.0	1.7	1.8	52	1.8
17	2.0	2.0	1.9	1.8	29	67	2.3	2.1	2.7	1.8	52	1.9
18	2.1	1.9	2.2	1.8	2.3	9.3	1.9	1.9	3.2	1.5	53	1.7
19	2.1	2.0	1.9	1.6	1.7	2.6	2.0	2.0	2.2	1.4	56	2.0
20	2.1	2.4	11	2.0	1.5	2.3	2.3	12	1.8	1.5	49	1.9
21	2.4	2.1	55	2.2	1.5	2.2	2 2	2.2	1 8	1.2	53	1.7
22	3.1	1.8	2.0	1.7	1.4	2.2	2.2	2.1	1.9	1.3	50	1.7
23	2.1	2.2	2.3	2.1	1.6	14	2.2	2.2	1.8	1.4	50	2.0
24	2.5	224	2.4	2.2	1.5	2.2	9.8	2.1	2.4	1.4	50	2.0
25	2.6	4.8	2.0	2.1	1.6	2.2	2.2	2.1	2.5	6.6	25	2.1
26	2.6	2.5	1.9	1.9	2.0	2.3	4.3	2.0	2.8	27	2.3	2.4
27	2.8	1.8	1.6	45	1.3	2.1	2.1	2.0	2.5	39	1.7	1.8
28	2.8	2.3	1.9	29	1.5	2.3	1.9	2.1	2.7	38	1.7	1.7
29	3.3	4.6	14	2.3	---	2.6	1.9	2.3	1.9	39	1.7	2.3
30	5.0	2.1	4.4	2.2	---	2.1	2.0	2.2	1.8	49	1.7	2.1
31	2.3	---	2.3	2.3	---	2.0	---	2.2	---	50	1.8	---
TOTAL	67.0	310.7	191.1	140.1	79.5	152.0	72.6	73.5	64.3	292.5	1323.9	54.4
MEAN	2.161	10.36	6.165	4.519	2.839	4.903	2.420	2.371	2.143	9.435	42.71	1.813
MAX	5.0	224	55	45	29	67	9.8	12	3.2	50	63	2.4
MIN	1.2	1.3	1.6	1.6	1.3	1 8	1.7	1.7	1.7	1.2	1.7	1.5
AC-FT	133	616	379	278	158	301	144	146	128	580	2630	108

e Estimated.

11073360 CHINO CREEK AT SCHAEFER AVENUE, NEAR CHINO, CA—Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1970 - 2002, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	16.44	16.85	26.44	33.90	38.12	28.46	9.959	13.07	18.83	19.42	16.90	13.89
MAX	126	113	189	186	193	257	68.6	104	184	176	191	198
(WY)	1979	1976	1976	1976	1980	1978	1974	1997	1976	1974	1974	1997
MIN	0.061	0.23	0.53	0.55	0.33	0.30	0.14	0.22	0.062	0.069	0.14	0.13
(WY)	1978	1978	1970	1972	1972	1972	1977	1973	1977	1977	1976	1977

SUMMARY STATISTICS	FOR 2001 CALENDAR YEAR		FOR 2002 WATER YEAR		WATER YEARS 1970 - 2002	
ANNUAL TOTAL	3617.36		2821.6			
ANNUAL MEAN	9 911		7.730		20.96	
HIGHEST ANNUAL MEAN					92.4	1974
LOWEST ANNUAL MEAN					3.24	1970
HIGHEST DAILY MEAN	624	Feb 12	224	Nov 24	2060	Mar 1 1978
LOWEST DAILY MEAN	0.96	Sep 26	1.2	Oct 1	0.00	May 21 1977
ANNUAL SEVEN-DAY MINIMUM	1.1	Sep 22	1.4	Jul 18	0.02	Oct 28 1977
MAXIMUM PEAK FLOW			3070	Nov 24	12700	Feb 27 1983
MAXIMUM PEAK STAGE			6.87	Nov 24	10.32	Feb 27 1983
ANNUAL RUNOFF (AC-FT)	7180		5600		15190	
10 PERCENT EXCEEDS	5.6		28		76	
50 PERCENT EXCEEDS	2.4		2.1		1.2	
90 PERCENT EXCEEDS	1.6		1 6		0 34	

11074000 SANTA ANA RIVER BELOW PRADO DAM, CA—Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

Date	Time	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)
OCT									
05...	1140	207	--	--	--	--	970	--	22.0
15...	1430	217	749	8.6	100	8.2	1000	30.5	22.0
19...	1140	215	--	--	--	--	958	--	19.0
NOV									
02...	1120	237	--	--	--	--	950	--	18.5
16...	1120	257	--	--	--	--	935	--	16.5
30...	1300	190	--	--	--	--	835	--	13.0
DEC									
12...	1600	346	753	9.1	86	7.9	940	16.5	12.0
13...	1220	339	--	--	--	--	948	--	12.0
JAN									
04...	1130	283	--	--	--	--	940	--	14.5
16...	1430	304	750	9.8	96	8.0	949	16.5	13.5
18...	1200	295	--	--	--	--	970	--	13.0
FEB									
01...	1200	323	--	--	--	--	754	--	11.0
13...	1400	304	749	10.0	98	8.1	1040	24.5	13.5
15...	1115	301	--	--	--	--	994	18.5	14.5
MAR									
01...	1220	248	--	--	--	--	996	18.5	16.5
13...	1630	234	746	9.5	102	8.1	988	18.0	17.5
15...	1150	226	--	--	--	--	940	16.0	15.0
APR									
09...	1150	269	--	--	--	--	930	18.5	17.0
17...	1530	301	751	9.2	99	8.1	991	20.5	18.0
19...	1130	271	--	--	--	--	950	16.5	17.5
MAY									
03...	1140	241	--	--	--	--	944	20.0	19.0
17...	1200	232	--	--	--	--	959	22.5	21.0
JUN									
07...	1130	218	--	--	--	--	923	22.5	24.0
12...	1600	208	748	8.3	96	8.2	942	28.0	21.5
20...	1010	218	--	--	--	--	940	21.0	23.0
JUL									
05...	1145	195	--	--	--	--	960	27.0	22.0
18...	1120	165	--	--	--	--	978	26.5	23.5
AUG									
02...	1145	234	--	--	--	--	868	26.5	23.0
14...	1530	205	745	7.7	97	8.2	858	31.5	25.5
15...	1150	209	--	--	--	--	899	26.0	23.5
SEP									
06...	1200	182	--	--	--	--	950	31.0	24.0
19...	0935	166	--	--	--	--	989	21.0	20.0

11074000 SANTA ANA RIVER BELOW PRADO DAM, CA—Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

Date	ALKALINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICARBONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	CHLORIDE, DISSOLVED (MG/L AS CL) (00940)	SULFATE DISSOLVED (MG/L AS SO4) (00945)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L) (70300)	NITROGEN, AMMONIA DISSOLVED (MG/L AS N) (00608)	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N) (00631)	NITROGEN, NITRITE DISSOLVED (MG/L AS N) (00613)
OCT									
05...	--	--	--	--	608	--	--	--	--
15...	204	249	114	104	--	.08	1.0	4.88	.050
19...	--	--	--	--	600	--	--	--	--
NOV									
02...	--	--	--	--	604	--	--	--	--
16...	--	--	--	--	588	--	--	--	--
30...	--	--	--	--	532	--	--	--	--
DEC									
12...	197	240	105	99.7	--	.10	.91	4.89	.114
13...	--	--	--	--	606	--	--	--	--
JAN									
04...	--	--	--	--	600	--	--	--	--
16...	195	238	114	103	--	.04	.82	5.79	.065
18...	--	--	--	--	604	--	--	--	--
FEB									
01...	--	--	--	--	462	--	--	--	--
13...	217	264	114	108	--	<.04	.86	6.55	.068
15...	--	--	--	--	612	--	--	--	--
MAR									
01...	--	--	--	--	628	--	--	--	--
13...	206	251	105	103	--	.06	.72	6.51	.052
15...	--	--	--	--	616	--	--	--	--
APR									
09...	--	--	--	--	597	--	--	--	--
17...	196	239	107	105	--	.07	.76	6.03	.059
19...	--	--	--	--	605	--	--	--	--
MAY									
03...	--	--	--	--	612	--	--	--	--
17...	--	--	--	--	583	--	--	--	--
JUN									
07...	--	--	--	--	584	--	--	--	--
12...	228	278	103	96.6	--	.08	.92	4.43	.078
20...	--	--	--	--	595	--	--	--	--
JUL									
05...	--	--	--	--	585	--	--	--	--
18...	--	--	--	--	607	--	--	--	--
AUG									
02...	--	--	--	--	543	--	--	--	--
14...	179	219	101	85.6	--	.04	.82	3.33	.048
15...	--	--	--	--	542	--	--	--	--
SEP									
06...	--	--	--	--	594	--	--	--	--
19...	--	--	--	--	607	--	--	--	--

< Actual value is known to be less than the value shown.

11074000 SANTA ANA RIVER BELOW PRADO DAM, CA—Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

Date	ORTHO-PHOS-PHATE, DIS-SOLVED (MG/L AS P) (00671)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	2,6-DI-ETHYL ANILINE WAT FLT 0.7 U GF, REC (UG/L) (82660)	ACETO-CHLOR, WATER FLTRD REC (UG/L) (49260)	ALA-CHLOR, WATER, DISS, REC, (UG/L) (46342)	ALPHA BHC DIS-SOLVED (UG/L) (34253)	ATRA-ZINE, WATER, DISS, REC (UG/L) (39632)	BEN-FLUR-ALIN WAT FLD 0.7 U GF, REC (UG/L) (82673)	BUTYL-ATE, WATER, DISS, REC (UG/L) (04028)
OCT									
05...	--	--	--	--	--	--	--	--	--
15...	.97	1.16	<.002	<.004	<.002	<.005	e.006	<.010	<.002
19...	--	--	--	--	--	--	--	--	--
NOV									
02...	--	--	--	--	--	--	--	--	--
16...	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--	--
DEC									
12...	.95	.98	<.002	<.004	<.002	<.005	e.005	<.010	<.002
13...	--	--	--	--	--	--	--	--	--
JAN									
04...	--	--	--	--	--	--	--	--	--
16...	.80	.85	<.006	<.006	<.004	<.005	.008	<.010	<.002
18...	--	--	--	--	--	--	--	--	--
FEB									
01...	--	--	--	--	--	--	--	--	--
13...	.70	.81	<.006	<.006	<.004	<.005	<.007	<.010	<.002
15...	--	--	--	--	--	--	--	--	--
MAR									
01...	--	--	--	--	--	--	--	--	--
13...	.64	.72	<.006	<.006	<.004	<.005	.007	<.010	<.002
15...	--	--	--	--	--	--	--	--	--
APR									
09...	--	--	--	--	--	--	--	--	--
17...	.73	.82	<.006	<.006	<.004	<.005	.009	<.010	<.002
19...	--	--	--	--	--	--	--	--	--
MAY									
03...	--	--	--	--	--	--	--	--	--
17...	--	--	--	--	--	--	--	--	--
JUN									
07...	--	--	--	--	--	--	--	--	--
12...	.87	.99	<.006	<.006	<.004	<.005	<.008	<.010	<.002
20...	--	--	--	--	--	--	--	--	--
JUL									
05...	--	--	--	--	--	--	--	--	--
18...	--	--	--	--	--	--	--	--	--
AUG									
02...	--	--	--	--	--	--	--	--	--
14...	.58	.79	<.006	<.006	<.004	<.005	e.007	<.010	<.002
15...	--	--	--	--	--	--	--	--	--
SEP									
06...	--	--	--	--	--	--	--	--	--
19...	--	--	--	--	--	--	--	--	--

< Actual value is known to be less than the value shown.
e Estimated.

11074000 SANTA ANA RIVER BELOW PRADO DAM, CA—Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

Date	CAR-BARYL WATER FLTRD 0.7 U GF, REC (UG/L) (82680)	CARBO-FURAN WATER FLTRD 0.7 U GF, REC (UG/L) (82674)	CHLOR-PYRIFOS DIS-SOLVED (UG/L) (38933)	CYANA-ZINE, WATER, DISS, REC (UG/L) (04041)	DCPA WATER FLTRD 0.7 U GF, REC (UG/L) (82682)	DEETHYL ATRA-ZINE, WATER, DISS, REC (UG/L) (04040)	DI-AZINON, DIS-SOLVED (UG/L) (39572)	DI-ELDRIN DIS-SOLVED (UG/L) (39381)	DISUL-FOTON WATER FLTRD 0.7 U GF, REC (UG/L) (82677)
OCT									
05...	--	--	--	--	--	--	--	--	--
15...	e.003	<.020	<.005	<.018	<.003	e.004	.028	<.005	<.02
19...	--	--	--	--	--	--	--	--	--
NOV									
02...	--	--	--	--	--	--	--	--	--
16...	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--	--
DEC									
12...	<.041	<.020	<.005	<.018	e.002	<.006	.024	<.005	<.02
13...	--	--	--	--	--	--	--	--	--
JAN									
04...	--	--	--	--	--	--	--	--	--
16...	e.003	<.020	<.005	<.018	e.001	e.004	.017	<.005	<.02
18...	--	--	--	--	--	--	--	--	--
FEB									
01...	--	--	--	--	--	--	--	--	--
13...	<.041	<.020	<.005	<.018	<.003	<.006	.008	<.005	<.02
15...	--	--	--	--	--	--	--	--	--
MAR									
01...	--	--	--	--	--	--	--	--	--
13...	e.005	<.020	<.005	<.018	<.003	e.004	.016	<.005	<.02
15...	--	--	--	--	--	--	--	--	--
APR									
09...	--	--	--	--	--	--	--	--	--
17...	e.009	<.020	<.005	<.018	e.003	<.006	.018	<.005	<.02
19...	--	--	--	--	--	--	--	--	--
MAY									
03...	--	--	--	--	--	--	--	--	--
17...	--	--	--	--	--	--	--	--	--
JUN									
07...	--	--	--	--	--	--	--	--	--
12...	<.041	<.020	<.005	<.018	<.003	e.007	.009	<.005	<.02
20...	--	--	--	--	--	--	--	--	--
JUL									
05...	--	--	--	--	--	--	--	--	--
18...	--	--	--	--	--	--	--	--	--
AUG									
02...	--	--	--	--	--	--	--	--	--
14...	<.041	<.020	<.005	<.018	e.001	e.004	.025	<.005	<.02
15...	--	--	--	--	--	--	--	--	--
SEP									
06...	--	--	--	--	--	--	--	--	--
19...	--	--	--	--	--	--	--	--	--

< Actual value is known to be less than the value shown.
e Estimated.

11074000 SANTA ANA RIVER BELOW PRADO DAM, CA—Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

Date	EPTC WATER FLTRD 0.7 U GF, REC (UG/L) (82668)	ETHAL-FLUR-ALIN WAT FLT 0.7 U GF, REC (UG/L) (82663)	ETHO-PROP WATER FLTRD 0.7 U GF, REC (UG/L) (82672)	FONOFOS WATER DISS REC (UG/L) (04095)	LINDANE DIS-SOLVED (UG/L) (39341)	LIN-URON WATER FLTRD 0.7 U GF, REC (UG/L) (82666)	MALA-THION, DIS-SOLVED (UG/L) (39532)	METHYL AZIN-PHOS WAT FLT 0.7 U GF, REC (UG/L) (82686)	METHYL PARA-THION WAT FLT 0.7 U GF, REC (UG/L) (82667)
OCT									
05...	--	--	--	--	--	--	--	--	--
15...	<.002	<.009	<.005	<.003	<.004	<.035	<.027	<.050	<.006
19...	--	--	--	--	--	--	--	--	--
NOV									
02...	--	--	--	--	--	--	--	--	--
16...	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--	--
DEC									
12...	<.002	<.009	<.005	<.003	<.004	<.035	<.027	<.050	<.006
13...	--	--	--	--	--	--	--	--	--
JAN									
04...	--	--	--	--	--	--	--	--	--
16...	<.002	<.009	<.005	<.003	<.004	<.035	<.027	<.050	<.006
18...	--	--	--	--	--	--	--	--	--
FEB									
01...	--	--	--	--	--	--	--	--	--
13...	<.002	<.009	<.005	<.003	<.004	<.035	<.027	<.050	<.006
15...	--	--	--	--	--	--	--	--	--
MAR									
01...	--	--	--	--	--	--	--	--	--
13...	<.002	<.009	<.005	<.003	<.004	<.035	<.027	<.050	<.006
15...	--	--	--	--	--	--	--	--	--
APR									
09...	--	--	--	--	--	--	--	--	--
17...	<.002	<.009	<.005	<.003	<.004	<.035	<.027	<.050	<.006
19...	--	--	--	--	--	--	--	--	--
MAY									
03...	--	--	--	--	--	--	--	--	--
17...	--	--	--	--	--	--	--	--	--
JUN									
07...	--	--	--	--	--	--	--	--	--
12...	<.002	<.009	<.005	<.003	<.004	<.035	<.027	<.050	<.006
20...	--	--	--	--	--	--	--	--	--
JUL									
05...	--	--	--	--	--	--	--	--	--
18...	--	--	--	--	--	--	--	--	--
AUG									
02...	--	--	--	--	--	--	--	--	--
14...	<.002	<.009	<.005	<.003	<.011	<.035	<.051	<.050	<.006
15...	--	--	--	--	--	--	--	--	--
SEP									
06...	--	--	--	--	--	--	--	--	--
19...	--	--	--	--	--	--	--	--	--

< Actual value is known to be less than the value shown.

11074000 SANTA ANA RIVER BELOW PRADO DAM, CA—Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

Date	METO-LACHLOR WATER DISSOLV (UG/L) (39415)	METRI-BUZIN SENCOR WATER DISSOLV (UG/L) (82630)	MOL-INATE WATER FLTRD 0.7 U GF, REC (UG/L) (82671)	NAPROP-AMIDE WATER FLTRD 0.7 U GF, REC (UG/L) (82684)	P,P' DDE DISSOLV (UG/L) (34653)	PARA-THION, DIS-SOLVED (UG/L) (39542)	PEB-ULATE WATER FILTRD 0.7 U GF, REC (UG/L) (82669)	PENDI-METH-ALIN WAT FLT 0.7 U GF, REC (UG/L) (82683)	PER-METHRIN CIS WAT FLT 0.7 U GF, REC (UG/L) (82687)
OCT									
05...	--	--	--	--	--	--	--	--	--
15...	<.013	<.006	<.002	<.007	<.003	<.007	<.002	<.010	<.006
19...	--	--	--	--	--	--	--	--	--
NOV									
02...	--	--	--	--	--	--	--	--	--
16...	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--	--
DEC									
12...	<.013	<.006	<.002	<.007	<.003	<.007	<.002	<.010	<.006
13...	--	--	--	--	--	--	--	--	--
JAN									
04...	--	--	--	--	--	--	--	--	--
16...	<.013	<.006	<.002	<.007	<.003	<.010	<.004	<.022	<.006
18...	--	--	--	--	--	--	--	--	--
FEB									
01...	--	--	--	--	--	--	--	--	--
13...	<.013	<.006	<.002	<.007	<.003	<.010	<.004	<.022	<.006
15...	--	--	--	--	--	--	--	--	--
MAR									
01...	--	--	--	--	--	--	--	--	--
13...	<.013	<.006	<.002	<.007	<.003	<.010	<.004	<.022	<.006
15...	--	--	--	--	--	--	--	--	--
APR									
09...	--	--	--	--	--	--	--	--	--
17...	e.010	<.006	<.002	<.007	<.003	<.010	<.004	<.022	<.006
19...	--	--	--	--	--	--	--	--	--
MAY									
03...	--	--	--	--	--	--	--	--	--
17...	--	--	--	--	--	--	--	--	--
JUN									
07...	--	--	--	--	--	--	--	--	--
12...	<.013	<.006	<.002	<.007	<.003	<.010	<.004	<.022	<.006
20...	--	--	--	--	--	--	--	--	--
JUL									
05...	--	--	--	--	--	--	--	--	--
18...	--	--	--	--	--	--	--	--	--
AUG									
02...	--	--	--	--	--	--	--	--	--
14...	e.007	<.006	<.002	<.007	<.003	<.010	<.004	<.022	<.006
15...	--	--	--	--	--	--	--	--	--
SEP									
06...	--	--	--	--	--	--	--	--	--
19...	--	--	--	--	--	--	--	--	--

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e Estimated.

11074000 SANTA ANA RIVER BELOW PRADO DAM, CA—Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

Date	PHORATE WATER FLTRD 0.7 U GF, REC (UG/L) (82664)	PRO-METON, WATER, DISS, REC (UG/L) (04037)	PRON-AMIDE WATER FLTRD 0.7 U GF, REC (UG/L) (82676)	PROPA-CHLOR, WATER, DISS, REC (UG/L) (04024)	PRO-PANIL WATER FLTRD 0.7 U GF, REC (UG/L) (82679)	PRO-PARGITE WATER FLTRD 0.7 U GF, REC (UG/L) (82685)	SI-MAZINE, WATER, DISS, REC (UG/L) (04035)	TEBU-THIURON WATER FLTRD 0.7 U GF, REC (UG/L) (82670)	TER-BACIL WATER FLTRD 0.7 U GF, REC (UG/L) (82665)
OCT									
05...	--	--	--	--	--	--	--	--	--
15...	<.011	e.01	<.004	<.010	<.011	<.02	.024	<.02	<.034
19...	--	--	--	--	--	--	--	--	--
NOV									
02...	--	--	--	--	--	--	--	--	--
16...	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--	--
DEC									
12...	<.011	e.01	<.004	<.010	<.011	<.02	.055	<.02	<.034
13...	--	--	--	--	--	--	--	--	--
JAN									
04...	--	--	--	--	--	--	--	--	--
16...	<.011	<.01	<.004	<.010	<.011	<.02	.041	<.02	<.034
18...	--	--	--	--	--	--	--	--	--
FEB									
01...	--	--	--	--	--	--	--	--	--
13...	<.011	e.01	<.004	<.010	<.011	<.02	.044	<.02	<.034
15...	--	--	--	--	--	--	--	--	--
MAR									
01...	--	--	--	--	--	--	--	--	--
13...	<.011	e.01	<.004	<.010	<.011	<.02	.060	<.02	<.034
15...	--	--	--	--	--	--	--	--	--
APR									
09...	--	--	--	--	--	--	--	--	--
17...	<.011	.02	<.004	<.010	<.011	<.02	.040	<.02	<.034
19...	--	--	--	--	--	--	--	--	--
MAY									
03...	--	--	--	--	--	--	--	--	--
17...	--	--	--	--	--	--	--	--	--
JUN									
07...	--	--	--	--	--	--	--	--	--
12...	<.011	e.01	<.004	<.010	<.011	<.02	.226	<.02	<.034
20...	--	--	--	--	--	--	--	--	--
JUL									
05...	--	--	--	--	--	--	--	--	--
18...	--	--	--	--	--	--	--	--	--
AUG									
02...	--	--	--	--	--	--	--	--	--
14...	<.011	e.01	<.004	<.010	<.011	<.02	.031	<.02	<.034
15...	--	--	--	--	--	--	--	--	--
SEP									
06...	--	--	--	--	--	--	--	--	--
19...	--	--	--	--	--	--	--	--	--

< Actual value is known to be less than the value shown.
e Estimated.

