

**11058500 East Twin Creek near Arrowhead Springs, CA**

Santa Ana River Basin

LOCATION.--Lat 34°10'45", long 117°15'53" referenced to North American Datum of 1927, in NE ¼ NE ¼ sec.14, T.1 N., R.4 W., San Bernardino County, CA, Hydrologic Unit 18070203, on right bank, 1,000 ft upstream from Del Rosa Water Co.'s Diversion, 0.5 mi south of Arrowhead Springs, and 1.0 mi downstream from Strawberry Creek.

DRAINAGE AREA.--8.80 mi<sup>2</sup>.

**SURFACE-WATER RECORDS**

PERIOD OF RECORD.--December 1919 to current year. Discharge measurements only from Nov. 8, 2002, to Sept. 30, 2003. Prior to October 1952, published as "Strawberry Creek near Arrowhead Springs."

REVISED RECORDS.--WSP 1635: 1924 (instantaneous maximum discharge), 1927, 1928 (instantaneous maximum discharge), 1929, 1932 (instantaneous maximum discharge). WSP 1928: Drainage area.

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 1,590 ft above NGVD of 1929, from topographic map.

REMARKS.--Records poor. No regulation upstream from station. One small diversion dam for domestic use upstream from station. See schematic diagram of Santa Ana River Basin available from the California Water Science Center.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,000 ft<sup>3</sup>/s, Dec. 25, 2003, gage height, 11.49 ft, from floodmark left by debris flow, on basis of critical-depth measurement of peak flow; no flow for a portion of the day at times in 1929, 1931-35, and May 31, 2002 (during fire suppression activities).

The peak discharge for the flood of Dec. 25, 2003, is based on hydraulic computations that were applied to a possible debris or hyperconcentrated flow. It is also likely that the peak stage of 11.49 ft was left by a debris or hyperconcentrated flow event at the gage, that is not associated with the site of the critical-depth survey, 400 ft downstream of the gage. The peak of Dec. 25, 2003, was the result of an intense rain storm less than two months after a wildfire burned over 90 percent of the drainage basin.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 40 ft<sup>3</sup>/s and (or) maximum (\*), from rating curve extended above 120 ft<sup>3</sup>/s, on basis of slope-area measurement at gage height 8.35 ft:

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Dec 19	1745	864	6.55
Dec 20	2330	*1,100	*7.03
Dec 29	2030	85	3.68
Jan 3	0030	47	3.30
Feb 19	0445	75	3.67
Feb 26	0500	100	3.89
Mar 21	0730	46	3.46
Mar 25	1215	51	3.52