11074000 SANTA ANA RIVER BELOW PRADO DAM, CA—Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

Date	TER-BUFOS WATER FLTRD 0.7 U GF, REC (UG/L) (82675)	THIO-BENCARB WATER FLTRD 0.7 U GF, REC (UG/L) (82681)	TRIAL-LATE WATER FLTRD 0.7 U GF, REC (UG/L) (82678)	TRI-FLUR-ALIN WAT FLT 0.7 U GF, REC (UG/L) (82661)
OCT				
05...	--	--	--	--
15...	<.02	<.005	<.002	<.009
19...	--	--	--	--
NOV				
02...	--	--	--	--
16...	--	--	--	--
30...	--	--	--	--
DEC				
12...	<.02	<.005	<.002	<.009
13...	--	--	--	--
JAN				
04...	--	--	--	--
16...	<.02	<.005	<.002	<.009
18...	--	--	--	--
FEB				
01...	--	--	--	--
13...	<.02	<.005	<.002	<.009
15...	--	--	--	--
MAR				
01...	--	--	--	--
13...	<.02	<.005	<.002	<.009
15...	--	--	--	--
APR				
09...	--	--	--	--
17...	<.02	<.005	<.002	<.009
19...	--	--	--	--
MAY				
03...	--	--	--	--
17...	--	--	--	--
JUN				
07...	--	--	--	--
12...	<.02	<.005	<.002	<.009
20...	--	--	--	--
JUL				
05...	--	--	--	--
18...	--	--	--	--
AUG				
02...	--	--	--	--
14...	<.02	<.005	<.002	<.009
15...	--	--	--	--
SEP				
06...	--	--	--	--
19...	--	--	--	--

< Actual value is known to be less than the value shown.

11074000 SANTA ANA RIVER BELOW PRADO DAM, CA—Continued

PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

Date	Time	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER-ATURE WATER (DEG C) (00010)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)
OCT						
15...SS	1430	217	22.0	92	81	47.5
DEC						
12...SS	1600	346	12.0	65	6.0	5.6
JAN						
16...SS	1430	304	13.5	62	6.0	4.9
FEB						
13...SS	1400	304	13.5	83	12	9.8
MAR						
13...SS	1630	234	17.5	96	14	8.8
APR						
17...SS	1530	301	18.0	93	25	20.3
JUN						
12...SS	1600	208	21.5	96	30	16.8
AUG						
14...SS	1530	205	25.5	83	52	28.8

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

11074000 SANTA ANA RIVER BELOW PRADO DAM, CA—Continued

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	994	958	1010	977	913	859	944	916	829	710	1000	966
2	998	964	982	952	929	912	923	859	849	707	984	964
3	1010	973	982	952	941	864	913	849	894	808	980	964
4	1010	966	978	950	950	875	963	891	877	803	980	966
5	994	963	982	957	933	882	924	871	888	793	991	973
6	984	945	987	961	943	868	902	847	888	833	981	938
7	980	925	991	953	973	854	882	847	952	849	956	911
8	973	930	972	943	967	853	927	839	946	916	933	912
9	994	940	964	949	973	856	942	913	984	897	968	931
10	973	942	966	944	969	895	970	917	907	836	957	926
11	974	948	973	942	989	927	976	908	923	866	951	934
12	986	956	984	885	997	934	963	915	907	870	963	924
13	1000	956	938	618	1000	937	964	891	1030	892	979	945
14	1010	961	963	850	963	941	983	923	1040	999	971	953
15	1000	974	955	943	969	899	979	938	1020	963	963	931
16	1010	972	953	941	907	838	981	935	997	968	949	925
17	1010	957	949	931	853	780	978	882	982	924	950	927
18	978	945	942	924	832	768	971	905	924	806	929	576
19	968	940	970	916	954	826	985	897	935	852	701	555
20	973	936	968	950	952	895	938	859	965	901	801	598
21	968	936	992	944	954	894	942	846	966	950	906	782
22	965	942	965	937	906	775	939	850	995	951	941	882
23	964	939	954	930	775	690	935	854	968	931	960	908
24	980	939	951	223	810	716	955	883	955	928	963	853
25	964	931	559	347	801	717	957	890	1030	929	928	854
26	956	937	708	551	906	781	945	879	1020	994	950	917
27	973	949	734	604	903	860	935	859	996	980	945	908
28	990	942	942	723	920	869	932	849	1030	982	940	908
29	979	957	857	820	939	895	865	671	---	---	959	914
30	1020	970	889	824	942	917	827	667	---	---	966	918
31	993	971	---	---	942	918	838	718	---	---	965	931
MONTH	1020	925	1010	223	1000	690	985	667	1040	707	1000	555
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	986	931	946	916	917	888	934	870	817	795	932	882
2	966	938	936	916	917	900	949	878	879	809	935	882
3	964	940	960	911	913	886	961	895	871	792	955	898
4	961	931	946	911	898	863	897	861	831	790	948	885
5	952	919	941	913	919	881	964	895	850	786	912	884
6	942	922	940	911	936	912	971	914	820	783	943	912
7	938	920	938	910	928	915	944	921	854	811	938	844
8	933	913	935	915	927	904	953	913	837	796	847	817
9	933	911	936	911	925	892	968	934	845	793	904	830
10	939	903	932	912	948	886	985	948	839	805	939	882
11	938	913	928	902	935	909	948	917	834	805	952	917
12	932	914	933	861	944	903	939	921	834	806	939	885
13	947	911	929	865	947	923	938	899	843	810	903	860
14	945	922	924	907	936	910	1010	874	855	821	890	866
15	951	915	933	915	929	898	984	909	892	838	940	872
16	927	913	940	922	957	889	952	912	862	831	988	917
17	993	910	953	906	945	914	962	924	859	821	976	936
18	959	930	928	897	941	909	983	942	852	817	993	950
19	964	934	918	892	950	919	951	844	844	812	990	930
20	956	927	932	889	945	897	872	821	851	813	964	929
21	945	921	897	813	929	905	908	826	865	816	965	910
22	943	919	889	808	930	895	914	851	840	805	923	873
23	961	933	903	866	927	893	968	890	849	782	923	880
24	950	671	909	864	931	896	946	902	819	799	968	914
25	881	739	918	884	940	912	937	891	847	805	966	925
26	915	878	929	845	940	899	900	809	890	847	965	922
27	892	797	934	887	927	896	809	752	902	758	955	886
28	908	812	932	894	925	863	801	763	876	858	910	884
29	951	891	930	889	926	869	859	773	900	830	939	901
30	952	891	912	896	912	800	869	829	914	876	963	918
31	---	---	910	890	---	---	870	814	909	887	---	---
MONTH	993	671	960	808	957	800	1010	752	914	758	993	817

11074000 SANTA ANA RIVER BELOW PRADO DAM, CA—Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	26.0	22.5	21.0	18.5	13.0	12.5	13.5	13.0	11.0	10.5	18.5	16.5
2	25.5	21.5	20.0	18.0	13.0	12.5	14.0	13.0	11.5	10.0	17.0	14.0
3	25.0	22.0	20.5	17.5	13.0	12.5	14.5	13.5	11.5	10.5	17.0	12.5
4	24.5	21.5	20.5	19.0	13.5	13.0	15.0	14.0	12.0	10.5	18.0	13.0
5	23.5	21.5	21.5	18.5	13.5	13.0	14.5	14.0	11.5	11.0	18.0	13.5
6	23.0	20.5	21.0	19.0	14.0	13.0	14.0	13.5	12.0	11.5	17.5	14.0
7	23.5	20.5	21.0	19.0	14.0	13.0	14.0	13.5	12.5	11.5	18.0	16.0
8	22.0	19.5	21.0	17.5	13.5	12.5	14.0	13.5	13.0	12.0	18.0	15.5
9	22.0	20.5	20.0	17.5	13.0	12.5	14.0	13.5	13.5	12.5	19.0	15.0
10	23.0	19.0	20.5	18.5	13.0	12.5	15.0	14.0	13.0	12.0	19.0	16.0
11	22.5	19.0	21.0	19.0	12.5	12.0	14.5	13.5	13.0	12.0	20.0	16.0
12	22.5	19.5	20.5	18.0	12.5	12.0	14.0	13.5	13.5	12.5	20.0	17.0
13	23.0	19.0	19.5	17.5	12.5	12.0	13.5	13.0	14.0	13.0	19.5	17.5
14	23.0	18.5	19.0	17.0	12.0	11.5	13.5	13.0	14.5	13.5	18.0	14.5
15	23.0	19.0	18.5	17.0	12.5	11.5	13.5	13.0	15.5	14.0	17.0	14.5
16	22.5	19.5	18.5	16.5	11.5	11.0	13.5	13.0	16.0	15.0	16.0	14.5
17	22.5	18.5	18.5	16.5	11.5	11.0	13.5	13.0	15.5	15.0	15.5	13.5
18	22.0	18.0	18.5	16.0	11.0	10.5	13.5	12.5	15.0	14.0	14.5	13.5
19	21.5	18.5	18.5	15.5	11.5	11.0	12.5	12.0	15.0	14.0	13.5	12.5
20	22.0	19.0	18.5	16.5	11.5	11.0	12.0	11.5	16.0	14.5	14.5	13.0
21	21.5	19.5	18.5	16.0	12.0	11.0	12.0	11.5	17.0	15.5	16.0	14.5
22	21.5	19.5	18.5	16.0	12.0	11.5	12.0	11.5	17.5	16.5	16.5	16.0
23	21.0	18.5	18.5	16.0	12.0	11.5	12.0	11.0	17.5	17.0	17.0	16.5
24	22.0	19.0	17.0	14.5	12.5	11.5	11.5	11.0	18.0	17.0	17.0	16.5
25	22.5	19.0	15.0	14.5	12.0	11.5	11.5	10.5	18.0	17.0	17.0	16.5
26	22.0	18.5	14.5	14.0	12.0	11.5	11.5	11.0	18.5	17.0	17.5	16.5
27	21.5	18.5	14.0	13.5	12.0	11.5	12.0	11.5	19.0	17.0	18.0	17.0
28	20.5	19.0	13.5	13.0	12.0	12.0	12.5	12.0	18.5	16.5	18.0	17.5
29	21.5	19.5	13.0	13.0	12.5	12.0	12.5	12.0	---	---	17.5	16.5
30	20.5	18.5	13.5	12.5	13.0	12.0	12.0	11.5	---	---	17.5	16.5
31	21.0	19.0	---	---	13.0	12.5	11.5	11.0	---	---	18.5	17.5
MONTH	26.0	18.0	21.5	12.5	14.0	10.5	15.0	10.5	19.0	10.0	20.0	12.5
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	19.0	18.5	20.0	18.5	23.5	23.0	26.5	22.0	25.5	22.0	28.0	22.5
2	19.0	18.5	19.0	18.5	23.5	22.0	26.5	21.5	26.0	22.5	28.0	23.0
3	19.0	18.0	20.0	19.0	23.0	21.5	26.0	21.5	26.0	22.5	27.5	23.0
4	20.0	17.5	20.5	19.5	23.5	21.5	25.5	21.0	26.0	22.0	27.0	23.0
5	20.0	16.5	20.5	19.5	25.0	23.0	25.5	21.0	26.0	22.0	25.5	23.5
6	18.5	16.5	20.5	19.5	25.5	24.0	26.5	21.5	25.5	21.5	25.5	23.0
7	19.5	16.5	20.5	19.5	25.5	23.5	27.0	21.5	25.5	21.0	25.5	21.5
8	20.0	17.5	20.5	19.5	25.0	23.5	28.0	22.5	26.0	21.5	24.0	20.0
9	21.5	17.0	21.0	20.0	24.5	22.0	28.5	23.0	26.0	21.5	24.5	20.0
10	22.0	18.0	21.5	20.5	23.5	22.0	28.0	23.5	26.5	22.0	25.0	20.5
11	22.5	19.0	21.5	20.0	23.5	21.5	26.5	24.0	27.0	23.0	25.0	20.5
12	22.0	19.0	22.0	20.0	24.0	22.0	28.0	23.0	27.0	23.0	25.0	21.0
13	23.5	19.0	22.5	21.0	24.5	22.5	28.0	23.0	26.5	23.0	25.0	21.0
14	23.5	20.0	22.5	21.5	25.0	22.5	28.0	23.0	26.5	22.5	25.5	21.0
15	23.0	20.0	22.5	21.5	25.5	22.5	28.0	23.0	26.0	22.5	25.5	21.0
16	22.0	18.5	22.0	20.5	26.0	22.5	27.5	23.0	25.5	22.5	24.5	21.0
17	20.5	18.0	22.0	20.5	26.5	23.0	27.5	22.5	25.5	22.5	24.5	20.5
18	21.0	17.5	22.0	21.0	26.5	23.0	27.5	22.5	25.0	22.5	24.0	21.0
19	21.0	17.0	21.5	20.5	26.5	23.5	27.0	22.5	24.5	22.5	25.0	20.0
20	21.5	16.5	21.0	20.0	26.0	23.0	26.5	22.5	24.0	22.0	25.0	21.0
21	22.5	17.5	20.5	18.5	25.5	22.5	26.0	22.0	25.0	22.0	25.5	20.5
22	23.5	18.0	20.5	19.5	26.0	21.5	26.5	22.0	25.0	22.0	26.0	21.0
23	23.5	18.5	21.5	20.5	26.5	22.0	27.5	22.0	25.0	21.5	26.0	21.5
24	22.5	18.0	21.5	20.5	26.0	22.5	27.5	22.5	25.0	21.0	25.0	21.5
25	21.5	18.5	21.5	21.0	26.5	22.0	27.5	22.5	25.5	21.0	25.5	22.0
26	21.5	18.5	21.5	21.0	26.5	22.0	27.5	22.0	26.0	21.5	25.0	22.0
27	18.5	17.0	21.5	21.0	26.0	21.5	26.5	22.0	25.5	21.5	23.5	21.0
28	18.5	17.0	22.5	21.0	26.0	21.0	26.0	21.0	26.0	22.5	22.0	20.5
29	20.0	18.5	23.5	22.0	26.0	21.0	26.0	21.0	25.5	21.5	22.5	20.0
30	20.0	19.5	24.0	23.0	26.5	21.5	26.0	21.5	26.5	21.5	21.5	19.0
31	---	---	24.0	23.0	---	---	25.5	22.0	25.5	22.5	---	---
MONTH	23.5	16.5	24.0	18.5	26.5	21.0	28.5	21.0	27.0	21.0	28.0	19.0

11074000 SANTA ANA RIVER BELOW PRADO DAM, CA—Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.—Water years 1967 to current year.
CHEMICAL DATA: Water years 1967 to current year.
SPECIFIC CONDUCTANCE: Water years 1970 to current year.
WATER TEMPERATURE: Water years 1970 to current year.
BIOLOGICAL DATA: Water years 1975–81.
SEDIMENT DATA: Water years 1974–94, 1999 to current year.
CHLORIDE: October 1970 to September 1971.

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

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

REMARKS.—Specific conductance records rated fair for Oct. 1 to Mar. 12 and June 21 to Sept. 11, good for Mar. 13 to June 20, and poor for Sept. 12-30. Temperature records rated good for Oct. 1 to Nov. 16 and Apr. 9 to Sept. 30, and poor for remainder of year. Specific conductance and water temperature values are affected by releases from Prado Dam. Interruptions in record at times due to malfunction of recording or sensing equipment. Sediment data and a portion of chemical data collected for the National Water-Quality Assessment (NAWQA) Program.

EXTREMES FOR PERIOD OF DAILY RECORD.—
SPECIFIC CONDUCTANCE: Maximum recorded, 1,830 microsiemens, Apr. 30, 1971; minimum recorded, 220 microsiemens, Feb. 20, 1978.
WATER TEMPERATURE: Maximum recorded, 36.0°C, Sept. 4, 1972, Sept. 8, 1984; minimum recorded, 2.5°C, Dec. 30, 1969.
SEDIMENT CONCENTRATION: Maximum daily mean, 2,870 mg/L, Mar. 5, 1978; minimum daily mean, 3 mg/L, Apr. 2, 1980, and several days during 1982.
SEDIMENT LOAD: Maximum daily, 18,900 tons, Mar. 5, 1978; minimum daily, 0.58 ton, Sept. 20, 1978.

EXTREMES FOR CURRENT YEAR.—
SPECIFIC CONDUCTANCE: Maximum recorded, 1,040 microsiemens, Feb. 14; minimum recorded, 223 microsiemens, Nov. 24.
WATER TEMPERATURE: Maximum recorded, 28.5°C, July 9; minimum recorded, 10.0°C, Feb. 2.

CROSS SECTION ANALYSES, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

Date	Time	BAROMETRIC PRESSURE (MM OF HG) (00025)	OXYGEN, DISSOLVED (MG/L) (00300)	OXYGEN, DISSOLVED (PERCENT SATURATION) (00301)	SPECIFIC CONDUCTANCE (US/CM) (00095)	TEMPERATURE WATER (DEG C) (00010)	SAMPLE LOCATION, CROSS SECTION (FT FM L BANK) (00009)
NOV							
30...*	1203	--	--	--	848	13.0	30.0
30...*	1206	--	--	--	845	13.0	24.0
30...*	1209	--	--	--	846	13.0	18.0
30...*	1212	--	--	--	847	13.0	12.0
30...*	1215	--	--	--	848	13.0	6.00
MAR							
13...*	1726	746	9.6	103	991	17.5	4.00
13...*	1727	746	9.5	102	991	17.5	12.0
13...*	1728	746	9.5	102	991	17.5	20.0
13...*	1730	746	9.4	101	990	17.5	28.0
13...*	1732	746	9.4	101	991	17.5	36.0
SEP							
06...*	1303	--	--	--	950	24.0	7.00
06...*	1306	--	--	--	944	24.0	13.0
06...*	1309	--	--	--	946	24.0	19.0
06...*	1312	--	--	--	944	24.0	27.0
06...*	1315	--	--	--	940	24.5	33.0

* Instantaneous discharge at the time of cross-sectional measurements: Nov. 30, 188 ft^3/s; Mar. 13, 234 ft^3/s; Sept. 6, 184 ft^3/s.

11066460 SANTA ANA RIVER AT MWD CROSSING, NEAR ARLINGTON, CA—Continued

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002

Date	Time	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	TEMPER-ATURE WATER (DEG C) (00010)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)
OCT					
02...	1330	85	921	24.0	584
16...	1330	88	939	24.0	576
NOV					
06...	1245	96	926	21.5	574
23...	1030	90	873	19 0	580
DEC					
04...	1300	113	898	18 0	582
19...	1300	99	914	18 5	568
JAN					
03...	1230	93	858	19.0	540
16...	1245	119	869	18 5	540
FEB					
04...	1300	88	926	18 0	592
22...	1200	85	925	20.0	576
MAR					
05...	1115	82	916	17 0	580
20...	1135	119	870	22.0	541
APR					
10...	1000	104	885	19.0	549
23...	1300	96	894	24.0	565
MAY					
06...	1245	116	875	22.0	553
20...	1030	107	848	20.5	530
JUN					
04...	1245	104	918	25.0	560
18...	1145	93	864	24.5	558
JUL					
01...	1200	82	905	25.0	569
18...	1000	85	912	24.5	563
AUG					
01...	1120	76	935	24.0	574
16...	0910	72	930	21.5	584
30...	1030	80	916	23.0	571
SEP					
12...	1230	67	920	24.0	584

APPENDIX B

DAILY PRECIPITATION DATA
ESTIMATED FOR SAN BERNARDINO

WATER YEAR 2001-02

TABLE B-1

DAILY PRECIPITATION CALCULATED FOR MISSING/QUESTIONABLE DATA
FOR STATION 2146-A AT SAN BERNARDINO
(inches)

	2001			2002								
Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	0.01	0	0	0.02	0	0	0	0	0	0	0	0
2	0	0	0.02	0.03	0	0	0	0	0	0	0	0
3	0	0	0.07	0.03	0	0	0	0	0	0	0	0
4	0	0.01	0	0	0	0	0	0	0	0	0	0
5	0	0.01	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0.07	0.10	0	0	0	0	0
7	0	0	0	0	0	0.12	0	0	0	0	0	0
8	0	0	0	0	0	0	0.13	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0.01	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0.00	0	0	0
13	0	0	0	0	0	0.04	0	0	0	0	0	0
14	0	0	0.14	0	0.02	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0.04	0	0	0	0	0
16	0	0	0.09	0.05	0	0	0	0	0	0	0	0
17	0	0	0	0	0.23	0.76	0	0	0	0	0	0
18	0	0	0	0	0.09	0.07	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0.15	0	0	0	0	0.02	0	0	0	0
21	0	0	0.19	0	0	0	0	0.01	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0.05	0	0	0	0	0	0
24	0	0.77	0	0	0	0.01	0.11	0	0	0	0	0
25	0	0.36	0	0	0	0	0.07	0	0	0	0	0
26	0	0	0	0	0	0	0.06	0	0	0	0	0
27	0	0	0	0.26	0	0	0	0	0	0	0	0
28	0	0	0	0.33	0	0.07	0	0	0	0	0	0
29	0	0.04	0.01	0		0	0	0	0	0	0	0
30	0.07	0	0	0		0	0	0	0	0	0	0
31	0		0	0		0		0		0	0	
Total	0.08	1.53	0.67	0.72	0.34	1.19	0.52	0.03	0.00	0.00	0.00	0.00

Total Rainfall = 5.08 Inches

Data Source:

Calculated from San Bernardino Flood Control District Precipitation Stations 2001B2, 2015, and 2357 using the method described in the following memo dated April 3, 2003.

MEMORANDUM

DATE: April 3, 2003
TO: SAR Watermaster
FROM: Gwen Sharp, Roy Herndon

SUBJECT: CALCULATION OF 2001-02 PRECIPITATION FOR MISSING/QUESTIONABLE DATA FOR STATION 2146-A AT SAN BERNARDINO

The Santa Ana River Watermaster has historically used precipitation recorded at the San Bernardino County Hospital Station 2146 to assist in determining when storm flow occurs in the Santa Ana River. Data from a standard, or manually measured, station was used until that station was abandoned after 1998. Thereafter, data from the automatic station, 2146-A, which was established in 1984, has been used. As review of the data for the 2001-02 Watermaster Report began, it was noted that the total precipitation recorded at Station 2146-A, 3.60 inches, was considerably lower than that of the surrounding stations and that there were 23 days of missing data.

A similar problem with missing and inconsistent precipitation data for Station 2146-A had occurred last year. At that time staff obtained and reviewed a copy of the USGS paper, "Double-Mass Curves," by James K. Searcy and Clayton H. Hardison, (1960), from Manual of Hydrology: Part 1. General Surface-Water Techniques, Geological Survey Water-Supply Paper 1541-B. A copy of that paper was included in the 2000-01 Basic Data. Staff review found that the primary purpose of the double-mass method was for data quality or trend analysis of a flow or precipitation station rather than to replace a missing year of record. Searcy and Hardison suggested the method used by the U.S. Weather Bureau as a simpler and more suitable method to use in a case where one year of data was missing or poor. The authors state that "The double-mass curve can also be used to estimate missing precipitation data, but the method is generally more laborious and no more accurate than the U.S. Weather Bureau method."

The paper described the Weather Bureau method (page 39) of using data from three adjacent stations to calculate missing data. If the three adjacent stations have precipitation ratios within 10% of the missing station, an average of the three stations is used. If the ratios are not all within 10% of the missing station, the normal-ratio method is used. "In this method, the precipitation at each of the three stations is multiplied by the ratio of the normal annual precipitation at the interpolation [missing or poor-quality] station to the normal annual precipitation at each station. The weighted precipitation of

the three stations is averaged to obtain the estimate for the interpolation station." Based on this information, staff proceeded to follow the U.S. Weather Bureau method.

Nearby precipitation stations were reviewed for proximity to Station 2146-A and completeness of records. Station 2001B2 located approximately one and one-half miles south of 2146, Station 2015 located three miles north and one mile east of 2146, and Station 2357 located two and one-quarter miles north and one mile west of 2146 were determined to be the best stations for this purpose due to their proximity to 2146-A (see location map attached) and for having from 22 to over 40 years of continuous data.

The cumulative annual precipitation from 1984-85 through 2000-01 for each of the adjacent stations was graphed against like data for the same time period from Station 2146-A. A trend line through the points on the graph gave the ratio of each station's precipitation to that of Station 2146-A (see attached graphs). The R^2 values for all of the trend lines were greater than 0.996, showing excellent correlation. The ratios did, however, vary between 0.896 and 1.1156 (greater than 10%), so it was necessary to apply the normal-ratio method.

The historical annual precipitation ratio of each station to 2146-A was applied to the 2001-02 daily precipitation for each of the three adjacent stations and then averaged to estimate the daily precipitation for Station 2146-A, using the following equation:

$$P_{2146\text{-}A} = (R_1P_1 + R_2P_2 + R_3P_3)/3$$

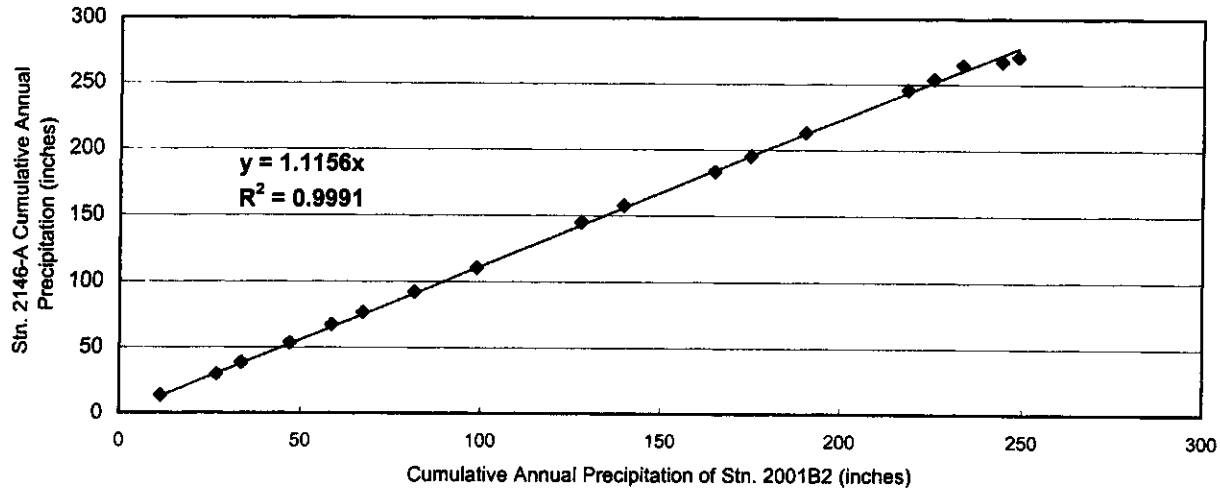
where: $P_{2146\text{-}A}$ = calculated daily precipitation for Station 2146-A
R_x = historical annual precipitation ratio of Station X to Station 2146-A
P_x = daily precipitation for Station X

As seen in Table B-3, the calculated total 2001-02 precipitation for Station 2146-A was 5.08 inches.

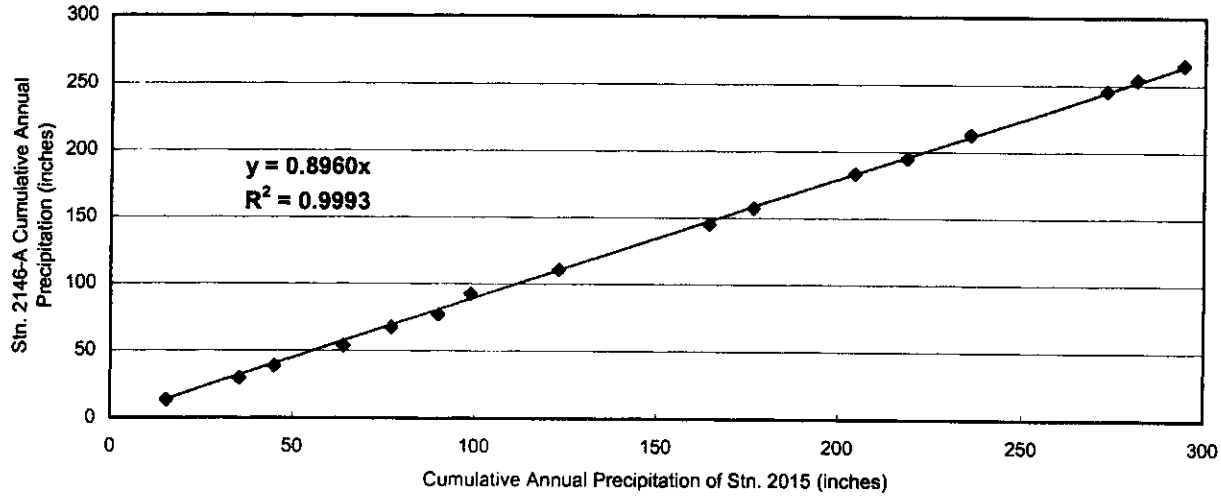
TABLE B-2

HISTORICAL ANNUAL PRECIPITATION RATIO CALCULATION

Cumulative Annual Precipitation for Stn. 2001B2 vs. Stn. 2146-A



Cumulative Annual Precipitation for Stn. 2015 vs. Stn. 2146-A



Cumulative Annual Precipitation for Stn. 2357 vs. Stn. 2146-A

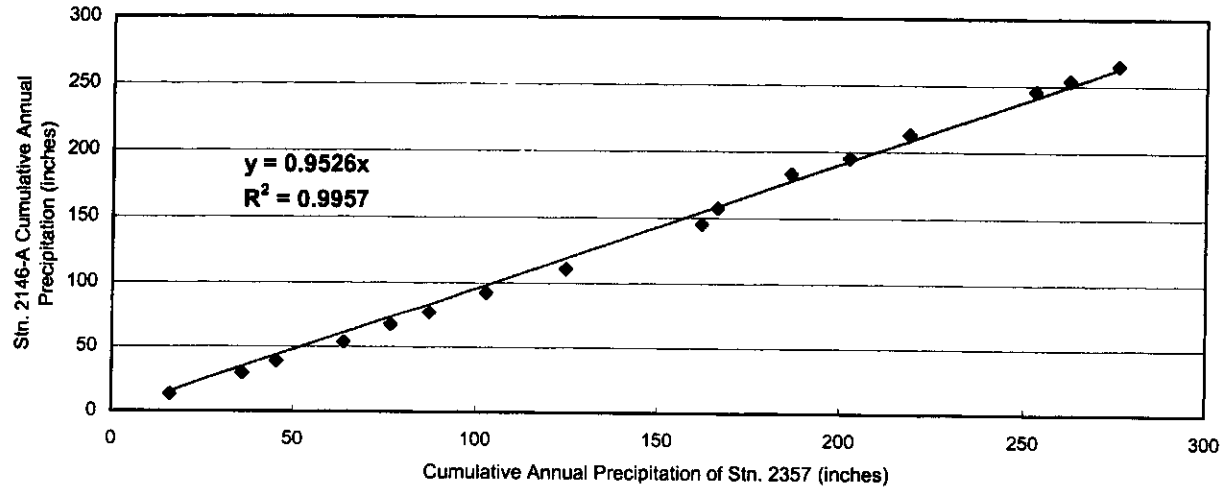


Table B-3

2001-02 DATA FOR 2146-A CALCULATED FROM
ADJACENT STATIONS 2001B2, 2015, AND 2357 (Inches)

	Recorded Daily Precipitation				Calculated Precipitation For Stn. 2146-A =			**Calculated Data**	
	Interpolation Stn. 2146-A	Adjacent Stations							
		2001B2	2015	2357	(2001B2 X	(2015 X	(2357 X		Monthly
Ratio Adjacent Stn. to 2146-A =		1.1156	0.896	0.9526	1.1156)	0.9076)	0.9958)	Average	Total
10/1/01	0	0.02	0	0	0.02	0	0	0.01	
10/2/01	0	0	0.01	0	0	0.01	0	0	
10/3/01	0	0	0	0	0	0	0	0	
10/4/01	0	0	0	0	0	0	0	0	
10/5/01	0	0	0	0	0	0	0	0	
10/6/01	0	0	0	0	0	0	0	0	
10/7/01	0	0	0	0	0	0	0	0	
10/8/01	0	0	0	0	0	0	0	0	
10/9/01	0	0	0	0	0	0	0	0	
10/10/01	0	0	0	0	0	0	0	0	
10/11/01	0	0	0	0	0	0	0	0	
10/12/01	0	0	0	0	0	0	0	0	
10/13/01	0	0	0	0	0	0	0	0	
10/14/01	0	0	0	0	0	0	0	0	
10/15/01	0	0	0	0	0	0	0	0	
10/16/01	0	0	0	0	0	0	0	0	
10/17/01	0	0	0	0	0	0	0	0	
10/18/01	0	0	0	0	0	0	0	0	
10/19/01	0	0	0	0	0	0	0	0	
10/20/01	0	0	0	0	0	0	0	0	
10/21/01	0	0	0	0	0	0	0	0	
10/22/01	0	0	0	0	0	0	0	0	
10/23/01	0	0	0	0	0	0	0	0	
10/24/01	0	0	0	0	0	0	0	0	
10/25/01	0	0	0	0	0	0	0	0	
10/26/01	0	0	0	0	0	0	0	0	
10/27/01	0	0	0	0	0	0	0	0	
10/28/01	0	0	0	0	0	0	0	0	
10/29/01	0	0	0	0	0	0	0	0	
10/30/01	0.04	0.08	0.07	0.05	0.09	0.06	0.05	0.07	
10/31/01	0	0	0	0	0	0	0	0	0.08
11/1/01	0	0	0	0	0	0	0	0	
11/2/01	0.01	0	0	0	0	0	0	0	
11/3/01	0	0	0	0	0	0	0	0	
11/4/01	0	0	0.01	0.01	0	0.01	0.01	0.01	
11/5/01	0	0	0	0.02	0	0	0.02	0.01	
11/6/01	0	0	0	0	0	0	0	0	
11/7/01	0	0	0	0	0	0	0	0	
11/8/01	0	0	0	0	0	0	0	0	
11/9/01	0	0	0	0	0	0	0	0	
11/10/01	0	0	0	0	0	0	0	0	
11/11/01	0	0	0.02	0.01	0	0.02	0.01	0.01	
11/12/01	0.24	0.38	0.31	0.31	0.42	0.28	0.30	0.33	

Table B-3

2001-02 DATA FOR 2146-A CALCULATED FROM
ADJACENT STATIONS 2001B2, 2015, AND 2357 (Inches)

	Recorded Daily Precipitation				Calculated Precipitation For Stn. 2146-A =			Calculated Data	
	Interpolation Stn. 2146-A	Adjacent Stations							
		2001B2	2015	2357	(2001B2 X	(2015 X	(2357 X		Monthly
Ratio Adjacent Stn. to 2146-A =		1.1156	0.896	0.9526	1.1156)	0.9076)	0.9958)	Average	Total
11/13/01	0	0	0.01	0	0	0.01	0	0	
11/14/01	0	0	0	0	0	0	0	0	
11/15/01	0	0	0	0	0	0	0	0	
11/16/01	0	0	0	0	0	0	0	0	
11/17/01	0	0	0	0	0	0	0	0	
11/18/01	0	0	0	0	0	0	0	0	
11/19/01	0	0	0	0	0	0	0	0	
11/20/01	0	0	0	0	0	0	0	0	
11/21/01	0	0	0	0	0	0	0	0	
11/22/01	0	0	0	0	0	0	0	0	
11/23/01	0	0	0	0	0	0	0	0	
11/24/01	0.83	0	1.28	1.22	0	1.15	1.16	0.77	
11/25/01	0	0.98	0	0	1.09	0	0	0.36	
11/26/01	0	0	0	0	0	0	0	0	
11/27/01	0	0	0	0	0	0	0	0	
11/28/01	0	0	0	0	0	0	0	0	
11/29/01	0.02	0.03	0.05	0.05	0.03	0.04	0.05	0.04	
11/30/01	0	0	0.01	0	0	0.01	0	0	1.53
12/1/01	0	0	0	0	0	0	0	0	
12/2/01	0	0.06	0	0	0.07	0	0	0.02	
12/3/01	0.03	0	0.13	0.11	0	0.12	0.10	0.07	
12/4/01	0.01	0	0.01	0	0	0.01	0	0	
12/5/01	0	0	0	0	0	0	0	0	
12/6/01	0	0	0	0	0	0	0	0	
12/7/01	0	0	0	0	0	0	0	0	
12/8/01	0	0	0	0	0	0	0	0	
12/9/01	0	0	0	0.01	0	0	0.01	0	
12/10/01	0	0	0	0	0	0	0	0	
12/11/01	0	0	0	0	0	0	0	0	
12/12/01	0	0	0	0	0	0	0	0	
12/13/01	0	0	0	0	0	0	0	0	
12/14/01	0.25	0	0.22	0.23	0	0.20	0.22	0.14	
12/15/01	0	0	0	0	0	0	0	0	
12/16/01	0	0.23	0	0	0.26	0	0	0.09	
12/17/01	0	0	0	0	0	0	0	0	
12/18/01	0	0	0	0	0	0	0	0	
12/19/01	0	0	0	0	0	0	0	0	
12/20/01	0.04	0.3	0.07	0.06	0.33	0.06	0.06	0.15	
12/21/01	0.04	0	0.34	0.29	0	0.30	0.28	0.19	
12/22/01	0	0	0	0	0	0	0	0	
12/23/01	0	0	0	0	0	0	0	0	
12/24/01	0	0	0	0	0	0	0	0	
12/25/01	0	0	0	0	0	0	0	0	

Table B-3

2001-02 DATA FOR 2146-A CALCULATED FROM
ADJACENT STATIONS 2001B2, 2015, AND 2357 (Inches)

	Recorded Daily Precipitation				Calculated Precipitation For Stn. 2146-A =			Calculated Data	
	Interpolation Stn. 2146-A	Adjacent Stations							
		2001B2	2015	2357	(2001B2 X	(2015 X	(2357 X		Monthly
Ratio Adjacent Stn. to 2146-A =		1.1156	0.896	0.9526	1.1156)	0.9076)	0.9958)	Average	Total
12/26/01	0	0	0	0	0	0	0	0	
12/27/01	0	0	0	0	0	0	0	0	
12/28/01	0	0	0	0	0	0	0	0	
12/29/01	0.01	0	0.01	0.02	0	0.01	0.02	0.01	
12/30/01	0	0	0	0	0	0	0	0	
12/31/01	0	0	0	0	0	0	0	0	0.67
1/1/02	0	0.05	0	0	0.06	0	0	0.02	
1/2/02	0	0.07	0	0.01	0.08	0	0.01	0.03	
1/3/02	0.02	0	0.05	0.04	0	0.04	0.04	0.03	
1/4/02	0	0	0	0	0	0	0	0	
1/5/02	0	0	0	0	0	0	0	0	
1/6/02	0	0	0	0	0	0	0	0	
1/7/02	0	0	0	0	0	0	0	0	
1/8/02	0	0	0	0	0	0	0	0	
1/9/02	0	0	0	0	0	0	0	0	
1/10/02	0	0	0	0	0	0	0	0	
1/11/02	0	0	0	0	0	0	0	0	
1/12/02	0	0	0	0	0	0	0	0	
1/13/02	0	0	0	0	0	0	0	0	
1/14/02	0	0	0	0	0	0	0	0	
1/15/02	0	0	0	0	0	0	0	0	
1/16/02	0.03	0.09	0.02	0.02	0.10	0.02	0.02	0.05	
1/17/02	0	0	0	0	0	0	0	0	
1/18/02	0	0	0	0	0	0	0	0	
1/19/02	0	0	0	0	0	0	0	0	
1/20/02	0	0	0	0	0	0	0	0	
1/21/02	0	0	0	0	0	0	0	0	
1/22/02	0	0	0	0	0	0	0	0	
1/23/02	0	0	0	0	0	0	0	0	
1/24/02	0	0	0	0	0	0	0	0	
1/25/02	0	0	0	0	0	0	0	0	
1/26/02	0	0	0	0	0	0	0	0	
1/27/02	0.13	0.24	0.25	0.3	0.27	0.22	0.29	0.26	
1/28/02	0.32	0.01	0.62	0.45	0.01	0.56	0.43	0.33	
1/29/02	0.01	0.01	0	0	0.01	0	0	0	
1/30/02	0	0	0	0	0	0	0	0	
1/31/02	0	0	0	0	0	0	0	0	0.72
2/1/02	0	0	0	0	0	0	0	0	
2/2/02	0	0	0	0	0	0	0	0	
2/3/02	0	0	0	0	0	0	0	0	
2/4/02	0	0	0	0	0	0	0	0	
2/5/02	0	0	0	0.01	0	0	0.01	0	
2/6/02	0	0	0	0	0	0	0	0	

Table B-3

2001-02 DATA FOR 2146-A CALCULATED FROM
ADJACENT STATIONS 2001B2, 2015, AND 2357 (Inches)

	Recorded Daily Precipitation				Calculated Precipitation For Stn. 2146-A =			**Calculated Data**	
	Interpolation Stn.	Adjacent Stations							
	2146-A	2001B2	2015	2357	(2001B2 X	(2015 X	(2357 X		Monthly
Ratio Adjacent Stn. to 2146-A =		1.1156	0.896	0.9526	1.1156)	0.9076)	0.9958)	Average	Total
2/7/02	0	0	0	0	0	0	0	0	
2/8/02	0	0	0	0	0	0	0	0	
2/9/02	0	0	0	0	0	0	0	0	
2/10/02	0	0	0	0	0	0	0	0	
2/11/02	0	0	0	0	0	0	0	0	
2/12/02	0	0	0	0	0	0	0	0	
2/13/02	0	0	0	0	0	0	0	0	
2/14/02	0	0	0	0.05	0	0	0.05	0.02	
2/15/02	0	0	0	0	0	0	0	0	
2/16/02	0	0	0	0	0	0	0	0	
2/17/02	0.28	0	0.39	0.37	0	0.35	0.35	0.23	
2/18/02	0	0.25	0	0	0.28	0	0	0.09	
2/19/02	0	0	0	0	0	0	0	0	
2/20/02	0	0	0	0	0	0	0	0	
2/21/02	0	0	0	0	0	0	0	0	
2/22/02	0	0	0	0.01	0	0	0.01	0	
2/23/02	0	0	0	0	0	0	0	0	
2/24/02	0	0	0	0	0	0	0	0	
2/25/02	0	0	0	0	0	0	0	0	
2/26/02	0	0	0	0	0	0	0	0	
2/27/02	0	0	0	0	0	0	0	0	
2/28/02	0	0	0	0	0	0	0	0	0.34
3/1/02	0	0	0	0	0	0	0	0	
3/2/02	0	0	0	0	0	0	0	0	
3/3/02	0	0	0	0	0	0	0	0	
3/4/02	0	0	0	0	0	0	0	0	
3/5/02	0	0	0	0	0	0	0	0	
3/6/02	0.02	0	0.14	0.09	0	0.13	0.09	0.07	
3/7/02	0.09	0.1	0.18	0.08	0.11	0.16	0.08	0.12	
3/8/02	0.01	0	0	0	0	0	0	0	
3/9/02	0	0	0	0	0	0	0	0	
3/10/02	0	0	0	0	0	0	0	0	
3/11/02	0	0	0	0	0	0	0	0	
3/12/02	0	0	0	0	0	0	0	0	
3/13/02	0.02	0	0.08	0.04	0	0.07	0.04	0.04	
3/14/02	0	0	0	0	0	0	0	0	
3/15/02	0	0	0	0.01	0	0	0.01	0	
3/16/02	0	0	0	0	0	0	0	0	
3/17/02	0.72	0.78	0.8	0.72	0.87	0.72	0.69	0.76	
3/18/02	0.05	0	0.11	0.12	0	0.10	0.11	0.07	
3/19/02	0	0	0	0	0	0	0	0	
3/20/02	0	0	0	0	0	0	0	0	
3/21/02	0	0	0	0	0	0	0	0	

Table B-3

2001-02 DATA FOR 2146-A CALCULATED FROM
ADJACENT STATIONS 2001B2, 2015, AND 2357 (Inches)

	Recorded Daily Precipitation				Calculated Precipitation For Stn. 2146-A =			Calculated Data	
	Interpolation Stn. 2146-A	Adjacent Stations							
		2001B2	2015	2357	(2001B2 X	(2015 X	(2357 X		Monthly
Ratio Adjacent Stn. to 2146-A =		1.1156	0.896	0.9526	1.1156)	0.9076)	0.9958)	Average	Total
3/22/02	0	0	0	0	0	0	0	0	
3/23/02	0.02	0	0.09	0.07	0	0.08	0.07	0.05	
3/24/02	0	0.04	0	0	0.04	0	0	0.01	
3/25/02	0	0	0	0	0	0	0	0	
3/26/02	0	0	0	0	0	0	0	0	
3/27/02	0	0	0	0	0	0	0	0	
3/28/02	0.06	0.03	0.1	0.08	0.03	0.09	0.08	0.07	
3/29/02	0	0	0	0	0	0	0	0	
3/30/02	0	0	0	0	0	0	0	0	
3/31/02	0	0	0	0	0	0	0	0	1.19
4/1/02	0	0	0	0	0	0	0	0	
4/2/02	0	0	0	0	0	0	0	0	
4/3/02	0	0	0.01	0	0	0.01	0	0	
4/4/02	0	0	0	0	0	0	0	0	
4/5/02	0	0	0	0	0	0	0	0	
4/6/02	0.04	0	0.18	0.14	0	0.16	0.13	0.10	
4/7/02	0	0	0	0	0	0	0	0	
4/8/02	0	0.35	0	0	0.39	0	0	0.13	
4/9/02	0	0	0	0	0	0	0	0	
4/10/02	0	0	0	0	0	0	0	0	
4/11/02	0	0	0	0	0	0	0	0	
4/12/02	0	0	0	0	0	0	0	0	
4/13/02	0	0	0	0	0	0	0	0	
4/14/02	0	0	0	0	0	0	0	0	
4/15/02	0.02	0.02	0.09	0.02	0.02	0.08	0.02	0.04	
4/16/02	0	0	0	0	0	0	0	0	
4/17/02	0	0	0	0	0	0	0	0	
4/18/02	0	0	0	0	0	0	0	0	
4/19/02	0	0	0	0	0	0	0	0	
4/20/02	0	0	0	0	0	0	0	0	
4/21/02	0	0	0	0	0	0	0	0	
4/22/02	0	0	0	0	0	0	0	0	
4/23/02	0	0	0	0	0	0	0	0	
4/24/02	0.21	0	0.19	0.16	0	0.17	0.15	0.11	
4/25/02	0	0.19	0	0	0.21	0	0	0.07	
4/26/02	0.01	0	0.13	0.08	0	0.12	0.08	0.06	
4/27/02	0	0	0.01	0	0	0.01	0	0	
4/28/02	0	0	0	0	0	0	0	0	
4/29/02	0	0.04	0	0	0.04	0	0	0.01	
4/30/02	0	0	0	0	0	0	0	0	0.52
5/1/02	0	0	0	0	0	0	0	0	
5/2/02	0	0	0	0	0	0	0	0	
5/3/02	0	0	0	0	0	0	0	0	

Table B-3

2001-02 DATA FOR 2146-A CALCULATED FROM
ADJACENT STATIONS 2001B2, 2015, AND 2357 (Inches)