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**DISCHARGE, CUBIC FEET PER SECOND**  
**WATER YEAR OCTOBER 2010 TO SEPTEMBER 2011**  
**DAILY MEAN VALUES**  
[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	0.83	e1.3	1.7	29	9.7	18	14	6.1	5.1	3.0	3.7	2.0
2	0.86	e1.0	1.6	29	9.3	15	14	5.5	5.2	2.9	3.3	1.8
3	0.97	1.1	1.6	35	9.1	14	14	5.6	5.1	2.8	3.1	1.9
4	e1.0	1.2	1.7	27	8.8	13	13	5.5	5.2	2.9	3.0	1.9
5	e1.3	1.1	1.7	23	8.5	12	12	6.2	5.1	2.7	2.9	2.3
6	1.4	1.2	2.3	21	8.1	12	12	6.6	5.2	2.9	3.0	2.0
7	1.3	1.3	1.8	20	7.9	20	12	7.0	5.1	2.8	2.9	1.8
8	1.1	2.0	1.8	19	7.8	14	13	8.2	5.2	2.5	2.7	1.6
9	1.1	1.6	1.8	18	7.4	13	12	8.7	5.1	2.6	2.8	1.6
10	1.1	1.5	1.8	17	7.3	12	11	7.9	4.9	2.6	2.6	1.9
11	1.0	1.4	1.8	15	7.1	11	10	7.7	4.9	2.5	2.9	2.0
12	1.0	1.3	1.8	15	7.0	11	9.9	7.1	4.9	2.5	2.7	1.7
13	0.95	1.3	1.7	14	6.9	11	9.7	6.3	4.6	2.6	2.9	2.4
14	0.92	1.3	2.0	14	6.9	9.9	9.3	6.3	4.3	3.0	2.9	2.1
15	0.95	1.2	2.3	13	6.8	9.4	8.6	9.6	4.2	3.2	2.6	2.1
16	1.0	1.2	3.4	13	14	8.9	8.1	8.0	4.3	3.3	2.4	2.2
17	1.2	1.3	3.9	12	9.4	8.6	7.9	8.3	4.1	3.1	2.2	2.4
18	1.3	1.2	7.7	12	10	8.2	8.4	9.5	4.3	2.6	2.2	2.2
19	1.3	1.3	303	11	31	9.8	8.7	6.2	4.4	2.5	2.3	1.9
20	1.4	8.1	546	11	21	9.8	8.6	5.6	3.9	2.4	2.6	1.9
21	1.5	5.4	e759	10	17	30	8.1	5.2	3.8	2.5	2.5	1.8
22	1.6	2.8	e1,050	11	14	21	8.1	5.5	3.7	2.4	2.3	1.7
23	1.5	2.3	e583	10	12	17	7.5	5.5	3.6	2.5	2.3	1.6
24	1.5	2.5	e315	9.9	11	16	7.4	5.2	3.5	2.4	2.3	1.7
25	1.6	2.1	e150	9.8	12	29	6.9	5.1	3.6	2.2	2.3	1.9
26	1.5	2.0	e106	9.6	48	23	6.4	5.1	3.4	2.3	2.0	1.9
27	1.2	2.1	e67	9.3	24	22	5.9	5.2	3.2	2.3	2.0	1.7
28	1.2	2.1	e49	9.0	20	20	5.8	5.4	3.2	2.5	2.1	1.8
29	1.2	1.8	e45	9.1	---	18	5.8	5.8	3.3	2.4	1.9	1.8
30	1.4	1.8	40	10	---	16	6.6	5.4	3.3	2.5	2.0	1.7
31	1.4	---	33	10	---	15	---	5.2	---	5.1	1.9	---
<b>Total</b>	37.58	57.8	4,088.4	475.7	362.0	467.6	284.7	200.5	129.7	84.5	79.3	57.3
<b>Mean</b>	1.21	1.93	132	15.3	12.9	15.1	9.49	6.47	4.32	2.73	2.56	1.91
<b>Max</b>	1.6	8.1	1,050	35	48	30	14	9.6	5.2	5.1	3.7	2.4
<b>Min</b>	0.83	1.0	1.6	9.0	6.8	8.2	5.8	5.1	3.2	2.2	1.9	1.6
<b>Ac-ft</b>	75	115	8,110	944	718	927	565	398	257	168	157	114

**STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1921 - 2011, BY WATER YEAR (WY)**

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
<b>Mean</b>	1.56	2.42	6.24	8.63	12.5	12.9	7.95	4.81	2.85	1.67	1.27	1.15
<b>Max</b>	11.4	20.3	132	95.7	102	101	38.3	30.6	15.9	9.40	11.9	4.94
<b>(WY)</b>	(1984)	(1966)	(2011)	(1993)	(1993)	(1991)	(1978)	(1998)	(1998)	(1983)	(1983)	(1983)
<b>Min</b>	0.20	0.47	0.51	0.91	1.14	1.16	0.56	0.65	0.56	0.18	0.20	0.20
<b>(WY)</b>	(1965)	(1965)	(1990)	(1963)	(1964)	(2002)	(1977)	(2002)	(2002)	(1964)	(1964)	(1964)

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SUMMARY STATISTICS

	Calendar Year 2010		Water Year 2011		Water Years 1921 - 2011	
<b>Annual total</b>	5,939.18		6,325.08			
<b>Annual mean</b>	16.3		17.3		5.30	
<b>Highest annual mean</b>					23.1	1993
<b>Lowest annual mean</b>					0.85	1961
<b>Highest daily mean</b>	1,050	Dec 22	1,050	Dec 22	1,050	Dec 22, 2010
<b>Lowest daily mean</b>	0.44	Aug 26	0.83	Oct 1	0.10	Aug 23, 1929
<b>Annual seven-day minimum</b>	0.47	Aug 22	0.99	Oct 10	0.11	Jul 11, 1964
<b>Maximum peak flow</b>			1,100	Dec 20	<sup>a</sup> 6,000	Dec 25, 2003
<b>Maximum peak stage</b>			7.03	Dec 20	<sup>b</sup> 11.49	Dec 25, 2003
<b>Annual runoff (ac-ft)</b>	11,780		12,550		3,840	
<b>10 percent exceeds</b>	11		17		9.5	
<b>50 percent exceeds</b>	2.0		4.3		2.0	
<b>90 percent exceeds</b>	0.69		1.4		0.53	

<sup>a</sup> The peak discharge for the flood of Dec. 25, 2003, is based on hydraulic computations that were applied to a possible debris or hyperconcentrated flow event.

<sup>b</sup> The maximum stage for the period of record is probably not related to the maximum discharge but rather is associated with a debris or hyperconcentrated flow at the gaging station.