	Recorded Daily Precipitation				Calculated Precipitation For Stn. 2146-A =			**Calculated Data**	
	Interpolation Stn. 2146-A	Adjacent Stations							
		2001B2	2015	2357	(2001B2 X	(2015 X	(2357 X		Monthly
Ratio Adjacent Stn. to 2146-A =		1.1156	0.896	0.9526	1.1156)	0.9076)	0.9958)	Average	Total
5/4/02	0	0	0	0	0	0	0	0	
5/5/02	0	0	0	0	0	0	0	0	
5/6/02	0.01	0	0	0	0	0	0	0	
5/7/02	0	0	0	0	0	0	0	0	
5/8/02	0	0	0	0	0	0	0	0	
5/9/02	0	0	0	0	0	0	0	0	
5/10/02	0	0	0	0	0	0	0	0	
5/11/02	0	0	0	0	0	0	0	0	
5/12/02	0	0	0	0	0	0	0	0	
5/13/02	0	0	0	0	0	0	0	0	
5/14/02	0	0	0	0	0	0	0	0	
5/15/02	0	0	0	0	0	0	0	0	
5/16/02	0	0	0.01	0	0	0.01	0	0	
5/17/02	0	0	0	0	0	0	0	0	
5/18/02	0	0	0	0	0	0	0	0	
5/19/02	0	0	0.01	0	0	0.01	0	0	
5/20/02	0	0	0.05	0.03	0	0.04	0.03	0.02	
5/21/02	0	0.04	0	0	0.04	0	0	0.01	
5/22/02	0	0	0	0	0	0	0	0	
5/23/02	0	0	0	0	0	0	0	0	
5/24/02	0	0	0	0	0	0	0	0	
5/25/02	0	0	0	0	0	0	0	0	
5/26/02	0	0	0	0	0	0	0	0	
5/27/02	0	0	0	0	0	0	0	0	
5/28/02	0	0	0	0	0	0	0	0	
5/29/02	0	0	0	0	0	0	0	0	
5/30/02	0	0	0	0	0	0	0	0	
5/31/02	0	0	0	0	0	0	0	0	0.03
6/1/02	0	0	0.01	0	0	0.01	0	0	
6/2/02	0	0	0	0	0	0	0	0	
6/3/02	0	0	0	0	0	0	0	0	
6/4/02	0	0	0.01	0	0	0.01	0	0	
6/5/02	0	0	0	0	0	0	0	0	
6/6/02	0	0	0	0	0	0	0	0	
6/7/02	0	0	0	0	0	0	0	0	
6/8/02	0	0	0	0	0	0	0	0	
6/9/02	0	0	0	0	0	0	0	0	
6/10/02	0	0	0	0	0	0	0	0	
6/11/02	0	0	0	0	0	0	0	0	
6/12/02	0	0	0	0	0	0	0	0	
6/13/02	0	0	0	0	0	0	0	0	
6/14/02	0	0	0	0	0	0	0	0	
6/15/02	0	0	0	0	0	0	0	0	

Table B-3

2001-02 DATA FOR 2146-A CALCULATED FROM
ADJACENT STATIONS 2001B2, 2015, AND 2357 (Inches)

	Recorded Daily Precipitation				Calculated Precipitation For Stn. 2146-A =			Calculated Data	
	Interpolation Stn.	Adjacent Stations							
	2146-A	2001B2	2015	2357	(2001B2 X	(2015 X	(2357 X		Monthly
Ratio Adjacent Stn. to 2146-A =		1.1156	0.896	0.9526	1.1156)	0.9076)	0.9958)	Average	Total
6/16/02	0	0	0	0	0	0	0	0	
6/17/02	0	0	0	0	0	0	0	0	
6/18/02	0	0	0	0	0	0	0	0	
6/19/02	0	0	0	0	0	0	0	0	
6/20/02	0	0	0	0	0	0	0	0	
6/21/02	0	0	0	0	0	0	0	0	
6/22/02	0	0	0	0	0	0	0	0	
6/23/02	0	0	0	0	0	0	0	0	
6/24/02	0	0	0	0	0	0	0	0	
6/25/02	0	0	0	0	0	0	0	0	
6/26/02	0	0	0	0	0	0	0	0	
6/27/02	0	0	0	0	0	0	0	0	
6/28/02	0	0	0	0	0	0	0	0	
6/29/02	0	0	0	0	0	0	0	0	
6/30/02	0	0	0	0	0	0	0	0	0.00
7/1/02	0	0	0	0	0	0	0	0	
7/2/02	0	0	0	0	0	0	0	0	
7/3/02	0	0	0	0	0	0	0	0	
7/4/02	0	0	0	0	0	0	0	0	
7/5/02	0	0	0	0	0	0	0	0	
7/6/02	0	0	0	0	0	0	0	0	
7/7/02	0	0	0	0	0	0	0	0	
7/8/02	0	0	0	0	0	0	0	0	
7/9/02	0	0	0	0	0	0	0	0	
7/10/02	0	0	0	0	0	0	0	0	
7/11/02	0	0	0	0	0	0	0	0	
7/12/02	0	0	0	0	0	0	0	0	
7/13/02	0	0	0	0	0	0	0	0	
7/14/02	0	0	0	0	0	0	0	0	
7/15/02	0	0	0	0	0	0	0	0	
7/16/02	0	0	0	0	0	0	0	0	
7/17/02	0	0	0	0	0	0	0	0	
7/18/02	0	0	0	0	0	0	0	0	
7/19/02	0	0	0	0	0	0	0	0	
7/20/02	0	0	0	0	0	0	0	0	
7/21/02	0	0	0	0	0	0	0	0	
7/22/02	0	0	0	0	0	0	0	0	
7/23/02	0	0	0	0	0	0	0	0	
7/24/02	0	0	0	0	0	0	0	0	
7/25/02	0	0	0	0	0	0	0	0	
7/26/02	0	0	0	0	0	0	0	0	
7/27/02	0	0	0	0	0	0	0	0	
7/28/02	0	0	0	0	0	0	0	0	

Table B-3

2001-02 DATA FOR 2146-A CALCULATED FROM
ADJACENT STATIONS 2001B2, 2015, AND 2357 (Inches)

	Recorded Daily Precipitation				Calculated Precipitation For Stn. 2146-A =			**Calculated Data**	
	Interpolation Stn. 2146-A	Adjacent Stations							
		2001B2	2015	2357	(2001B2 X	(2015 X	(2357 X		Monthly
Ratio Adjacent Stn. to 2146-A =		1.1156	0.896	0.9526	1.1156)	0.9076)	0.9958)	Average	Total
7/29/02	0	0	0	0	0	0	0	0	
7/30/02	0	0	0	0	0	0	0	0	
7/31/02	0	0	0	0	0	0	0	0	0.00
8/1/02	0	0	0	0	0	0	0	0	
8/2/02	0	0	0	0	0	0	0	0	
8/3/02	0	0	0	0	0	0	0	0	
8/4/02	0	0	0	0	0	0	0	0	
8/5/02	0	0	0	0	0	0	0	0	
8/6/02	0	0	0	0	0	0	0	0	
8/7/02	0	0	0	0	0	0	0	0	
8/8/02	0	0	0	0	0	0	0	0	
8/9/02	0	0	0	0	0	0	0	0	
8/10/02	0	0	0	0	0	0	0	0	
8/11/02	0	0	0	0	0	0	0	0	
8/12/02	0	0	0	0	0	0	0	0	
8/13/02	0	0	0	0	0	0	0	0	
8/14/02	0	0	0	0	0	0	0	0	
8/15/02	0	0	0	0	0	0	0	0	
8/16/02	0	0	0	0	0	0	0	0	
8/17/02	0	0	0	0	0	0	0	0	
8/18/02	0	0	0	0	0	0	0	0	
8/19/02	0	0	0	0	0	0	0	0	
8/20/02	0	0	0	0	0	0	0	0	
8/21/02	0	0	0	0	0	0	0	0	
8/22/02	0	0	0	0	0	0	0	0	
8/23/02	0	0	0	0	0	0	0	0	
8/24/02	0	0	0	0	0	0	0	0	
8/25/02	0	0	0	0	0	0	0	0	
8/26/02	0	0	0	0	0	0	0	0	
8/27/02	0	0	0	0	0	0	0	0	
8/28/02	0	0	0	0	0	0	0	0	
8/29/02	0	0	0	0	0	0	0	0	
8/30/02	0	0	0	0	0	0	0	0	
8/31/02	0	0	0	0	0	0	0	0	0
9/1/02	0	0	0	0	0	0	0	0	
9/2/02	0	0	0	0	0	0	0	0	
9/3/02	0	0	0	0	0	0	0	0	
9/4/02	0	0	0	0	0	0	0	0	
9/5/02	0	0	0	0	0	0	0	0	
9/6/02	0.01	0	0	0	0	0	0	0	
9/7/02	0	0	0	0	0	0	0	0	
9/8/02	0	0	0	0	0	0	0	0	
9/9/02	0	0	0	0	0	0	0	0	

Table B-3

2001-02 DATA FOR 2146-A CALCULATED FROM ADJACENT STATIONS 2001B2, 2015, AND 2357 (Inches)

	Recorded Daily Precipitation				Calculated Precipitation For Stn. 2146-A =			**Calculated Data**	
	Interpolation Stn. 2146-A	Adjacent Stations							
		2001B2	2015	2357	(2001B2 X	(2015 X	(2357 X		
Ratio Adjacent Stn. to 2146-A =		1.1156	0.896	0.9526	1.1156)	0.9076)	0.9958)	Average	Monthly Total
9/10/02	0	0	0	0	0	0	0	0	
9/11/02	0	0	0	0	0	0	0	0	
9/12/02	0	0	0	0	0	0	0	0	
9/13/02	0	0	0	0	0	0	0	0	
9/14/02	0	0	0	0	0	0	0	0	
9/15/02	0	0	0	0	0	0	0	0	
9/16/02	0	0	0	0	0	0	0	0	
9/17/02	0	0	0	0	0	0	0	0	
9/18/02	0	0	0	0	0	0	0	0	
9/19/02	0	0	0	0	0	0	0	0	
9/20/02	0	0	0	0	0	0	0	0	
9/21/02	0	0	0	0	0	0	0	0	
9/22/02	0	0	0	0	0	0	0	0	
9/23/02	0	0	0	0	0	0	0	0	
9/24/02	0	0	0	0	0	0	0	0	
9/25/02	0	0	0	0	0	0	0	0	
9/26/02	0	0	0	0	0	0	0	0	
9/27/02	0	0	0	0	0	0	0	0	
9/28/02	0	0	0	0	0	0	0	0	
9/29/02	0	0	0	0	0	0	0	0	
9/30/02	0	0	0	0	0	0	0	0	0.00
ANNUAL	3.60	4.39	6.08	5.29	4.90	5.45	5.04	5.08	5.08

APPENDIX C

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

WATER YEAR 2001-02

ORANGE COUNTY WATER DISTRICT

Orange County's Groundwater Authority

April 8, 2003

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

Subject: Review of Fiscal Year 2001-02 Financial Transactions

Gentlemen:

I have reviewed and prepared the attached statement of assets and liabilities comprised of cash transactions for Santa Ana River Watermaster, and the related statement of revenue, expenses, and changes in fund balance for year ended June 30, 2002. This review includes examining evidence that supports the amounts and disclosures in the financial statements. I have reviewed minutes of meetings as well as Bank of America Checking and Savings Accounts' transactions and statements, and have concluded that all transactions were properly recorded.

Very truly yours,

ORANGE COUNTY WATER DISTRICT

Laura R. Li
Internal Auditor

cc: John C. Kennedy, Assistant General Manager, OCWD

SANTA ANA RIVER WATERMASTER

FINANCIAL STATEMENTS

JUNE 30, 2002

SANTA ANA RIVER WATER MASTER

STATEMENT OF ASSETS AND LIABILITIES ARISING FROM CASH TRANSACTIONS

June 30, 2002

ASSETS

Cash in checking account (Notes 3)	$ 6,277
Cash in savings account (Notes 3)	2,447
TOTAL ASSETS	$ 8,724

FUND BALANCE

Fund balance	$ 8,724

See independent auditor's reports and notes to financial statements.

SANTA ANA RIVER WATER MASTER

STATEMENT OF ASSETS AND LIABILITIES ARISING FROM CASH TRANSACTIONS

June 30, 2002

	Actual	Budget	Variance-Favorable (Unfavorable)
REVENUE COLLECTED:			
Water district contributions (Note 2):			
Orange County Water District	$ 0	$ 3,500	$ (3,500)
Chino Basin Municipal Water District	0	1,750	(1,750)
San Bernardino Valley Municipal Water District	0	1,750	(1,750)
Western Municipal Water District	0	1,750	(1,750)
Interest from Savings Account	15	0	15
TOTAL REVENUE COLLECTED	$ 15	$ 8,750	$ (8,735)
EXPENSES PAID:			
Professional Engineering Service	$ 1,971	$ 9,500	$ (7,529)
Administrative Expenses:			
Auditing Services	0	0	0
Annual Reports	0	2,500	(2,500)
TOTAL EXPENSES PAID	$ 1,971	$ 12,000	$ (10,029)
EXCESS OF REVENUE COLLECTED OVER (UNDER) EXPENSES PAID	(1,956)	(3,250)	
FUND BALANCE AT JULY 1, 2001	10,680		
FUND BALANCE AT JUNE 30, 2002	$ 8,724		

See independent auditor's report and notes to financial statements.

SANTA ANA RIVER WATERMASTER

NOTES TO FINANCIAL STATEMENTS

June 30, 2002

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 the Orange County Water District and one representative each serves from Chino Basin Municipal Water District, 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 district contributions are made in the following ratios:

Orange County Water District	40%
Chino Basin Municipal Water District	20%
Western Municipal Water District	20%
San Bernardino Valley Municipal Water Districts	20%
Total	100%

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

3. CASH IN BANK:

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

Cash at June 30, 2002 consisted of the following:

Bank of America:	
Checking account	$ 6,277
Savings account	$ 2,447
	$ 8,724

All cash is fully insured by the FDIC.

APPENDIX D

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

WATER YEAR 2001-02

TABLE D-1

SAN BERNARDINO HIGH GROUNDWATER MITIGATION PROJECT WATER DISCHARGED TO THE SANTA ANA RIVER
WATER YEAR 2001-02
(acre-feet)

Month	Discharged Above Riverside Narrows[1]	Flow Arriving At Riverside Narrows[2]	Flow Arriving At Prado Dam[3]
2001			
October	0	0	0
November	184	182	178
December	432	428	419
2002			
January	691	684	670
February	94	93	92
March	847	839	822
April	983	973	954
May	1,033	1,023	1,002
June	314	311	305
July	0	0	0
August	0	0	0
September	0	0	0
Total	4,578	4,533	4,442

(1) Water discharged from wells to the Santa Ana River by SBVMWD.
(2) Adjusted for a 1% evapotranspiration loss above Riverside Narrows.
(3) Adjusted for a 2% evapotranspiration loss between Riverside Narrows and Prado.

TABLE D-2

SAN BERNARDINO HIGH GROUNDWATER MITIGATION PROJECT WATER
DISCHARGED TO THE SANTA ANA RIVER
WATER YEAR 2001-02

OCTOBER 2001

Day	Discharged Above Riverside Narrows[1] (cfs)	Flow Arriving At Riverside Narrows[2] (cfs)	Flow Arriving At Prado Dam[3] (cfs)
1	0.00	0.00	0.00
2	0.03	0.03	0.03
3	0.09	0.09	0.09
4	0.00	0.00	0.00
5	0.03	0.03	0.03
6	0.00	0.00	0.00
7	0.00	0.00	0.00
8	0.00	0.00	0.00
9	0.00	0.00	0.00
10	0.00	0.00	0.00
11	0.00	0.00	0.00
12	0.00	0.00	0.00
13	0.00	0.00	0.00
14	0.00	0.00	0.00
15	0.00	0.00	0.00
16	0.00	0.00	0.00
17	0.00	0.00	0.00
18	0.00	0.00	0.00
19	0.00	0.00	0.00
20	0.00	0.00	0.00
21	0.00	0.00	0.00
22	0.00	0.00	0.00
23	0.00	0.00	0.00
24	0.00	0.00	0.00
25	0.00	0.00	0.00
26	0.00	0.00	0.00
27	0.00	0.00	0.00
28	0.00	0.00	0.00
29	0.00	0.00	0.00
30	0.00	0.00	0.00
31	0.00	0.00	0.00
Total in cfs-days	0.15	0.15	0.14
Total in AF	0	0	0

(1) Water discharged from wells to the Santa Ana River by SBVMWD.
(2) Adjusted for a 1% evapotranspiration loss above Riverside Narrows.
(3) Adjusted for a 2% evapotranspiration loss between Riverside Narrows and Prado.

TABLE D-2 (continued)

SAN BERNARDINO HIGH GROUNDWATER MITIGATION PROJECT WATER
DISCHARGED TO THE SANTA ANA RIVER
WATER YEAR 2001-02

NOVEMBER 2001

Day	Discharged Above Riverside Narrows[1] (cfs)	Flow Arriving At Riverside Narrows[2] (cfs)	Flow Arriving At Prado Dam[3] (cfs)
1	0.00	0.00	0.00
2	0.00	0.00	0.00
3	0.00	0.00	0.00
4	0.00	0.00	0.00
5	0.00	0.00	0.00
6	0.00	0.00	0.00
7	0.11	0.10	0.10
8	0.00	0.00	0.00
9	0.00	0.00	0.00
10	0.00	0.00	0.00
11	0.00	0.00	0.00
12	0.00	0.00	0.00
13	0.00	0.00	0.00
14	0.00	0.00	0.00
15	0.00	0.00	0.00
16	0.00	0.00	0.00
17	0.00	0.00	0.00
18	0.00	0.00	0.00
19	0.00	0.00	0.00
20	0.00	0.00	0.00
21	9.03	8.94	8.77
22	7.81	7.74	7.58
23	8.58	8.49	8.32
24	8.48	8.40	8.23
25	8.69	8.60	8.43
26	9.08	8.99	8.81
27	17.90	17.72	17.36
28	18.74	18.55	18.18
29	4.24	4.20	4.12
30	0.00	0.00	0.00
Total in cfs-days	92.66	91.73	89.90
Total in AF	184	182	178

(1) Water discharged from wells to the Santa Ana River by SBVMWD.
(2) Adjusted for a 1% evapotranspiration loss above Riverside Narrows.
(3) Adjusted for a 2% evapotranspiration loss between Riverside Narrows and Prado.

TABLE D-2 (continued)

SAN BERNARDINO HIGH GROUNDWATER MITIGATION PROJECT WATER
DISCHARGED TO THE SANTA ANA RIVER
WATER YEAR 2001-02

DECEMBER 2001

Day	Discharged Above Riverside Narrows[1] (cfs)	Discharged Above Riverside Narrows[2] (cfs)	Flow Arriving At Prado Dam[3] (cfs)
1	0.00	0.00	0.00
2	0.00	0.00	0.00
3	6.67	6.60	6.47
4	8.31	8.23	8.06
5	18.53	18.34	17.98
6	17.83	17.65	17.30
7	9.46	9.37	9.18
8	9.09	9.00	8.82
9	9.58	9.49	9.30
10	9.39	9.29	9.11
11	9.29	9.20	9.02
12	9.59	9.49	9.30
13	9.09	9.00	8.82
14	9.64	9.55	9.36
15	9.31	9.22	9.04
16	9.23	9.14	8.95
17	9.42	9.32	9.14
18	9.20	9.11	8.93
19	3.68	3.64	3.57
20	3.91	3.87	3.80
21	3.62	3.58	3.51
22	3.78	3.75	3.67
23	3.66	3.62	3.55
24	3.65	3.62	3.54
25	3.89	3.86	3.78
26	3.63	3.60	3.52
27	9.62	9.53	9.33
28	3.82	3.79	3.71
29	3.52	3.49	3.42
30	3.67	3.64	3.56
31	3.77	3.73	3.66
Total in cfs-days	217.88	215.70	211.39
Total in AF	432	428	419

(1) Water discharged from wells to the Santa Ana River by SBVMWD.
(2) Adjusted for a 1% evapotranspiration loss above Riverside Narrows.
(3) Adjusted for a 2% evapotranspiration loss between Riverside Narrows and Prado.

TABLE D-2 (continued)

SAN BERNARDINO HIGH GROUNDWATER MITIGATION PROJECT WATER
DISCHARGED TO THE SANTA ANA RIVER
WATER YEAR 2001-02

JANUARY 2002

Day	Discharged Above Riverside Narrows[1] (cfs)	Discharged Above Riverside Narrows[2] (cfs)	Flow Arriving At Prado Dam[3] (cfs)
1	3.68	3.64	3.57
2	3.64	3.60	3.53
3	3.59	3.56	3.49
4	3.82	3.78	3.71
5	3.82	3.78	3.71
6	3.77	3.73	3.65
7	11.40	11.28	11.06
8	12.53	12.40	12.16
9	8.01	7.93	7.77
10	0.78	0.78	0.76
11	0.00	0.00	0.00
12	0.00	0.00	0.00
13	0.00	0.00	0.00
14	0.00	0.00	0.00
15	9.09	8.99	8.81
16	17.74	17.56	17.21
17	17.31	17.13	16.79
18	17.45	17.28	16.93
19	18.11	17.93	17.57
20	19.58	19.39	19.00
21	16.12	15.95	15.64
22	20.30	20.09	19.69
23	16.00	15.84	15.53
24	17.17	17.00	16.66
25	17.48	17.30	16.95
26	17.97	17.80	17.44
27	18.12	17.94	17.58
28	17.92	17.74	17.38
29	17.29	17.12	16.77
30	19.74	19.55	19.15
31	15.83	15.67	15.36
Total in cfs-days	348.28	344.80	337.90
Total in AF	691	684	670

(1) Water discharged from wells to the Santa Ana River by SBVMWD.
(2) Adjusted for a 1% evapotranspiration loss above Riverside Narrows.
(3) Adjusted for a 2% evapotranspiration loss between Riverside Narrows and Prado.

TABLE D-2 (continued)

SAN BERNARDINO HIGH GROUNDWATER MITIGATION PROJECT WATER
DISCHARGED TO THE SANTA ANA RIVER
WATER YEAR 2001-02

FEBRUARY 2002

Day	Discharged Above Riverside Narrows[1] (cfs)	Discharged Above Riverside Narrows[2] (cfs)	Flow Arriving At Prado Dam[3] (cfs)
1	18.27	18.09	17.73
2	17.55	17.38	17.03
3	9.34	9.24	9.06
4	2.45	2.43	2.38
5	0.00	0.00	0.00
6	0.00	0.00	0.00
7	0.00	0.00	0.00
8	0.00	0.00	0.00
9	0.00	0.00	0.00
10	0.00	0.00	0.00
11	0.00	0.00	0.00
12	0.00	0.00	0.00
13	0.00	0.00	0.00
14	0.00	0.00	0.00
15	0.00	0.00	0.00
16	0.00	0.00	0.00
17	0.00	0.00	0.00
18	0.00	0.00	0.00
19	0.00	0.00	0.00
20	0.00	0.00	0.00
21	0.00	0.00	0.00
22	0.00	0.00	0.00
23	0.00	0.00	0.00
24	0.00	0.00	0.00
25	0.00	0.00	0.00
26	0.00	0.00	0.00
27	0.00	0.00	0.00
28	0.00	0.00	0.00
Total in cfs-days	47.62	47.14	46.20
Total in AF	94	94	92

(1) Water discharged from wells to the Santa Ana River by SBVMWD.
(2) Adjusted for a 1% evapotranspiration loss above Riverside Narrows.
(3) Adjusted for a 2% evapotranspiration loss between Riverside Narrows and Prado.

TABLE D-2 (continued)

SAN BERNARDINO HIGH GROUNDWATER MITIGATION PROJECT WATER
DISCHARGED TO THE SANTA ANA RIVER
WATER YEAR 2001-02

MARCH 2002

Day	Discharged Above Riverside Narrows[1] (cfs)	Discharged Above Riverside Narrows[2] (cfs)	Flow Arriving At Prado Dam[3] (cfs)
1	0.00	0.00	0.00
2	0.00	0.00	0.00
3	0.00	0.00	0.00
4	0.00	0.00	0.00
5	0.28	0.28	0.27
6	9.49	9.39	9.21
7	16.75	16.58	16.25
8	17.18	17.01	16.67
9	17.75	17.57	17.22
10	18.26	18.07	17.71
11	17.44	17.27	16.92
12	18.03	17.85	17.50
13	17.66	17.48	17.13
14	18.69	18.50	18.13
15	16.93	16.76	16.42
16	17.18	17.01	16.67
17	18.07	17.89	17.53
18	18.26	18.08	17.71
19	17.19	17.02	16.68
20	16.54	16.38	16.05
21	17.35	17.18	16.84
22	20.23	20.03	19.63
23	15.63	15.47	15.16
24	18.44	18.25	17.89
25	14.12	13.98	13.70
26	13.35	13.21	12.95
27	15.64	15.49	15.18
28	13.42	13.29	13.02
29	13.89	13.75	13.47
30	14.29	14.15	13.87
31	15.14	14.99	14.69
Total in cfs-days	427.20	422.92	414.47
Total in AF	847	839	822

(1) Water discharged from wells to the Santa Ana River by SBVMWD.
(2) Adjusted for a 1% evapotranspiration loss above Riverside Narrows.
(3) Adjusted for a 2% evapotranspiration loss between Riverside Narrows and Prado.

TABLE D-2 (continued)

SAN BERNARDINO HIGH GROUNDWATER MITIGATION PROJECT WATER
DISCHARGED TO THE SANTA ANA RIVER
WATER YEAR 2001-02

APRIL 2002

Day	Discharged Above Riverside Narrows[1] (cfs)	Discharged Above Riverside Narrows[2] (cfs)	Flow Arriving At Prado Dam[3] (cfs)
1	14.49	14.35	14.06
2	14.40	14.26	13.98
3	17.38	17.21	16.86
4	17.69	17.52	17.17
5	17.35	17.18	16.83
6	14.00	13.86	13.58
7	21.60	21.38	20.95
8	15.83	15.67	15.36
9	17.78	17.61	17.25
10	17.87	17.70	17.34
11	17.10	16.93	16.59
12	18.03	17.85	17.50
13	15.74	15.58	15.27
14	18.39	18.20	17.84
15	16.94	16.77	16.44
16	17.97	17.79	17.43
17	15.18	15.02	14.72
18	12.84	12.71	12.45
19	13.63	13.49	13.22
20	14.23	14.08	13.80
21	15.56	15.40	15.09
22	12.91	12.78	12.52
23	16.37	16.20	15.88
24	18.27	18.09	17.73
25	17.05	16.88	16.54
26	15.92	15.77	15.45
27	17.52	17.35	17.00
28	19.14	18.95	18.57
29	15.89	15.73	15.42
30	18.42	18.23	17.87
Total in cfs-days	495.50	490.54	480.73
Total in AF	983	973	954

(1) Water discharged from wells to the Santa Ana River by SBVMWD.
(2) Adjusted for a 1% evapotranspiration loss above Riverside Narrows.
(3) Adjusted for a 2% evapotranspiration loss between Riverside Narrows and Prado.

TABLE D-2 (continued)

SAN BERNARDINO HIGH GROUNDWATER MITIGATION PROJECT WATER
DISCHARGED TO THE SANTA ANA RIVER
WATER YEAR 2001-02

MAY 2002

Day	Discharged Above Riverside Narrows[1] (cfs)	Discharged Above Riverside Narrows[2] (cfs)	Flow Arriving At Prado Dam[3] (cfs)
1	15.55	15.39	15.09
2	18.98	18.79	18.42
3	15.61	15.45	15.14
4	17.84	17.66	17.31
5	17.70	17.52	17.17
6	16.90	16.73	16.40
7	16.29	16.13	15.81
8	16.96	16.79	16.46
9	16.73	16.56	16.23
10	17.63	17.45	17.10
11	16.49	16.33	16.00
12	18.13	17.95	17.59
13	15.47	15.31	15.00
14	17.59	17.41	17.06
15	16.77	16.60	16.27
16	16.11	15.95	15.63
17	15.36	15.21	14.91
18	17.36	17.19	16.84
19	18.47	18.29	17.92
20	16.42	16.26	15.93
21	16.80	16.63	16.30
22	17.81	17.63	17.27
23	16.97	16.80	16.47
24	15.62	15.46	15.15
25	17.74	17.56	17.21
26	15.66	15.50	15.19
27	16.44	16.27	15.95
28	16.66	16.49	16.16
29	17.54	17.36	17.01
30	15.51	15.36	15.05
31	15.76	15.60	15.29
Total in cfs-days	520.85	515.64	505.33
Total in AF	1,033	1,023	1,002

(1) Water discharged from wells to the Santa Ana River by SBVMWD.
(2) Adjusted for a 1% evapotranspiration loss above Riverside Narrows.
(3) Adjusted for a 2% evapotranspiration loss between Riverside Narrows and Prado.

TABLE D-2 (continued)

SAN BERNARDINO HIGH GROUNDWATER MITIGATION PROJECT WATER
DISCHARGED TO THE SANTA ANA RIVER
WATER YEAR 2001-02

JUNE 2002

Day	Discharged Above Riverside Narrows[1] (cfs)	Discharged Above Riverside Narrows[2] (cfs)	Flow Arriving At Prado Dam[3] (cfs)
1	16.33	16.16	15.84
2	17.71	17.53	17.18
3	16.58	16.42	16.09
4	15.36	15.20	14.90
5	16.82	16.65	16.32
6	17.16	16.99	16.65
7	15.69	15.54	15.23
8	16.41	16.24	15.92
9	16.47	16.31	15.98
10	8.60	8.52	8.35
11	1.06	1.05	1.03
12	0.00	0.00	0.00
13	0.00	0.00	0.00
14	0.00	0.00	0.00
15	0.00	0.00	0.00
16	0.00	0.00	0.00
17	0.00	0.00	0.00
18	0.00	0.00	0.00
19	0.00	0.00	0.00
20	0.00	0.00	0.00
21	0.00	0.00	0.00
22	0.00	0.00	0.00
23	0.00	0.00	0.00
24	0.00	0.00	0.00
25	0.00	0.00	0.00
26	0.00	0.00	0.00
27	0.00	0.00	0.00
28	0.00	0.00	0.00
29	0.00	0.00	0.00
30	0.00	0.00	0.00
Total in cfs-days	158.20	156.62	153.49
Total in AF	314	311	305

(1) Water discharged from wells to the Santa Ana River by SBVMWD.
(2) Adjusted for a 1% evapotranspiration loss above Riverside Narrows.
(3) Adjusted for a 2% evapotranspiration loss between Riverside Narrows and Prado.

TABLE D-2 (continued)

SAN BERNARDINO HIGH GROUNDWATER MITIGATION PROJECT WATER
DISCHARGED TO THE SANTA ANA RIVER
WATER YEAR 2001-02

JULY 2002

Day	Discharged Above Riverside Narrows[1] (cfs)	Discharged Above Riverside Narrows[2] (cfs)	Flow Arriving At Prado Dam[3] (cfs)
1	0.00	0.00	0.00
2	0.00	0.00	0.00
3	0.00	0.00	0.00
4	0.00	0.00	0.00
5	0.00	0.00	0.00
6	0.00	0.00	0.00
7	0.00	0.00	0.00
8	0.00	0.00	0.00
9	0.00	0.00	0.00
10	0.00	0.00	0.00
11	0.00	0.00	0.00
12	0.00	0.00	0.00
13	0.00	0.00	0.00
14	0.00	0.00	0.00
15	0.00	0.00	0.00
16	0.00	0.00	0.00
17	0.00	0.00	0.00
18	0.00	0.00	0.00
19	0.00	0.00	0.00
20	0.00	0.00	0.00
21	0.00	0.00	0.00
22	0.00	0.00	0.00
23	0.00	0.00	0.00
24	0.00	0.00	0.00
25	0.00	0.00	0.00
26	0.00	0.00	0.00
27	0.00	0.00	0.00
28	0.00	0.00	0.00
29	0.00	0.00	0.00
30	0.00	0.00	0.00
31	0.00	0.00	0.00
Total in cfs-days	0.00	0.00	0.00
Total in AF	0	0	0

(1) Water discharged from wells to the Santa Ana River by SBVMWD.
(2) Adjusted for a 1% evapotranspiration loss above Riverside Narrows.
(3) Adjusted for a 2% evapotranspiration loss between Riverside Narrows and Prado.

TABLE D-2 (continued)

SAN BERNARDINO HIGH GROUNDWATER MITIGATION PROJECT WATER
DISCHARGED TO THE SANTA ANA RIVER
WATER YEAR 2001-02

AUGUST 2002

Day	Discharged Above Riverside Narrows[1] (cfs)	Discharged Above Riverside Narrows[2] (cfs)	Flow Arriving At Prado Dam[3] (cfs)
1	0.00	0.00	0.00
2	0.00	0.00	0.00
3	0.00	0.00	0.00
4	0.00	0.00	0.00
5	0.00	0.00	0.00
6	0.00	0.00	0.00
7	0.00	0.00	0.00
8	0.00	0.00	0.00
9	0.00	0.00	0.00
10	0.00	0.00	0.00
11	0.00	0.00	0.00
12	0.00	0.00	0.00
13	0.00	0.00	0.00
14	0.00	0.00	0.00
15	0.00	0.00	0.00
16	0.00	0.00	0.00
17	0.00	0.00	0.00
18	0.00	0.00	0.00
19	0.00	0.00	0.00
20	0.00	0.00	0.00
21	0.00	0.00	0.00
22	0.00	0.00	0.00
23	0.00	0.00	0.00
24	0.00	0.00	0.00
25	0.00	0.00	0.00
26	0.00	0.00	0.00
27	0.00	0.00	0.00
28	0.00	0.00	0.00
29	0.00	0.00	0.00
30	0.00	0.00	0.00
31	0.00	0.00	0.00
Total in cfs-days	0.00	0.00	0.00
Total in AF	0	0	0

(1) Water discharged from wells to the Santa Ana River by SBVMWD.
(2) Adjusted for a 1% evapotranspiration loss above Riverside Narrows.
(3) Adjusted for a 2% evapotranspiration loss between Riverside Narrows and Prado.

TABLE D-2 (continued)

SAN BERNARDINO HIGH GROUNDWATER MITIGATION PROJECT WATER
DISCHARGED TO THE SANTA ANA RIVER
WATER YEAR 2001-02

SEPTEMBER 2002

Day	Discharged Above Riverside Narrows[1] (cfs)	Discharged Above Riverside Narrows[2] (cfs)	Flow Arriving At Prado Dam[3] (cfs)
1	0.00	0.00	0.00
2	0.00	0.00	0.00
3	0.00	0.00	0.00
4	0.00	0.00	0.00
5	0.00	0.00	0.00
6	0.00	0.00	0.00
7	0.00	0.00	0.00
8	0.00	0.00	0.00
9	0.00	0.00	0.00
10	0.00	0.00	0.00
11	0.00	0.00	0.00
12	0.00	0.00	0.00
13	0.00	0.00	0.00
14	0.00	0.00	0.00
15	0.00	0.00	0.00
16	0.00	0.00	0.00
17	0.00	0.00	0.00
18	0.00	0.00	0.00
19	0.00	0.00	0.00
20	0.00	0.00	0.00
21	0.00	0.00	0.00
22	0.00	0.00	0.00
23	0.00	0.00	0.00
24	0.00	0.00	0.00
25	0.00	0.00	0.00
26	0.00	0.00	0.00
27	0.00	0.00	0.00
28	0.00	0.00	0.00
29	0.00	0.00	0.00
30	0.00	0.00	0.00
Total in cfs-days	0.00	0.00	0.00
Total in AF	0	0	0

(1) Water discharged from wells to the Santa Ana River by SBVMWD.
(2) Adjusted for a 1% evapotranspiration loss above Riverside Narrows.
(3) Adjusted for a 2% evapotranspiration loss between Riverside Narrows and Prado.

TABLE D-3

SUMMARY OF FLOW-WEIGHTED TDS OF HGMP WATER
DISCHARGED TO THE SANTA ANA RIVER
WATER YEAR 2001-02

Month	Discharged Above Riverside Narrows[1]	TDS[2] (mg/L)	Discharge x TDS	HGMP Flow At Riverside Narrows[3] (acre-feet)	HGMP Flow At Prado[4] (acre-feet)
2001					
October	0	--	0	0	0
November	184	542	99,728	182	178
December	432	476	205,632	428	419
2002					
January	691	442	305,422	684	670
February	94	466	43,804	93	92
March	847	488	413,336	839	822
April	983	522	513,126	973	954
May	1,033	527	544,391	1,023	1,002
June	314	521	163,594	311	305
July	0	--	0	0	0
August	0	--	0	0	0
September	0	--	0	0	0
Total	4,578		2,289,033	4,533	4,442

Flow-weighted TDS of pumped groundwater releases to the Santa Ana River :

At Riverside Narrows: $\frac{2,289,033}{4,533} = 505$ mg/L

At Prado: $\frac{2,289,033}{4,442} = 515$ mg/L

(1) Water discharged from wells to the Santa Ana River by SBVMWD.
(2) Average monthly TDS.
(3) Adjusted for a 1% evapotranspiration loss above Riverside Narrows.
(4) Adjusted for a 2% evapotranspiration loss between Riverside Narrows and Prado.

APPENDIX E

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

WATER YEAR 2001-02

TABLE E-1

NONTRIBUTARY WATER FROM OC-59
MONTHLY TOTALS
WATER YEAR 2001-02
(acre-feet)

Month	Released at OC-59	12-Hour Delay [1]	Evaporation Losses [2]	Calculated Flow at Prado
2001				
October	0	0	0	0
November	0	0	0	0
December	0	0	0	0
2002				
January	0	0	0	0
February	0	0	0	0
March	0	0	0	0
April	0	0	0	0
May	0	0	0	0
June	0	0	0	0
July	516	466	25	441
August	2,429	2,479	67	2,412
September	0	0	0	0
Total	2,945	2,945	92	2,853

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

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

TABLE E-2

NONTRIBUTARY WATER FROM OC-59
July 2002
(cfs)

Day	Released at OC-59	12-Hour Delay	Calculated Flow At Prado Dam [1]
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0
5	0	0	0
6	0	0	0
7	0	0	0
8	0	0	0
9	0	0	0
10	0	0	0
11	0	0	0
12	0	0	0
13	0	0	0
14	0	0	0
15	0	0	0
16	0	0	0
17	0	0	0
18	0	0	0
19	0	0	0
20	0	0	0
21	0	0	0
22	0	0	0
23	0	0	0
24	0	0	0
25	6	3	3
26	33	19	19
27	39	36	36
28	41	40	40
29	40	41	41
30	51	46	46
31	51	51	51
Total (cfs-days)	260	235	235
(AF)	516	466	466

(1) Includes the monthly evapotranspiration loss listed in Table E-3.

TABLE E-2

NONTRIBUTARY WATER FROM OC-59
August 2002
(cfs)

Day	Released at OC-59	12-Hour Delay	Calculated Flow At Prado Dam [1]
1	50	50	50
2	48	49	49
3	49	49	49
4	49	49	49
5	52	50	50
6	58	55	55
7	53	55	55
8	52	53	53
9	50	51	51
10	51	51	51
11	49	50	50
12	51	50	50
13	49	50	50
14	51	50	50
15	50	51	51
16	51	50	50
17	51	51	51
18	51	51	51
19	51	51	51
20	44	47	47
21	50	47	47
22	50	50	50
23	49	49	49
24	50	49	49
25	16	33	33
26	0	8	8
27	0	0	0
28	0	0	0
29	0	0	0
30	0	0	0
31	0	0	0
Total (cfs-days)	1,224	1,250	1,250
(AF)	2,429	2,479	2,479

(1) Includes the monthly evapotranspiration loss listed in Table E-3.

TABLE E-3

EVAPOTRANSPIRATION LOSSES OF STATE PROJECT WATER FROM OC-59
WATER YEAR 2001-02
SUM OF ALL CHANNEL REACHES
(acre-feet)

Month	State Water Released with 12-hour delay	Rialto Pipeline to Los Serranos Road	Los Serranos to Prado Dam w/o vegetation	Los Serranos to Prado Dam w/ vegetation	Total Evapo-transpiration	Percent of Monthly Release
2001						
October	0	0	0	0	0	0%
November	0	0	0	0	0	0%
December	0	0	0	0	0	0%
2002						
January	0	0	0	0	0	0%
February	0	0	0	0	0	0%
March	0	0	0	0	0	0%
April	0	0	0	0	0	0%
May	0	0	0	0	0	0%
June	0	0	0	0	0	0%
July	466	8	10	7	25	5.4%
August	2,479	27	35	5	67	2.7%
September	0	0	0	0	0	0%
Total	2,945	35	45	12	92	

Percent of Annual Releases : 3.1%

TABLE E-3.1

EVAPOTRANSPIRATION LOSSES OF STATE PROJECT WATER FROM OC-59

WATER YEAR 2001-02
RIALTO PIPELINE TO LOS SERRANOS ROAD

Month	State Water Released with 12-hour delay (AF)	Days of Evaporation	Evapo-transpiration (in) [a]	Computed Evaporation Losses[b]	
				(AF)	(% of release)
[1]	[2]	[3]	[4]	[5]	[6]
2001					
October	0	0	---	0	0%
November	0	0	---	0	0%
December	0	0	---	0	0%
2002					
January	0	0	---	0	0%
February	0	0	---	0	0%
March	0	0	---	0	0%
April	0	0	---	0	0%
May	0	0	---	0	0%
June	0	0	---	0	0%
July	466	7	7.55	8.0	1.7%
August	2,479	25	6.99	27.2	1.1%
September	0	0	---	0	0%

(a) At UCR Evapotranspiration Station #44
(b) Evaporation losses=[4]/(days/month)x[3]x(Pan Factor of 1.0)x(area of 56.1 acres)x(1 foot/12 inches)

TABLE E-3.2

EVAPOTRANSPIRATION LOSSES OF STATE PROJECT WATER FROM OC-59
WATER YEAR 2001-02
LOS SERRANOS ROAD TO PRADO DAM (WITHOUT VEGETATION COVER)

Month	State Water Released with 12-hour delay (AF)	Days of Evaporation (+7 days)[a]	Evapo-transpiration (in)[b]	Average Wetted Area (AF)[c]	Computed Evaporation Losses[d]	
					(AF)	(% of release)
[1]	[2]	[3]	[4]	[5]	[6]	[7]
2001						
October	0	0	---	0	0	0%
November	0	0	---	0	0	0%
December	0	0	---	0	0	0%
2002						
January	0	0	---	0	0	0%
February	0	0	---	0	0	0%
March	0	0	---	0	0	0%
April	0	0	---	0	0	0%
May	0	0	---	0	0	0%
June	0	0	---	0	0	0%
July	466	7	7.55	72	10.2	2.2%
August	2,479	25	6.99	72	35.0	1.4%
September	0	0	---	0	0	0%

(a) Period of delivery plus 7 days after stoppage of delivery.
(b) At UCR Evapotranspiration Station #44.
(c) Equals 1/2 of 144 acres if the maximum flow rate of the month is less than 200 cfs and 1/2 of 369 acres if the maximum flow rate is greater or equal to 200 cfs.
(d) Evaporation losses=[3]x[4]/(days/month)x[5]x(1 foot/12 inches)

TABLE E-3.3

EVAPOTRANSPIRATION LOSSES OF STATE PROJECT WATER FROM OC-59
WATER YEAR 2001-02
LOS SERRANOS ROAD TO PRADO DAM (WITH VEGETATION COVER)

Month	State Water Released with 12-hour delay (AF)	Days of Evaporation[a]	Evapo-transpiration (in)[b]	Normal Evaporation (in)[c]	Average Wetted Area (AF)[d]	Computed Evaporation Losses[e]	
						(AF)	(% of release)
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
2001							
October	0	0	---	---	0	0	0%
November	0	0	---	---	0	0	0%
December	0	0	---	---	0	0	0%
2002							
January	0	0	---	---	0	0	0%
February	0	0	---	---	0	0	0%
March	0	0	---	---	0	0	0%
April	0	0	---	---	0	0	0%
May	0	0	---	---	0	0	0%
June	0	0	---	---	0	0	0%
July	466	7	7.55	6.40	72	6.9	1.5%
August	2,479	25	6.99	6.20	72	4.7	0 2%
September	0	0	---	---	0	0	0%

(a) Period of delivery plus 7 days after stoppage of delivery.
(b) At UCI At UCR Evapotranspiration Station #44
(c) Referenced in the 1983 report "Nontributary Losses of State Water Released at OC-59 and Final Adjustments to Base Flows".
(d) Equals 1/2 of 144 acres if the maximum flow rate of the month is less than 200 cfs and 1/2 of 369 acres if the maximum flow rate is greater or equal to 200 cfs.
(e) Evaporation losses=[3]x([4]-[5])/(days/month)x[6]x(1 foot/12 inches)

TABLE E-4

CALCULATION OF WEIGHTED TDS OF
OC-59 RELEASES

WATER YEAR 2001-02

Month	OC-59 Discharge (acre-feet)	TDS at Release[1] (mg/L)	Discharge X TDS at Release	Calculated OC-59 Flow at Prado (acre-feet)	TDS at Prado[2] (mg/L)	Flow at Prado X TDS at Prado
2001						
October	0	-	0	0	-	0
November	0	-	0	0	-	0
December	0	-	0	0	-	0
2002						
January	0	-	0	0	-	0
February	0	-	0	0	-	0
March	0	-	0	0	-	0
April	0	-	0	0	-	0
May	0	-	0	0	-	0
June	0	-	0	0	-	0
July	516	282	145,512	441	271	119,511
August	2,429	242	587,818	2,412	271	653,652
September	0	-	0	0	-	0
Total	2,945		733,330	2,853		773,163

At Discharge:
Flow-Weighted TDS = $\frac{733,330}{2,853}$ = 257 mg/L

At Prado:
Flow-Weighted TDS = $\frac{773,163}{2,853}$ = 271 mg/L

(1) Monthly average TDS values for State Water Project water at Devil Canyon Power Plant.
(2) TDS values for OC-59 releases arriving at Prado were adjusted based on mass balance using known flow and quality components, as described in Table E-5.

TABLE E-5

TDS ADJUSTMENT OF OC-59 DISCHARGE
WATER YEAR 2001-02

This section describes the methodology used to adjust TDS concentrations in flows of OC-59 water as it arrived at Prado Dam. Because no direct TDS measurements were available as the water arrived at Prado, the adjusted TDS concentrations of OC-59 water were estimated from mass balance calculations using flows and TDS values of the Prado flow components for the period of delivery.

The TDS of the OC-59 water reaching Prado Dam is estimated using the two methods described below. Method 1 is essentially the same as that described in Appendix C of the Twelfth Annual Report. It uses the following equation that depends on assumed *annual average* TDS concentrations of Base Flow and Storm Flow at Prado, which are not measured values:

Method 1:

$$Q_p q_p = Q_{bf} q_{bf} + Q_{sf} q_{sf} + Q_{ad} q_{ad} + Q_{hgmp} q_{hgmp} + Q_{wmwd} q_{wmwd} + Q_{59} \mathbf{q_{59}}$$

where:

Q_p	= total inflow at Prado	= 174,968 af
q_p	= total inflow TDS at Prado	= 569 mg/L
Q_{bf}	= base flow at Prado	= 45,981 af
q_{bf}	= base flow TDS at Prado	= 600 mg/L*
Q_{sf}	= storm flow at Prado	= 10,615 af
q_{sf}	= storm flow TDS at Prado	= 350 mg/L*
Q_{ad}	= Arlington Desalter flow	= 6,200 af
q_{ad}	= Arlington Desalter TDS	= 377 mg/L
Q_{hgmp}	= HGMP flow	= 4,442 af
q_{hgmp}	= HGMP flow TDS	= 515 mg/L
Q_{wmwd}	= WMWD Transfer flow	= 4,877 af
q_{wmwd}	= WMWD Transfer flow Tds	= 447 mg/L
Q_{59}	= OC-59 flow reaching Prado	= 2,853 af
$\mathbf{q_{59}}$	= OC-59 flow TDS reaching Prado	

Note: All values are annualized.

*Assumed value

Solving for $\mathbf{q_{59}}$:

$$\mathbf{q_{59}} = \frac{Q_p q_p - Q_{bf} q_{bf} - Q_{sf} q_{sf} - Q_{ad} q_{ad} - Q_{hgmp} q_{hgmp} - Q_{wmwd} q_{wmwd}}{Q_{59}}$$

$$\mathbf{q_{59} = 507\ mg/L}$$

The value of $\mathbf{q_{59}}$ is very sensitive to the assumed values of Prado base flow and storm flow TDS and in this case resulted in the calculated q_{59} being unrealistically high. Therefore, this method of calculation was ineffectual this year. Since very small changes in assumed or calculated figures cause significant differences in estimated $\mathbf{q_{59}}$ values, the following method was developed to reduce this uncertainty.

TABLE E-5

TDS ADJUSTMENT OF OC-59 DISCHARGE
WATER YEAR 2001-02

Method 2

The TDS of Base Flow water reaching Prado Dam is a key element for the second method of calculating q_{59}. This year there was no month without water purchases and/or storm flow included in the total flow at Prado. Therefore, q_{bf} must be calculated before calculating q_{59}.

The months of October 2001 and September 2002 were chosen to calculate q_{bf} because they had the *least* amount of interference of the months during which there were no OC-59 deliveries. The following equation was used to calculate the TDS of base flow water reaching Prado Dam:

$$Q_p q_p = Q_{bf} \mathbf{q_{bf}} + Q_{ad} q_{ad} + Q_{wmwd} q_{wmwd}$$

where:

Q_p	= total flow at Prado[1]	= 23,863 af
q_p	= total flow TDS at Prado[2]	= 594 mg/L
Q_{ad}	= Arlington Desalter flow[1]	= 1,066 af
q_{ad}	= Arlington Desalter TDS[2]	= 411 mg/L
Q_{wmwd}	= WMWD Transfer flow	= 608 af
q_{wmwd}	= WMWD Transfer flow TDS	= 447 mg/L
Q_{bf}	= base flow at Prado[1]	= 22,189 af
$\mathbf{q_{bf}}$	= base flow TDS at Prado	

[1]For October 2001 and September 2002.
[2]Flow-weighted average TDS for October 2001 and September 2002.

Solving for $\mathbf{q_{bf}}$

$$\mathbf{q_{bf}} = \frac{Q_p q_p - Q_{ad} q_{ad} - Q_{wmwd} q_{wmwd}}{Q_{bf}}$$

$$\mathbf{q_{bf} = 606\ mg/L}$$

Method 2 uses essentially the same equation as Method 1, except the time period of flow measurements is based on the period during which OC-59 deliveries were made, July and August 2002. Since the daily flows of all components and daily TDS of Q_p and Q_{ad} were known, TDS was calculated using the period of State Project Water release, July 25 through August 25. The following equation was used to estimate the TDS of OC-59 water reaching Prado Dam:

$$Q_p q_p = Q_{bf} q_{bf} + Q_{ad} q_{ad} + Q_{wmwd} q_{wmwd} + Q_{59} \mathbf{q_{59}}$$

where:

TABLE E-5

TDS ADJUSTMENT OF OC-59 DISCHARGE
WATER YEAR 2001-02

		July 25 – Aug. 25
Q_p	= total flow at Prado[1]	13,997 af
q_p	= total flow TDS at Prado[2]	521 mg/L
Q_{bf}	= base flow at Prado[1]	10,049 af
q_{bf}	= base flow TDS at Prado[3]	606 mg/L
Q_{ad}	= Arlington Desalter flow[1]	455 af
q_{ad}	= Arlington Desalter TDS[2]	300 mg/L
Q_{wmwd}	= WMWD Transfer flow[1]	656 af
Q_{wmwd}	= WMWD Transfer flow TDS[2]	447 mg/L
Q_{59}	= OC-59 flow reaching Prado[1]	2,853 af
$\mathbf{q_{59}}$	= OC-59 flow TDS reaching Prado	

*Assumed value

[1]For given period in 2002
[2]Flow-weighted average TDS for given period.
[3]As calculated above for the months of October 2001 and September 2002.

Solving for $\mathbf{q_{59}}$:

$$\mathbf{q_{59}} = \frac{Q_p q_p - Q_{bf} q_{bf} - Q_{ad} q_{ad} - Q_{wmwd} q_{wmwd}}{Q_{59}}$$

$$\mathbf{q_{59} = 271\ mg/L}$$

By using the calculated base flow TDS concentration, this method more accurately reflects the TDS concentration of the OC-59 water reaching Prado Dam. *Therefore, the above values were used to calculate annual base and storm flow TDS at Prado in the report.*

APPENDIX F

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

WATER YEAR 2001-02

TABLE F-1

SUMMARY OF DISCHARGE AND WEIGHTED TDS
FROM THE ARLINGTON DESALTER TO THE ARLINGTON VALLEY DRAIN
WATER YEAR 2001-02

OCTOBER 2001

Day	Arlington Discharge (cfs)	Arlington Discharge (acre-feet)	Daily Mean EC (microsiemens/cm)	Computed TDS (mg/L) [1]	Outflow X TDS
1	9.86	19.6	697	408	4,022
2	9.80	19.4	696	407	3,989
3	9.80	19.4	697	408	3,993
4	9.79	19.4	695	407	3,983
5	9.79	19.4	695	407	3,983
6	9.79	19.4	695	407	3,983
7	9.79	19.4	695	407	3,983
8	9.79	19.4	695	407	3,983
9	9.78	19.4	692	405	3,959
10	7.86	15.6	752	440	3,460
11	8.33	16.5	776	454	3,778
12	9.73	19.3	693	405	3,945
13	9.73	19.3	692	404	3,935
14	9.72	19.3	692	405	3,931
15	9.73	19.3	693	406	3,946
16	9.53	18.9	705	412	3,930
17	9.70	19.2	693	405	3,933
18	9.52	18.9	706	413	3,933
19	9.70	19.2	692	405	3,928
20	9.69	19.2	692	405	3,923
21	9.15	18.1	737	431	3,942
22	9.05	18.0	695	407	3,682
23	9.66	19.2	695	406	3,923
24	7.38	14.6	788	461	3,401
25	6.79	13.5	747	437	2,970
26	5.88	11.7	754	441	2,593
27	7.15	14.2	759	444	3,175
28	7.43	14.7	758	443	3,294
29	7.14	14.2	758	443	3,163
30	7.14	14.2	756	442	3,155
31	8.05	16.0	695	406	3,270
Total	276	548			115,088
		Monthly Flow Weighted TDS		417	

1. TDS = EC x 0.5849
2. EC interpolated from the relationship between EC and the blend ratio of the reverse osmosis product water to the total flow discharged.

TABLE F-1 (continued)

SUMMARY OF DISCHARGE AND WEIGHTED TDS
FROM THE ARLINGTON DESALTER TO THE ARLINGTON VALLEY DRAIN
WATER YEAR 2001-02

NOVEMBER 2001

Day	Arlington Discharge (cfs)	Arlington Discharge (acre-feet)	Daily Mean EC (microsiemens/cm)	Computed TDS (mg/L) [1]	Outflow X TDS
1	9.11	18.1	625	366	3,331
2	9.10	18.1	625	365	3,326
3	9.10	18.1	624	365	3,325
4	9.10	18.1	623	365	3,320
5	9.10	18.1	624	365	3,319
6	9.39	18.6	658	385	3,618
7	9.39	18.6	658	385	3,618
8	9.77	19.4	704	412	4,024
9	9.77	19.4	704	412	4,023
10	9.77	19.4	704	412	4,021
11	9.77	19.4	704	412	4,020
12	9.77	19.4	704	412	4,025
13	8.81	17.5	707	413	3,640
14	9.49	18.8	716	419	3,976
15	9.60	19.0	710	416	3,987
16	9.78	19.4	706	413	4,036
17	9.77	19.4	705	413	4,033
18	9.77	19.4	703	411	4,017
19	9.78	19.4	704	412	4,023
20	9.77	19.4	704	412	4,026
21	9.77	19.4	704	412	4,022
22	9.77	19.4	704	412	4,025
23	9.77	19.4	704	412	4,021
24	9.76	19.4	703	411	4,014
25	9.76	19.4	703	411	4,014
26	9.77	19.4	701	410	4,007
27	9.77	19.4	701	410	4,003
28	9.77	19.4	701	410	4,003
29	9.77	19.4	701	410	4,005
30	9.76	19.4	701	410	4,003
Total	288	570			115,826
	Monthly Flow Weighted TDS			403	

1. TDS = EC x 0.5849
2. EC interpolated from the relationship between EC and the blend ratio of the reverse osmosis product water to the total flow discharged.

TABLE F-1 (continued)

SUMMARY OF DISCHARGE AND WEIGHTED TDS
FROM THE ARLINGTON DESALTER TO THE ARLINGTON VALLEY DRAIN
WATER YEAR 2001-02

DECEMBER 2001

Day	Arlington Discharge (cfs)	Arlington Discharge (acre-feet)	Daily Mean EC (microsiemens/cm)	Computed TDS (mg/L) [1]	Outflow X TDS
1	9.76	19.4	702	410	4,007
2	9.76	19.4	702	410	4,006
3	9.74	19.3	1263	739	7,191
4	8.61	17.1	691	404	3,478
5	9.55	18.9	680	398	3,796
6	9.55	18.9	670	392	3,743
7	9.56	19.0	666	389	3,721
8	9.55	19.0	664	389	3,713
9	8.50	16.9	458	268	2,276
10	9.75	19.3	699	409	3,986
11	9.63	19.1	705	413	3,972
12	9.75	19.3	700	410	3,993
13	9.75	19.3	700	410	3,994
14	9.40	18.6	703	411	3,863
15	9.75	19.3	698	408	3,978
16	9.75	19.3	697	408	3,976
17	8.20	16.3	813	475	3,900
18	7.79	15.4	846	495	3,852
19	8.37	16.6	794	464	3,889
20	9.59	19.0	688	403	3,859
21	9.75	19.3	675	395	3,851
22	9.75	19.3	675	395	3,847
23	9.75	19.3	674	394	3,841
24	9.75	19.3	671	392	3,826
25	9.75	19.3	669	391	3,816
26	9.77	19.4	671	393	3,835
27	9.77	19.4	671	393	3,835
28	9.77	19.4	672	393	3,839
29	9.33	18.5	700	410	3,824
30	9.61	19.1	675	395	3,796
31	9.77	19.4	672	393	3,840
Total	293	581			121,340
	Monthly Flow Weighted TDS			414	

1. TDS = EC x 0.5849
2. EC interpolated from the relationship between EC and the blend ratio of the reverse osmosis product water to the total flow discharged.

TABLE F-1 (continued)

SUMMARY OF DISCHARGE AND WEIGHTED TDS
FROM THE ARLINGTON DESALTER TO THE ARLINGTON VALLEY DRAIN
WATER YEAR 2001-02

JANUARY 2002

Day	Arlington Discharge (cfs)	Arlington Discharge (acre-feet)	Daily Mean EC (microsiemens/cm)	Computed TDS (mg/L) [1]	Outflow X TDS
1	9.77	19.4	673	394	3,846
2	9.63	19.1	680	398	3,832
3	9.73	19.3	671	392	3,817
4	9.73	19.3	670	392	3,814
5	9.13	18.1	709	415	3,789
6	9.66	19.2	673	394	3,805
7	9.68	19.2	673	394	3,811
8	9.69	19.2	672	393	3,807
9	9.70	19.2	671	392	3,806
10	9.54	18.9	683	400	3,812
11	9.71	19.3	670	392	3,805
12	9.71	19.3	670	392	3,805
13	7.88	15.6	814	476	3,749
14	8.73	17.3	728	426	3,721
15	9.72	19.3	665	389	3,780
16	9.71	19.3	666	390	3,786
17	9.72	19.3	666	390	3,785
18	9.71	19.3	666	389	3,781
19	9.72	19.3	665	389	3,778
20	9.71	19.3	665	389	3,776
21	9.72	19.3	665	389	3,781
22	9.71	19.3	665	389	3,781
23	9.72	19.3	667	390	3,790
24	9.72	19.3	665	389	3,782
25	9.74	19.3	663	388	3,776
26	8.86	17.6	773	452	4,003
27	2.82	5.6	860	503	1,417
28	0.00	0.0	0	0	0
29	0.17	0.3	1224	716	122
30	0.12	0.2	1260	737	91
31	0.00	0.0	0	0	0
Total	251	498			100,446
	Monthly Flow Weighted TDS			400	

1. TDS = EC x 0.5849
2. EC interpolated from the relationship between EC and the blend ratio of the reverse osmosis product water to the total flow discharged.

TABLE F-1 (continued)

SUMMARY OF DISCHARGE AND WEIGHTED TDS
FROM THE ARLINGTON DESALTER TO THE ARLINGTON VALLEY DRAIN
WATER YEAR 2001-02

FEBRUARY 2002

Day	Arlington Discharge (cfs)	Arlington Discharge (acre-feet)	Daily Mean EC (microsiemens/cm)	Computed TDS (mg/L) [1]	Outflow X TDS
1	0.00	0.0	0	0	0
2	0.00	0.0	0	0	0
3	0.00	0.0	0	0	0
4	0.00	0.0	0	0	0
5	1.89	3.7	866	507	957
6	0.51	1.0	890	520	266
7	0.00	0.0	0	0	0
8	0.00	0.0	0	0	0
9	3.96	7.9	677	396	1,570
10	9.81	19.4	673	393	3,857
11	9.80	19.4	678	396	3,884
12	9.72	19.3	683	399	3,879
13	9.79	19.4	675	395	3,862
14	9.78	19.4	674	394	3,858
15	9.78	19.4	676	395	3,867
16	9.78	19.4	674	394	3,855
17	9.78	19.4	674	394	3,856
18	9.77	19.4	666	390	3,810
19	9.63	19.1	668	391	3,763
20	9.78	19.4	666	389	3,808
21	9.78	19.4	663	388	3,790
22	9.78	19.4	664	389	3,799
23	8.84	17.5	672	393	3,475
24	9.78	19.4	668	391	3,820
25	9.78	19.4	667	390	3,812
26	9.77	19.4	666	389	3,807
27	9.77	19.4	666	390	3,810
28	9.77	19.4	666	390	3,807
Total	191	379			75,209
	Monthly Flow Weighted TDS			394	

1. TDS = EC x 0.5849
2. EC interpolated from the relationship between EC and the blend ratio of the reverse osmosis product water to the total flow discharged.

TABLE F-1 (continued)

SUMMARY OF DISCHARGE AND WEIGHTED TDS
FROM THE ARLINGTON DESALTER TO THE ARLINGTON VALLEY DRAIN
WATER YEAR 2001-02

MARCH 2002

Day	Arlington Discharge (cfs)	Arlington Discharge (acre-feet)	Daily Mean EC (microsiemens/cm)	Computed TDS (mg/L) [1]	Outflow X TDS
1	9.26	18.4	669	391	3,620
2	9.77	19.4	664	388	3,795
3	9.77	19.4	661	386	3,774
4	8.87	17.6	669	391	3,471
5	9.77	19.4	662	387	3,780
6	9.76	19.4	663	388	3,784
7	9.76	19.4	665	389	3,798
8	9.65	19.1	673	393	3,795
9	9.76	19.4	664	388	3,791
10	9.76	19.4	664	389	3,793
11	9.76	19.4	664	388	3,789
12	9.76	19.4	664	389	3,792
13	9.76	19.4	664	389	3,792
14	9.76	19.4	663	388	3,785
15	9.75	19.3	663	388	3,781
16	9.75	19.3	664	388	3,785
17	9.76	19.3	662	387	3,779
18	9.75	19.3	663	388	3,779
19	3.64	7.2	662	387	1,408
20	2.68	5.3	744	435	1,165
21	8.90	17.7	667	390	3,472
22	0.43	0.9	156	91	39
23	6.70	13.3	154	90	605
24	6.74	13.4	162	95	640
25	6.45	12.8	406	237	1,531
26	2.89	5.7	168	98	285
27	8.02	15.9	366	214	1,716
28	9.82	19.5	669	392	3,847
29	9.82	19.5	670	392	3,844
30	9.82	19.5	664	388	3,810
31	9.48	18.8	688	402	3,812
Total	260	515			93,858
	Monthly Flow Weighted TDS			362	

1. TDS = EC x 0.5849
2. EC interpolated from the relationship between EC and the blend ratio of the reverse osmosis product water to the total flow discharged.

TABLE F-1 (continued)

SUMMARY OF DISCHARGE AND WEIGHTED TDS
FROM THE ARLINGTON DESALTER TO THE ARLINGTON VALLEY DRAIN
WATER YEAR 2001-02

APRIL 2002

Day	Arlington Discharge (cfs)	Arlington Discharge (acre-feet)	Daily Mean EC (microsiemens/cm)	Computed TDS (mg/L) [1]	Outflow X TDS
1	8.54	16.9	683	399	3,413
2	9.78	19.4	656	384	3,755
3	8.54	16.9	683	399	3,413
4	9.78	19.4	657	384	3,757
5	9.22	18.3	651	381	3,513
6	9.77	19.4	669	392	3,827
7	9.38	18.6	668	390	3,662
8	9.78	19.4	660	386	3,776
9	8.34	16.5	656	383	3,199
10	4.19	8.3	663	388	1,627
11	9.80	19.4	644	377	3,689
12	9.79	19.4	642	376	3,678
13	7.09	14.1	665	389	2,756
14	9.79	19.4	647	378	3,702
15	9.78	19.4	648	379	3,710
16	9.79	19.4	646	378	3,699
17	9.79	19.4	646	378	3,699
18	9.79	19.4	645	377	3,692
19	9.79	19.4	646	378	3,700
20	9.79	19.4	644	377	3,688
21	9.78	19.4	643	376	3,680
22	9.78	19.4	644	377	3,683
23	9.23	18.3	581	340	3,138
24	9.09	18.0	580	339	3,087
25	9.22	18.3	1,562	914	8,427
26	9.75	19.3	646	378	3,686
27	9.75	19.3	645	378	3,682
28	9.75	19.3	646	378	3,683
29	9.75	19.3	645	377	3,678
30	9.18	18.2	688	403	3,695
Total	278	551			110,392
	Monthly Flow Weighted TDS			397	

1. TDS = EC x 0.5849
2. EC interpolated from the relationship between EC and the blend ratio of the reverse osmosis product water to the total flow discharged.

TABLE F-1 (continued)

SUMMARY OF DISCHARGE AND WEIGHTED TDS
FROM THE ARLINGTON DESALTER TO THE ARLINGTON VALLEY DRAIN
WATER YEAR 2001-02

MAY 2002

Day	Arlington Discharge (cfs)	Arlington Discharge (acre-feet)	Daily Mean EC (microsiemens/cm)	Computed TDS (mg/L) [1]	Outflow X TDS
1	8.81	17.5	685	400	3,527
2	9.24	18.3	684	400	3,696
3	9.75	19.3	644	377	3,673
4	9.74	19.3	644	377	3,672
5	9.74	19.3	645	377	3,673
6	9.69	19.2	650	380	3,683
7	9.75	19.3	648	379	3,696
8	9.73	19.3	648	379	3,689
9	9.38	18.6	677	396	3,712
10	6.31	12.5	657	384	2,426
11	9.56	19.0	660	386	3,689
12	9.73	19.3	644	376	3,664
13	9.60	19.0	655	383	3,678
14	9.60	19.0	655	383	3,678
15	9.74	19.3	645	377	3,673
16	9.44	18.7	669	391	3,693
17	9.73	19.3	645	377	3,670
18	9.73	19.3	644	377	3,667
19	9.73	19.3	645	377	3,669
20	9.73	19.3	641	375	3,647
21	8.71	17.3	626	366	3,190
22	8.27	16.4	684	400	3,305
23	5.60	11.1	629	368	2,061
24	8.89	17.6	551	322	2,866
25	8.88	17.6	551	322	2,862
26	8.88	17.6	549	321	2,854
27	8.88	17.6	551	322	2,861
28	8.88	17.6	551	322	2,859
29	8.87	17.6	550	322	2,853
30	8.86	17.6	550	322	2,849
31	8.74	17.3	564	330	2,881
Total	282	560			103,615
	Monthly Flow Weighted TDS			367	

1. TDS = EC x 0.5849
2. EC interpolated from the relationship between EC and the blend ratio of the reverse osmosis product water to the total flow discharged.

TABLE F-1 (continued)

SUMMARY OF DISCHARGE AND WEIGHTED TDS
FROM THE ARLINGTON DESALTER TO THE ARLINGTON VALLEY DRAIN
WATER YEAR 2001-02

JUNE 2002

Day	Arlington Discharge (cfs)	Arlington Discharge (acre-feet)	Daily Mean EC (microsiemens/cm)	Computed TDS (mg/L) [1]	Outflow X TDS
1	8.92	17.7	563	329	2,937
2	8.91	17.7	562	329	2,930
3	8.91	17.7	562	329	2,927
4	8.91	17.7	564	330	2,938
5	8.91	17.7	562	329	2,929
6	8.81	17.5	547	320	2,818
7	8.69	17.2	525	307	2,669
8	8.70	17.3	527	308	2,681
9	8.70	17.3	529	310	2,693
10	8.70	17.3	529	310	2,696
11	8.72	17.3	530	310	2,703
12	8.73	17.3	533	311	2,718
13	8.74	17.3	536	313	2,738
14	8.76	17.4	539	315	2,761
15	8.77	17.4	542	317	2,778
16	8.56	17.0	562	329	2,814
17	8.75	17.4	538	315	2,753
18	8.75	17.3	539	315	2,759
19	8.75	17.3	539	315	2,759
20	8.61	17.1	559	327	2,816
21	8.83	17.5	554	324	2,861
22	8.83	17.5	553	323	2,855
23	8.82	17.5	554	324	2,857
24	8.82	17.5	553	323	2,854
25	8.82	17.5	554	324	2,856
26	8.76	17.4	544	318	2,787
27	8.67	17.2	527	309	2,676
28	8.54	16.9	539	315	2,692
29	8.74	17.3	540	316	2,759
30	8.74	17.3	539	315	2,754
Total	263	521			83,768
	Monthly Flow Weighted TDS			319	

1. TDS = EC x 0.5849
2. EC interpolated from the relationship between EC and the blend ratio of the reverse osmosis product water to the total flow discharged.

TABLE F-1 (continued)

SUMMARY OF DISCHARGE AND WEIGHTED TDS
FROM THE ARLINGTON DESALTER TO THE ARLINGTON VALLEY DRAIN
WATER YEAR 2001-02

JULY 2002

Day	Arlington Discharge (cfs)	Arlington Discharge (acre-feet)	Daily Mean EC (microsiemens/cm)	Computed TDS (mg/L) [1]	Outflow X TDS
1	8.73	17.3	541	316	2,762
2	7.26	14.4	541	317	2,299
3	8.40	16.7	574	336	2,824
4	8.89	17.6	568	332	2,951
5	8.82	17.5	556	325	2,871
6	8.82	17.5	555	325	2,866
7	8.82	17.5	556	325	2,869
8	8.84	17.5	557	326	2,878
9	8.62	17.1	564	330	2,846
10	8.22	16.3	569	333	2,737
11	8.96	17.8	577	338	3,024
12	8.96	17.8	575	337	3,014
13	8.95	17.8	575	336	3,011
14	8.92	17.7	571	334	2,978
15	8.95	17.8	572	335	2,997
16	8.88	17.6	554	324	2,879
17	8.89	17.6	557	326	2,896
18	8.23	16.3	535	313	2,578
19	8.65	17.1	533	311	2,693
20	8.65	17.2	532	311	2,693
21	6.21	12.3	532	311	1,933
22	8.09	16.1	548	321	2,596
23	8.72	17.3	545	319	2,776
24	7.99	15.8	587	344	2,744
25	8.58	17.0	519	304	2,605
26	8.59	17.0	520	304	2,610
27	8.59	17.0	523	306	2,628
28	6.62	13.1	529	309	2,050
29	8.72	17.3	546	319	2,783
30	8.71	17.3	547	320	2,788
31	8.26	16.4	545	319	2,633
Total	263	521			84,814
	Monthly Flow Weighted TDS			323	

1. TDS = EC x 0.5849
2. EC interpolated from the relationship between EC and the blend ratio of the reverse osmosis product water to the total flow discharged.

TABLE F-1 (continued)

SUMMARY OF DISCHARGE AND WEIGHTED TDS
FROM THE ARLINGTON DESALTER TO THE ARLINGTON VALLEY DRAIN
WATER YEAR 2001-02

AUGUST 2002

Day	Arlington Discharge (cfs)	Arlington Discharge (acre-feet)	Daily Mean EC (microsiemens/cm)	Computed TDS (mg/L) [1]	Outflow X TDS
1	8.51	16.9	510	298	2,540
2	4.19	8.3	558	326	1,369
3	0.00	0.0	0	0	0
4	0.00	0.0	0	0	0
5	1.55	3.1	577	337	522
6	4.91	9.7	557	326	1,599
7	8.74	17.3	551	322	2,814
8	8.73	17.3	549	321	2,804
9	8.72	17.3	549	321	2,801
10	8.71	17.3	551	322	2,807
11	8.71	17.3	551	322	2,808
12	8.71	17.3	551	322	2,805
13	9.05	18.0	591	346	3,131
14	8.47	16.8	468	274	2,317
15	6.66	13.2	152	89	593
16	6.66	13.2	152	89	590
17	6.66	13.2	151	88	588
18	6.66	13.2	151	88	589
19	7.92	15.7	400	234	1,852
20	9.18	18.2	608	356	3,265
21	9.63	19.1	660	386	3,717
22	9.63	19.1	659	385	3,711
23	9.63	19.1	659	385	3,711
24	9.63	19.1	659	385	3,711
25	0.00	0.0	0	0	0
26	5.11	10.1	672	393	2,007
27	9.63	19.1	659	385	3,711
28	6.18	12.2	663	388	2,395
29	9.62	19.1	663	388	3,729
30	9.35	18.5	666	390	3,642
31	9.61	19.1	665	389	3,738
Total	221	438			69,866
	Monthly Flow Weighted TDS			317	

1. TDS = EC x 0.5849
2. EC interpolated from the relationship between EC and the blend ratio of the reverse osmosis product water to the total flow discharged.

TABLE F-1 (continued)

SUMMARY OF DISCHARGE AND WEIGHTED TDS
FROM THE ARLINGTON DESALTER TO THE ARLINGTON VALLEY DRAIN
WATER YEAR 2001-02

SEPTEMBER 2002

Day	Arlington Discharge (cfs)	Arlington Discharge (acre-feet)	Daily Mean EC (microsiemens/cm)	Computed TDS (mg/L) [1]	Outflow X TDS
1	8.71	17.3	723	423	3,687
2	7.58	15.0	821	480	3,642
3	8.64	17.1	739	432	3,735
4	8.56	17.0	675	395	3,380
5	9.26	18.4	697	408	3,777
6	9.58	19.0	667	390	3,735
7	9.57	19.0	665	389	3,726
8	9.15	18.1	705	412	3,770
9	9.57	19.0	669	392	3,746
10	9.60	19.0	666	390	3,741
11	9.56	19.0	665	389	3,719
12	9.56	19.0	665	389	3,717
13	9.56	19.0	665	389	3,719
14	9.56	19.0	666	389	3,720
15	9.55	19.0	664	389	3,713
16	9.55	18.9	663	388	3,704
17	3.96	7.9	664	389	1,540
18	8.25	16.4	764	447	3,685
19	7.57	15.0	813	475	3,599
20	8.54	16.9	733	429	3,665
21	9.40	18.7	662	387	3,644
22	8.81	17.5	711	416	3,661
23	7.27	14.4	750	439	3,193
24	3.25	6.4	672	393	1,277
25	9.45	18.7	670	392	3,700
26	9.44	18.7	670	392	3,699
27	9.44	18.7	669	391	3,696
28	9.45	18.7	670	392	3,699
29	9.44	18.7	668	391	3,692
30	9.44	18.7	669	391	3,692
Total	261	518			105,674
	Monthly Flow Weighted TDS			404	

1. TDS = EC x 0.5849
2. EC interpolated from the relationship between EC and the blend ratio of the reverse osmosis product water to the total flow discharged.

TABLE F-2

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

WATER YEAR 2001-02

Month	Discharge (acre-feet)	Weighted TDS (mg/L)	Discharge X TDS
2001			
October	548	417	228,273
November	570	403	229,738
December	581	414	240,557
2002			
January	498	400	199,232
February	379	394	149,175
March	515	362	186,164
April	551	397	218,960
May	560	367	205,517
June	521	319	166,151
July	521	323	168,227
August	438	317	138,578
September	518	404	209,601
Total	6,200		2,340,172
	Yearly Flow Weighted TDS =	377	

APPENDIX G

WATER QUALITY AND DISCHARGE FROM THE SAN JACINTO WATERSHED

WATER YEAR 2001-02

No discharges into the Santa Ana River watershed from
Lake Elsinore or Lee Lake occurred during the 2001-02 water year.

APPENDIX H

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

WATER YEAR 2001-02

TABLE H-1

WATER QUALITY SAMPLES BELOW PRADO DAM
FOR WATER YEAR 2001-02

Date	EC (microsiemens/cm)	TDS (mg/L)	Source
10/05/01	970	608	USGS
10/08/01	989	600	OCWD
10/19/01	958	600	USGS
11/02/01	950	604	USGS
11/08/01	978	584	OCWD
11/16/01	935	588	USGS
11/30/01	835	532	USGS
12/10/01	935	552	OCWD
12/13/01	948	606	USGS
01/04/02	940	600	USGS
01/14/02	1000	612	OCWD
01/18/02	970	604	USGS
02/01/02	754	462	USGS
02/07/02	974	598	OCWD
02/15/02	994	612	USGS
03/01/02	996	628	USGS
03/11/02	1000	614	OCWD
03/15/02	940	616	USGS
04/08/02	976	586	OCWD
04/09/02	930	597	USGS
04/19/02	950	605	USGS
05/03/02	944	612	USGS
05/09/02	964	588	OCWD
05/17/02	959	583	USGS
06/07/02	923	584	USGS
06/10/02	951	552	OCWD
06/20/02	940	595	USGS
07/05/02	960	585	USGS
07/15/02	984	570	OCWD
07/18/02	978	607	USGS
08/02/02	868	543	USGS
08/13/02	890	534	OCWD
08/15/02	899	542	USGS
09/06/02	950	594	USGS
09/09/02	991	540	OCWD
09/19/02	989	607	USGS

TABLE H-2

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
FOR WATER YEAR 2001-02

OCTOBER 2001

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	205	975	612	125,492
2	198	979	615	121,704
3	207	991	622	128,795
4	210	984	618	129,739
5	208	975	612	127,328
6	209	967	607	126,890
7	211	953	598	126,250
8	214	949	596	127,508
9	211	958	601	126,912
10	216	955	600	129,513
11	216	960	603	130,191
12	211	969	608	128,370
13	203	975	612	124,267
14	209	979	615	128,465
15	214	988	620	132,748
16	208	992	623	129,548
17	212	978	614	130,176
18	218	958	601	131,123
19	217	952	598	129,704
20	218	954	599	130,575
21	224	953	598	134,029
22	231	952	598	138,072
23	232	953	598	138,815
24	241	968	608	146,470
25	238	951	597	142,106
26	237	947	595	140,914
27	227	963	605	137,249
28	231	963	605	139,667
29	238	966	607	144,348
30	237	986	619	146,717
31	242	981	616	149,053
Total	6,793			4,122,740
		Monthly Flow Weighted TDS =	607	mg/L

1. TDS = EC x 0.627851

TABLE H-2 (continued)

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
FOR WATER YEAR 2001-02

NOVEMBER 2001

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	235	990	622	146,069
2	236	967	607	143,283
3	223	964	605	134,970
4	237	963	605	143,295
5	242	969	608	147,230
6	241	972	610	147,075
7	237	970	609	144,337
8	238	957	601	143,003
9	234	957	601	140,600
10	232	954	599	138,961
11	234	956	600	140,453
12	239	954	599	143,154
13	291	844	530	154,203
14	261	929	583	152,234
15	262	947	595	155,779
16	258	946	594	153,238
17	249	943	592	147,424
18	243	933	586	142,346
19	260	947	595	154,589
20	262	957	601	157,424
21	248	963	605	149,946
22	242	953	598	144,799
23	242	943	592	143,279
24	264	719	451	119,176
25	276	518	325	89,763
26	335	625	392	131,456
27	365	653	410	149,645
28	289	802	504	145,522
29	189	830	521	98,491
30	190	847	532	101,040
Total	7,554			4,202,782

Monthly Flow Weighted TDS = 556 mg/L

1. TDS = EC x 0.627851

TABLE H-2 (continued)

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
FOR WATER YEAR 2001-02

DECEMBER 2001

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	190	884	555	105,454
2	190	919	577	109,629
3	217	900	565	122,619
4	307	917	576	176,752
5	330	916	575	189,787
6	313	895	562	175,883
7	337	900	565	190,427
8	332	906	569	188,852
9	333	915	574	191,303
10	331	937	588	194,726
11	343	963	605	207,385
12	349	960	603	210,355
13	344	957	601	206,693
14	324	950	596	193,252
15	269	935	587	157,914
16	268	864	542	145,380
17	309	802	504	155,593
18	328	798	501	164,336
19	321	908	570	182,998
20	276	914	574	158,384
21	257	919	577	148,288
22	331	845	531	175,607
23	329	731	459	150,997
24	322	754	473	152,435
25	321	763	479	153,775
26	318	831	522	165,915
27	316	882	554	174,990
28	258	897	563	145,301
29	206	919	577	118,861
30	207	929	583	120,738
31	207	925	581	120,218
Total	9,083			5,054,846
		Monthly Flow Weighted TDS =	557	mg/L

1. TDS = EC x 0.627851

TABLE H-2 (continued)

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
FOR WATER YEAR 2001-02

JANUARY 2002

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	207	927	582	120,478
2	225	887	557	125,303
3	269	887	557	149,807
4	291	923	580	168,636
5	286	897	563	161,070
6	281	877	551	154,726
7	279	859	539	150,471
8	277	857	538	149,045
9	276	929	583	160,983
10	271	941	591	160,109
11	268	935	587	157,327
12	268	930	584	156,485
13	267	934	586	156,572
14	289	958	601	173,828
15	307	953	598	183,691
16	304	948	595	180,942
17	301	935	587	176,699
18	298	950	596	177,745
19	295	941	591	174,288
20	294	907	569	167,421
21	291	904	568	165,165
22	291	902	566	164,799
23	266	912	573	152,312
24	254	919	577	146,557
25	255	932	585	149,215
26	255	924	580	147,934
27	255	914	574	146,333
28	217	900	565	122,619
29	241	781	490	118,175
30	265	741	465	123,288
31	302	783	492	148,465
Total	8,445			4,790,488
	Monthly Flow Weighted TDS =		567	mg/L

1. TDS = EC x 0.627851

TABLE H-2 (continued)

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
FOR WATER YEAR 2001-02

FEBRUARY 2002

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	326	758	476	155,147
2	322	784	492	158,500
3	321	845	531	170,301
4	282	842	529	149,079
5	307	838	526	161,525
6	315	870	546	172,062
7	312	926	581	181,394
8	308	933	586	180,422
9	297	943	592	175,843
10	291	891	559	162,790
11	308	901	566	174,234
12	312	894	561	175,125
13	308	914	574	176,747
14	306	1030	647	197,886
15	302	996	625	188,852
16	298	978	614	182,983
17	296	966	607	179,525
18	296	865	543	160,755
19	287	892	560	160,732
20	263	949	596	156,703
21	260	959	602	156,548
22	259	973	611	158,223
23	257	953	598	153,774
24	254	942	591	150,225
25	267	953	598	159,757
26	270	1000	628	169,520
27	277	988	620	171,828
28	271	1000	628	170,148
Total	8,172			4,710,627

Monthly Flow Weighted TDS = 576 mg/L

1. TDS = EC x 0.627851

TABLE H-2 (continued)

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
FOR WATER YEAR 2001-02

MARCH 2002

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	250	991	622	155,550
2	236	972	610	144,024
3	234	973	611	142,950
4	256	974	612	156,551
5	255	980	615	156,900
6	239	965	606	144,804
7	237	939	590	139,724
8	253	924	580	146,774
9	251	950	596	149,711
10	251	950	596	149,711
11	250	943	592	148,016
12	227	954	599	135,966
13	233	959	602	140,291
14	232	960	603	139,835
15	227	948	595	135,111
16	230	939	590	135,597
17	230	937	588	135,308
18	266	720	452	120,246
19	300	598	375	112,636
20	314	714	448	140,762
21	317	844	530	167,980
22	313	912	573	179,224
23	312	939	590	183,940
24	311	909	571	177,493
25	309	892	560	173,053
26	308	929	583	179,648
27	305	926	581	177,324
28	303	924	580	175,781
29	300	932	585	175,547
30	295	939	590	173,918
31	293	945	593	173,842
Total	8,337			4,768,217

Monthly Flow Weighted TDS = 572 mg/L

1. TDS = EC x 0.627851

TABLE H-2 (continued)

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
FOR WATER YEAR 2001-02

APRIL 2002

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	289	949	596	172,195
2	303	948	595	180,346
3	306	952	598	182,900
4	293	942	591	173,291
5	280	938	589	164,899
6	273	934	586	160,091
7	270	929	583	157,484
8	270	923	580	156,467
9	269	922	579	155,718
10	266	924	580	154,316
11	261	928	583	152,070
12	261	924	580	151,415
13	261	926	581	151,743
14	266	935	587	156,153
15	270	938	589	159,009
16	267	922	579	154,561
17	229	935	587	134,432
18	286	943	592	169,330
19	272	951	597	162,407
20	258	941	591	152,428
21	255	935	587	149,695
22	259	930	584	151,230
23	260	949	596	154,916
24	272	881	553	150,453
25	269	830	521	140,180
26	257	897	563	144,738
27	265	823	517	136,931
28	266	867	544	144,796
29	266	914	574	152,646
30	285	918	576	164,265
Total	8,104			4,691,105
		Monthly Flow Weighted TDS =	579	mg/L

1. TDS = EC x 0.627851

TABLE H-2 (continued)

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
FOR WATER YEAR 2001-02

MAY 2002

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	286	926	581	166,277
2	256	926	581	148,836
3	243	932	585	142,193
4	242	929	583	141,152
5	243	922	579	140,667
6	244	923	580	141,399
7	243	927	582	141,430
8	240	922	579	138,931
9	238	925	581	138,221
10	239	921	578	138,202
11	237	917	576	136,450
12	233	895	562	130,929
13	232	906	569	131,969
14	233	917	576	134,147
15	236	927	582	137,356
16	233	933	586	136,488
17	231	934	586	135,461
18	230	913	573	131,842
19	231	908	570	131,690
20	235	910	571	134,266
21	237	852	535	126,778
22	233	864	542	126,394
23	233	884	555	129,320
24	234	890	559	130,756
25	234	902	566	132,519
26	234	898	564	131,932
27	231	911	572	132,126
28	232	914	574	133,134
29	231	912	573	132,271
30	227	905	568	128,982
31	225	899	564	126,998
Total	7,356			4,209,119

Monthly Flow Weighted TDS = 572 mg/L

1. TDS = EC x 0.627851

TABLE H-2 (continued)

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
FOR WATER YEAR 2001-02

JUNE 2002

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	224	905	568	127,278
2	222	909	571	126,699
3	219	898	564	123,474
4	222	889	558	123,911
5	222	900	565	125,445
6	220	922	579	127,353
7	218	922	579	126,195
8	216	918	576	124,495
9	215	909	571	122,704
10	214	928	583	124,686
11	214	920	578	123,611
12	213	922	579	123,301
13	213	934	586	124,906
14	211	924	580	122,408
15	210	914	574	120,510
16	209	924	580	121,248
17	215	929	583	125,404
18	216	927	582	125,716
19	213	932	585	124,638
20	216	923	580	125,173
21	210	918	576	121,037
22	205	916	575	117,898
23	207	911	572	118,398
24	211	919	577	121,746
25	207	928	583	120,608
26	206	922	579	119,249
27	208	913	573	119,231
28	201	904	568	114,083
29	199	905	568	113,073
30	201	878	551	110,802
Total	6,377			3,665,281
		Monthly Flow Weighted TDS =	575	mg/L

1. TDS = EC x 0.627851

TABLE H-2 (continued)

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
FOR WATER YEAR 2001-02

JULY 2002

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	213	906	569	121,161
2	198	924	580	114,867
3	199	943	592	117,821
4	194	876	550	106,699
5	195	945	593	115,697
6	195	944	593	115,575
7	196	934	586	114,937
8	199	940	590	117,446
9	194	952	598	115,956
10	187	968	608	113,651
11	191	930	584	111,525
12	183	932	585	107,084
13	180	919	577	103,859
14	176	911	572	100,667
15	177	943	592	104,795
16	174	933	586	101,927
17	172	946	594	102,159
18	167	960	603	100,657
19	171	888	558	95,338
20	183	845	531	97,088
21	186	858	539	100,197
22	187	872	547	102,380
23	183	921	578	105,820
24	178	933	586	104,270
25	167	918	576	96,253
26	181	858	539	97,504
27	204	780	490	99,904
28	214	784	492	105,338
29	213	832	522	111,265
30	215	846	531	114,200
31	223	850	534	119,009
Total	5,895			3,335,048
		Monthly Flow Weighted TDS =	566	mg/L

1. TDS = EC x 0.627851

TABLE H-2 (continued)

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
FOR WATER YEAR 2001-02

AUGUST 2002

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	234	807	507	118,562
2	234	853	536	125,320
3	233	834	524	122,005
4	229	808	507	116,172
5	227	811	509	115,585
6	231	805	505	116,752
7	226	832	522	118,056
8	221	818	514	113,502
9	219	816	512	112,199
10	216	826	519	112,019
11	221	822	516	114,057
12	218	822	516	112,508
13	217	828	520	112,810
14	216	835	524	113,239
15	219	868	545	119,349
16	225	850	534	120,076
17	223	842	529	117,889
18	231	838	526	121,538
19	230	829	520	119,712
20	227	828	520	118,008
21	228	846	531	121,105
22	232	822	516	119,734
23	228	818	514	117,097
24	227	812	510	115,728
25	228	819	514	117,240
26	186	877	551	102,416
27	192	883	554	106,443
28	211	868	545	114,990
29	210	889	558	117,213
30	216	897	563	121,647
31	204	896	563	114,761
Total	6,859			3,607,734

Monthly Flow Weighted TDS = 526 mg/L

1. TDS = EC x 0.627851

TABLE H-2 (continued)

SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM
FOR WATER YEAR 2001-02

SEPTEMBER 2002

Day	Prado Outflow (cfs)	Daily Mean EC (microsiemens/cm)	Computed TDS [1]	Outflow X TDS
1	188	907	569	107,059
2	182	908	570	103,756
3	186	921	578	107,555
4	180	917	576	103,633
5	186	898	564	104,869
6	185	928	583	107,789
7	179	890	559	100,023
8	188	832	522	98,206
9	187	857	538	100,619
10	178	912	573	101,923
11	169	933	586	98,998
12	165	910	571	94,272
13	164	887	557	91,332
14	161	879	552	88,853
15	157	904	568	89,110
16	162	944	593	96,016
17	170	960	603	102,465
18	167	970	609	101,706
19	168	954	599	100,627
20	173	948	595	102,970
21	170	944	593	100,757
22	175	908	570	99,765
23	174	906	569	98,977
24	163	936	588	95,790
25	169	948	595	100,589
26	169	941	591	99,846
27	173	918	576	99,711
28	180	894	561	101,034
29	183	919	577	105,590
30	187	945	593	110,951
Total	5,238			3,014,789
		Monthly Flow Weighted TDS =	576	mg/L

1. TDS = EC x 0.627851

TABLE H-3

ANNUAL SUMMARY OF FLOW WEIGHTED TDS BELOW PRADO DAM

FOR WATER YEAR 2001-02

Month	Monthly Flow (cfs-days)	Monthly Weighted TDS (mg/L)	Monthly Flow x TDS
2001			
October	6,793	607	4,122,740
November	7,554	556	4,202,782
December	9,083	557	5,054,846
2002			
January	8,445	567	4,790,488
February	8,172	576	4,710,627
March	8,337	572	4,768,217
April	8,104	579	4,691,105
May	7,356	572	4,209,119
June	6,377	575	3,665,281
July	5,895	566	3,335,048
August	6,859	526	3,607,734
September	5,238	576	3,014,789
Total	88,213		50,172,775
Yearly Flow Weighted TDS =		569	

APPENDIX I

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

WATER YEAR 2001-02

PREPARED BY

DONALD L. HARRIGER

TABLE I-1

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

WATER YEAR 2001-02

MONTH	Discharge (acre -feet)	TDS (mg/L)	Discharge xTDS
2001			
October	195	648	126,360
November	189	648	122,472
December	194	660	128,040
2002			
January	190	696	132,240
February	170	668	113,560
March	189	640	120,960
April	183	692	126,636
May	190	612	116,280
June	190	700	133,000
July	195	680	132,600
August	194	654	126,876
September	191	672	128,352
Total	2,270		1,507,376

Flow weighted TDS = 664 mg/L

APPENDIX J

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

WATER YEAR 2001-02

PREPARED BY

DONALD L. HARRIGER

Table J-1

SANTA ANA RIVER AT RIVERSIDE NARROWS

WATER YEAR 2001-02

Date Sampled	E.C. (microsiemens/cm)	TDS (mg/L)	Source of Data		*Ratio*	*average*
2001						
10/2/01	921	584	USGS		0.63	
10/3/01	982	592	C of R		0.60	
10/12/01	1007	616	C of R		0.61	
10/16/01	939	576	USGS		0.61	
10/17/01	1000	608	C of R		0.61	
10/26/01	1010	608	C of R		0.60	
10/31/01	990	612	C of R		0.62	599
11/1/01	1004	600	C of R		0.60	
11/6/01	926	574	USGS		0.62	
11/14/01	977	608	C of R	*	0.62	
11/23/01	975	644	C of R		0.66	
11/23/01	873	580	USGS		0.66	
11/28/01	882	560	C of R	*	0.63	600
12/4/01	898	582	USGS		0.65	
12/7/01	997	608	C of R		0.61	
12/12/01	982	580	C of R		0.59	
12/19/01	914	568	USGS		0.62	
12/21/01	492	376	C of R	*	0.76	
12/26/01	942	600	C of R	*	0.64	585
2002						
1/3/02	858	540	USGS	*	0.63	
1/4/02	943	528	C of R	*	0.56	
1/9/02	953	596	C of R		0.63	
1/16/02	869	540	USGS	*	0.62	
1/18/02	941	612	C of R		0.65	
1/23/02	979	640	C of R		0.65	616
2/1/02	962	592	C of R		0.62	
2/4/02	975	588	C of R		0.60	
2/4/02	926	592	USGS		0.64	
2/6/02	998	592	C of R		0.59	
2/15/02	1011	664	C of R		0.66	
2/20/02	1003	628	C of R		0.63	
2/22/02	925	576	USGS		0.62	605

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

Table J-1

SANTA ANA RIVER AT RIVERSIDE NARROWS

WATER YEAR 2001-02

Date Sampled	E.C. (microsiemens/cm)	TDS (mg/L)	Source of Data		*Ratio*	*average*
3/1/02	1017	592	C of R		0.58	
3/4/02	1006	612	C of R		0.61	
3/5/02	916	580	USGS		0.63	
3/15/02	912	572	C of R		0.63	
3/20/02	893	556	C of R	*	0.62	
3/20/02	870	541	USGS	*	0.62	
3/29/02	907	588	C of R		0.65	589
4/3/02	963	624	C of R		0.65	
4/10/02	885	549	USGS		0.62	
4/12/02	945	612	C of R		0.65	
4/17/02	886	536	C of R	*	0.60	
4/23/02	894	565	USGS		0.63	
4/26/02	907	544	C of R	*	0.60	588
5/1/02	902	544	C of R		0.60	
5/6/02	875	553	USGS		0.63	
5/10/02	936	484	C of R	*	0.52	
5/15/02	914	572	C of R		0.63	
5/20/02	848	530	USGS	*	0.63	
5/24/02	928	540	C of R		0.58	
5/29/02	907	576	C of R		0.64	557
6/4/02	918	560	USGS		0.61	
6/7/02	903	568	C of R		0.63	
6/12/02	941	600	C of R		0.64	
6/18/02	864	558	USGS		0.65	
6/21/02	890	560	C of R		0.63	
6/26/02	902	552	C of R		0.61	566
7/1/02	905	569	USGS		0.63	
7/5/02	920	584	C of R		0.63	
7/8/02	911	592	C of R		0.65	
7/11/02	915	572	C of R		0.63	
7/18/02	912	563	USGS		0.62	
7/19/02	909	552	C of R		0.61	
7/24/02	940	552	C of R		0.59	569

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

Table J-1

SANTA ANA RIVER AT RIVERSIDE NARROWS

WATER YEAR 2001-02

Date Sampled	E.C. (microsiemens/cm)	TDS (mg/L)	Source of Data	*Ratio*	*average*
8/1/02	935	574	USGS	0.61	
8/2/02	924	568	C of R	0.61	
8/8/02	935	580	C of R	0.62	
8/16/02	939	580	C of R	0.62	
8/16/02	930	584	USGS	0.63	
8/21/02	925	564	C of R	0.61	
8/30/02	921	572	C of R	0.62	
8/30/02	916	571	USGS	0.62	574
9/4/02	918	580	C of R	0.63	
9/12/02	920	584	USGS	0.63	
9/13/02	917	568	C of R	0.62	
9/18/02	912	548	C of R	0.60	
9/27/02	924	560	C of R	0.61	568

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

TABLE J-2

FLOW WEIGHTED TDS OF BASE FLOW AT RIVERSIDE NARROWS
(Including Nontributary Flow Discharged Above the Narrows)

WATER YEAR 2001-02

Month	Flow [1] (acre-feet)	TDS [2] (mg/L)	Flow x TDS
2001			
October	5,008	599	2,999,792
November	5,389	600	3,233,400
December	5,989	585	3,503,565
2002			
January	5,979	616	3,683,064
February	4,876	605	2,949,980
March	5,944	589	3,501,016
April	6,416	588	3,772,608
May	6,819	557	3,798,183
June	5,490	566	3,107,340
July	5,050	569	2,873,450
August	4,570	574	2,623,180
September	4,314	568	2,450,352
Total	65,844		38,495,930

$$\text{Flow weighted TDS} = \frac{38{,}495{,}930}{65{,}844} = 585 \text{ mg/L}$$

(1) USGS measured flow minus storm flow from Table 7, Stream Flow on Table 6

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

APPENDIX K

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

WATER YEAR 2001-02

TABLE K-1

WMWD TRANSFER PROGRAM WATER
DISCHARGED TO THE SANTA ANA RIVER ABOVE RIVERSIDE NARROWS
WATER YEAR 2001-02
(acre-feet)

Month	Discharged Above Riverside Narrows[1]	Flow Arriving At Riverside Narrows[1]	Flow Arriving At Prado Dam[1]
2001			
October	0	0	0
November	0	0	0
December	323	323	323
2002			
January	398	398	398
February	28	28	28
March	405	405	405
April	616	616	616
May	650	650	650
June	571	571	571
July	641	641	641
August	638	638	638
September	608	608	608
Total	4,877	4,877	4,877

(1) Unadjusted for evapotranspiration loss per agreement between WMWD and OCWD.

TABLE K-2

WMWD TRANSFER PROGRAM WATER
DISCHARGED TO THE SANTA ANA RIVER ABOVE RIVERSIDE NARROWS
WATER YEAR 2001-02
OCTOBER 2001

Day	Discharged Above Riverside Narrows (cfs)	Flow Arriving At Riverside Narrows[1] (cfs)	Flow Arriving At Prado Dam[1] (cfs)
1	0.0	0.0	0.0
2	0.0	0.0	0.0
3	0.0	0.0	0.0
4	0.0	0.0	0.0
5	0.0	0.0	0.0
6	0.0	0.0	0.0
7	0.0	0.0	0.0
8	0.0	0.0	0.0
9	0.0	0.0	0.0
10	0.0	0.0	0.0
11	0.0	0.0	0.0
12	0.0	0.0	0.0
13	0.0	0.0	0.0
14	0.0	0.0	0.0
15	0.0	0.0	0.0
16	0.0	0.0	0.0
17	0.0	0.0	0.0
18	0.0	0.0	0.0
19	0.0	0.0	0.0
20	0.0	0.0	0.0
21	0.0	0.0	0.0
22	0.0	0.0	0.0
23	0.0	0.0	0.0
24	0.0	0.0	0.0
25	0.0	0.0	0.0
26	0.0	0.0	0.0
27	0.0	0.0	0.0
28	0.0	0.0	0.0
29	0.0	0.0	0.0
30	0.0	0.0	0.0
31	0.0	0.0	0.0
Total in cfs-days	0.0	0.0	0.0
Total in AF	0	0	0

(1) Unadjusted for evapotranspiration loss per agreement between WMWD

TABLE K-2 (continued)

WMWD TRANSFER PROGRAM WATER
DISCHARGED TO THE SANTA ANA RIVER ABOVE RIVERSIDE NARROWS
WATER YEAR 2001-02
NOVEMBER 2001

Day	Discharged Above Riverside Narrows[1] (cfs)	Flow Arriving At Riverside Narrows[2] (cfs)	Flow Arriving At Prado Dam[3] (cfs)
1	0.0	0.0	0.0
2	0.0	0.0	0.0
3	0.0	0.0	0.0
4	0.0	0.0	0.0
5	0.0	0.0	0.0
6	0.0	0.0	0.0
7	0.0	0.0	0.0
8	0.0	0.0	0.0
9	0.0	0.0	0.0
10	0.0	0.0	0.0
11	0.0	0.0	0.0
12	0.0	0.0	0.0
13	0.0	0.0	0.0
14	0.0	0.0	0.0
15	0.0	0.0	0.0
16	0.0	0.0	0.0
17	0.0	0.0	0.0
18	0.0	0.0	0.0
19	0.0	0.0	0.0
20	0.0	0.0	0.0
21	0.0	0.0	0.0
22	0.0	0.0	0.0
23	0.0	0.0	0.0
24	0.0	0.0	0.0
25	0.0	0.0	0.0
26	0.0	0.0	0.0
27	0.0	0.0	0.0
28	0.0	0.0	0.0
29	0.0	0.0	0.0
30	0.0	0.0	0.0
Total in cfs-days	0.0	0.0	0.0
Total in AF	0	0	0

(1) Unadjusted for evapotranspiration loss per agreement between WMWD

TABLE K-2 (continued)

WMWD TRANSFER PROGRAM WATER
DISCHARGED TO THE SANTA ANA RIVER ABOVE RIVERSIDE NARROWS
WATER YEAR 2001-02
DECEMBER 2001

Day	Discharged Above Riverside Narrows[1] (cfs)	Flow Arriving At Riverside Narrows[2] (cfs)	Flow Arriving At Prado Dam[3] (cfs)
1	0.0	0.0	0.0
2	0.0	0.0	0.0
3	0.0	0.0	0.0
4	0.0	0.0	0.0
5	0.0	0.0	0.0
6	0.0	0.0	0.0
7	0.0	0.0	0.0
8	0.0	0.0	0.0
9	0.0	0.0	0.0
10	0.0	0.0	0.0
11	0.0	0.0	0.0
12	0.0	0.0	0.0
13	0.0	0.0	0.0
14	8.9	8.9	8.9
15	10.2	10.2	10.2
16	8.7	8.7	8.7
17	7.6	7.6	7.6
18	8.8	8.8	8.8
19	8.9	8.9	8.9
20	8.8	8.8	8.8
21	9.4	9.4	9.4
22	9.7	9.7	9.7
23	8.7	8.7	8.7
24	9.3	9.3	9.3
25	8.8	8.8	8.8
26	9.1	9.1	9.1
27	8.0	8.0	8.0
28	9.1	9.1	9.1
29	10.4	10.4	10.4
30	8.9	8.9	8.9
31	9.4	9.4	9.4
Total in cfs-days	162.7	162.7	162.7
Total in AF	323	323	323

(1) Unadjusted for evapotranspiration loss per agreement between WMWD

TABLE K-2 (continued)

WMWD TRANSFER PROGRAM WATER
DISCHARGED TO THE SANTA ANA RIVER ABOVE RIVERSIDE NARROWS
WATER YEAR 2001-02
JANUARY 2002

Day	Discharged Above Riverside Narrows[1] (cfs)	Flow Arriving At Riverside Narrows[2] (cfs)	Flow Arriving At Prado Dam[3] (cfs)
1	5.1	5.1	5.1
2	10.0	10.0	10.0
3	6.3	6.3	6.3
4	11.7	11.7	11.7
5	8.9	8.9	8.9
6	9.8	9.8	9.8
7	6.8	6.8	6.8
8	10.2	10.2	10.2
9	9.2	9.2	9.2
10	2.5	2.5	2.5
11	0.0	0.0	0.0
12	0.0	0.0	0.0
13	0.0	0.0	0.0
14	0.0	0.0	0.0
15	0.0	0.0	0.0
16	1.7	1.7	1.7
17	9.5	9.5	9.5
18	11.1	11.1	11.1
19	9.2	9.2	9.2
20	9.7	9.7	9.7
21	9.8	9.8	9.8
22	8.7	8.7	8.7
23	7.8	7.8	7.8
24	8.9	8.9	8.9
25	10.0	10.0	10.0
26	8.5	8.5	8.5
27	3.7	3.7	3.7
28	8.3	8.3	8.3
29	4.5	4.5	4.5
30	4.5	4.5	4.5
31	4.5	4.5	4.5
Total in cfs-days	200.7	200.7	200.7
Total in AF	398	398	398

(1) Unadjusted for evapotranspiration loss per agreement between WMWD

TABLE K-2 (continued)

WMWD TRANSFER PROGRAM WATER
DISCHARGED TO THE SANTA ANA RIVER ABOVE RIVERSIDE NARROWS
WATER YEAR 2001-02
FEBRUARY 2002

Day	Discharged Above Riverside Narrows[1] (cfs)	Flow Arriving At Riverside Narrows[2] (cfs)	Flow Arriving At Prado Dam[3] (cfs)
1	5.5	5.5	5.5
2	4.2	4.2	4.2
3	4.3	4.3	4.3
4	0.0	0.0	0.0
5	0.0	0.0	0.0
6	0.0	0.0	0.0
7	0.0	0.0	0.0
8	0.0	0.0	0.0
9	0.0	0.0	0.0
10	0.0	0.0	0.0
11	0.0	0.0	0.0
12	0.0	0.0	0.0
13	0.0	0.0	0.0
14	0.0	0.0	0.0
15	0.0	0.0	0.0
16	0.0	0.0	0.0
17	0.0	0.0	0.0
18	0.0	0.0	0.0
19	0.0	0.0	0.0
20	0.0	0.0	0.0
21	0.0	0.0	0.0
22	0.0	0.0	0.0
23	0.0	0.0	0.0
24	0.0	0.0	0.0
25	0.0	0.0	0.0
26	0.0	0.0	0.0
27	0.0	0.0	0.0
28	0.0	0.0	0.0
Total in cfs-days	14.0	14.0	14.0
Total in AF	28	28	28

(1) Unadjusted for evapotranspiration loss per agreement between WMWD

TABLE K-2 (continued)

WMWD TRANSFER PROGRAM WATER
DISCHARGED TO THE SANTA ANA RIVER ABOVE RIVERSIDE NARROWS
WATER YEAR 2001-02
MARCH 2002

Day	Discharged Above Riverside Narrows[1] (cfs)	Flow Arriving At Riverside Narrows[2] (cfs)	Flow Arriving At Prado Dam[3] (cfs)
1	0.0	0.0	0.0
2	0.0	0.0	0.0
3	0.0	0.0	0.0
4	0.0	0.0	0.0
5	0.0	0.0	0.0
6	0.0	0.0	0.0
7	0.0	0.0	0.0
8	0.0	0.0	0.0
9	0.0	0.0	0.0
10	0.0	0.0	0.0
11	0.0	0.0	0.0
12	6.6	6.6	6.6
13	8.3	8.3	8.3
14	10.8	10.8	10.8
15	9.1	9.1	9.1
16	12.7	12.7	12.7
17	10.1	10.1	10.1
18	8.9	8.9	8.9
19	10.6	10.6	10.6
20	10.6	10.6	10.6
21	10.6	10.6	10.6
22	10.6	10.6	10.6
23	12.3	12.3	12.3
24	10.5	10.5	10.5
25	7.1	7.1	7.1
26	10.4	10.4	10.4
27	10.6	10.6	10.6
28	10.6	10.6	10.6
29	13.0	13.0	13.0
30	10.3	10.3	10.3
31	10.2	10.2	10.2
Total in cfs-days	204.0	204.0	204.0
Total in AF	405	405	405

(1) Unadjusted for evapotranspiration loss per agreement between WMWD

TABLE K-2 (continued)

WMWD TRANSFER PROGRAM WATER
DISCHARGED TO THE SANTA ANA RIVER ABOVE RIVERSIDE NARROWS
WATER YEAR 2001-02
APRIL 2002

Day	Discharged Above Riverside Narrows[1] (cfs)	Flow Arriving At Riverside Narrows[2] (cfs)	Flow Arriving At Prado Dam[3] (cfs)
1	11.1	11.1	11.1
2	10.8	10.8	10.8
3	10.7	10.7	10.7
4	10.5	10.5	10.5
5	10.5	10.5	10.5
6	10.5	10.5	10.5
7	10.9	10.9	10.9
8	7.6	7.6	7.6
9	10.6	10.6	10.6
10	13.1	13.1	13.1
11	8.2	8.2	8.2
12	13.0	13.0	13.0
13	10.3	10.3	10.3
14	7.1	7.1	7.1
15	7.9	7.9	7.9
16	10.5	10.5	10.5
17	10.6	10.6	10.6
18	10.7	10.7	10.7
19	10.9	10.9	10.9
20	11.7	11.7	11.7
21	12.4	12.4	12.4
22	8.0	8.0	8.0
23	13.9	13.9	13.9
24	9.2	9.2	9.2
25	9.2	9.2	9.2
26	11.4	11.4	11.4
27	11.5	11.5	11.5
28	8.2	8.2	8.2
29	9.1	9.1	9.1
30	10.8	10.8	10.8
Total in cfs-days	310.8	310.8	310.8
Total in AF	616	616	616

(1) Unadjusted for evapotranspiration loss per agreement between WMWD

TABLE K-2 (continued)

WMWD TRANSFER PROGRAM WATER
DISCHARGED TO THE SANTA ANA RIVER ABOVE RIVERSIDE NARROWS
WATER YEAR 2001-02
MAY 2002

Day	Discharged Above Riverside Narrows[1] (cfs)	Flow Arriving At Riverside Narrows[2] (cfs)	Flow Arriving At Prado Dam[3] (cfs)
1	12.9	12.9	12.9
2	8.5	8.5	8.5
3	10.7	10.7	10.7
4	12.5	12.5	12.5
5	11.9	11.9	11.9
6	7.5	7.5	7.5
7	10.7	10.7	10.7
8	10.7	10.7	10.7
9	10.7	10.7	10.7
10	13.3	13.3	13.3
11	10.3	10.3	10.3
12	10.7	10.7	10.7
13	9.4	9.4	9.4
14	10.5	10.5	10.5
15	12.8	12.8	12.8
16	7.6	7.6	7.6
17	10.8	10.8	10.8
18	13.2	13.2	13.2
19	9.8	9.8	9.8
20	9.0	9.0	9.0
21	10.8	10.8	10.8
22	10.5	10.5	10.5
23	7.6	7.6	7.6
24	13.4	13.4	13.4
25	10.5	10.5	10.5
26	10.8	10.8	10.8
27	10.1	10.1	10.1
28	8.7	8.7	8.7
29	10.7	10.7	10.7
30	10.7	10.7	10.7
31	10.6	10.6	10.6
Total in cfs-days	327.6	327.6	327.6
Total in AF	650	650	650

(1) Unadjusted for evapotranspiration loss per agreement between WMWD

TABLE K-2 (continued)

WMWD TRANSFER PROGRAM WATER
DISCHARGED TO THE SANTA ANA RIVER ABOVE RIVERSIDE NARROWS
WATER YEAR 2001-02
JUNE 2002

Day	Discharged Above Riverside Narrows[1] (cfs)	Flow Arriving At Riverside Narrows[2] (cfs)	Flow Arriving At Prado Dam[3] (cfs)
1	12.8	12.8	12.8
2	10.9	10.9	10.9
3	8.1	8.1	8.1
4	10.7	10.7	10.7
5	12.4	12.4	12.4
6	8.8	8.8	8.8
7	13.1	13.1	13.1
8	10.8	10.8	10.8
9	11.0	11.0	11.0
10	7.7	7.7	7.7
11	0.0	0.0	0.0
12	0.0	0.0	0.0
13	0.0	0.0	0.0
14	9.9	9.9	9.9
15	12.4	12.4	12.4
16	11.9	11.9	11.9
17	8.1	8.1	8.1
18	10.7	10.7	10.7
19	12.6	12.6	12.6
20	8.0	8.0	8.0
21	14.5	14.5	14.5
22	9.0	9.0	9.0
23	13.2	13.2	13.2
24	7.2	7.2	7.2
25	10.7	10.7	10.7
26	6.2	6.2	6.2
27	12.3	12.3	12.3
28	11.6	11.6	11.6
29	11.7	11.7	11.7
30	11.5	11.5	11.5
Total in cfs-days	287.8	287.8	287.8
Total in AF	571	571	571

(1) Unadjusted for evapotranspiration loss per agreement between WMWD

TABLE K-2 (continued)

WMWD TRANSFER PROGRAM WATER
DISCHARGED TO THE SANTA ANA RIVER ABOVE RIVERSIDE NARROWS
WATER YEAR 2001-02
JULY 2002

Day	Discharged Above Riverside Narrows[1] (cfs)	Flow Arriving At Riverside Narrows[2] (cfs)	Flow Arriving At Prado Dam[3] (cfs)
1	7.9	7.9	7.9
2	10.6	10.6	10.6
3	10.6	10.6	10.6
4	13.1	13.1	13.1
5	6.4	6.4	6.4
6	15.8	15.8	15.8
7	8.7	8.7	8.7
8	8.8	8.8	8.8
9	10.5	10.5	10.5
10	10.5	10.5	10.5
11	10.5	10.5	10.5
12	10.6	10.6	10.6
13	10.6	10.6	10.6
14	10.5	10.5	10.5
15	10.4	10.4	10.4
16	10.5	10.5	10.5
17	10.5	10.5	10.5
18	10.6	10.6	10.6
19	10.8	10.8	10.8
20	12.6	12.6	12.6
21	11.1	11.1	11.1
22	7.8	7.8	7.8
23	10.5	10.5	10.5
24	12.9	12.9	12.9
25	8.0	8.0	8.0
26	10.5	10.5	10.5
27	12.2	12.2	12.2
28	10.1	10.1	10.1
29	6.5	6.5	6.5
30	10.2	10.2	10.2
31	12.7	12.7	12.7
Total in cfs-days	323.2	323.2	323.2
Total in AF	641	641	641

(1) Unadjusted for evapotranspiration loss per agreement between WMWD

TABLE K-2 (continued)

WMWD TRANSFER PROGRAM WATER
DISCHARGED TO THE SANTA ANA RIVER ABOVE RIVERSIDE NARROWS
WATER YEAR 2001-02
AUGUST 2002

Day	Discharged Above Riverside Narrows[1] (cfs)	Flow Arriving At Riverside Narrows[2] (cfs)	Flow Arriving At Prado Dam[3] (cfs)
1	8.5	8.5	8.5
2	11.4	11.4	11.4
3	11.4	11.4	11.4
4	11.5	11.5	11.5
5	7.5	7.5	7.5
6	10.5	10.5	10.5
7	13.6	13.6	13.6
8	7.2	7.2	7.2
9	12.1	12.1	12.1
10	11.1	11.1	11.1
11	10.9	10.9	10.9
12	7.5	7.5	7.5
13	10.4	10.4	10.4
14	11.6	11.6	11.6
15	12.4	12.4	12.4
16	9.7	9.7	9.7
17	10.0	10.0	10.0
18	10.8	10.8	10.8
19	9.8	9.8	9.8
20	8.1	8.1	8.1
21	10.5	10.5	10.5
22	10.3	10.3	10.3
23	10.5	10.5	10.5
24	13.1	13.1	13.1
25	10.2	10.2	10.2
26	7.8	7.8	7.8
27	10.4	10.4	10.4
28	12.5	12.5	12.5
29	8.1	8.1	8.1
30	11.1	11.1	11.1
31	11.1	11.1	11.1
Total in cfs-days	321.5	321.5	321.5
Total in AF	638	638	638

(1) Unadjusted for evapotranspiration loss per agreement between WMWD

TABLE K-2 (continued)

WMWD TRANSFER PROGRAM WATER
DISCHARGED TO THE SANTA ANA RIVER ABOVE RIVERSIDE NARROWS
WATER YEAR 2001-02
SEPTEMBER 2002

Day	Discharged Above Riverside Narrows[1] (cfs)	Flow Arriving At Riverside Narrows[2] (cfs)	Flow Arriving At Prado Dam[3] (cfs)
1	10.0	10.0	10.0
2	11.0	11.0	11.0
3	8.3	8.3	8.3
4	10.2	10.2	10.2
5	13.7	13.7	13.7
6	6.9	6.9	6.9
7	12.4	12.4	12.4
8	9.2	9.2	9.2
9	9.2	9.2	9.2
10	8.2	8.2	8.2
11	7.0	7.0	7.0
12	8.8	8.8	8.8
13	12.8	12.8	12.8
14	10.4	10.4	10.4
15	12.2	12.2	12.2
16	9.2	9.2	9.2
17	10.4	10.4	10.4
18	10.4	10.4	10.4
19	10.4	10.4	10.4
20	11.0	11.0	11.0
21	12.2	12.2	12.2
22	12.7	12.7	12.7
23	7.5	7.5	7.5
24	10.8	10.8	10.8
25	10.3	10.3	10.3
26	10.3	10.3	10.3
27	12.3	12.3	12.3
28	10.0	10.0	10.0
29	11.1	11.1	11.1
30	7.4	7.4	7.4
Total in cfs-days	306.6	306.6	306.6
Total in AF	608	608	608

(1) Unadjusted for evapotranspiration loss per agreement between WMWD

TABLE K-3

SUMMARY OF TDS OF WMWD TRANSFER PROGRAM WATER
DISCHARGED TO THE SANTA ANA RIVER ABOVE RIVERSIDE NARROWS
WATER YEAR 2001-02

CALCULATION OF WMWD TRANSFER PROGRAM FLOW TDS

No water quality samples were collected from the wells or from the channel where WMWD Transfer Program water was discharged this year. Only one sample was collected from the Tava Lane sampling site during the period when the Transfer water was being discharged; HGMP water was also being discharged at that time. Therefore, a TDS value for the Transfer water was calculated from known flows and known TDS values from the sample collected in March and HGMP TDS for March as follows:

3/19/2002 - Tave Lane TDS = 472 mg/L
Mar-02 - WMWD Flow = 10.61 cfs
Mar-02 - HGMP Flow = 16.68 cfs
Mar-02 - HGMP Monthly Average TDS = 488 mg/L

$$Q_{total}q_{Tava\ Lane} = Q_{wmwd}q_{wmwd} + Q_{hgmp}q_{hgmp}$$

Q_{wmwd} = 11 cfs
q_{wmwd} = Unknown
Q_{hgmp} = 17 cfs
q_{hgmp} = 488 mg/L
Q_{total} = 27.29 cfs
$q_{Tava\ Lane}$ = 472 mg/L

$$q_{wmwd} = \frac{Q_{total}q_{Tava\ Lane} - Q_{hgmp}q_{hgmp}}{Q_{wmwd}}$$

$$= \frac{(27.29*472) - (16.68*488)}{10.61}$$

q_{wmwd} = 447 mg/L