

EXHIBIT B

HYDROLOGY

HYDROLOGIC DATA  
LYTLE-CAJON CREEKS DRAINAGE AREA

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PRESENT STREAMGAGES  
IN OR NEAR LYTLE-CAJON CREEKS

<u>Stream Gages in Lytle Creek Basin</u>	USGS Numb	Lat	Long	Drainage (Area-sq.mi)	Elevation (ft)	Period of Record	Map Ref. No. Plate 7
Devil Canyon Creek near San Bernardino	11063680	34° 12' 30"	117° 19' 50"	5.49	2080	11/11 to 9/12, 10/13 to 9/14, and 12/19 to pres	17
Cajon Creek below Lone Pine Creek near* Keenbrook	11063510	34° 16' 04"	117° 27' 58"	56.5	2600	10/71 to 9/77 and 10/83 to pres	
Lone Pine Creek near Keenbrook	11063500	34° 15' 59"	117° 27' 47"	15.1	2606	12/19 to 9/38 and 6/49 to pres	15
Lytle Creek near Fontana	11062000	34° 12' 44"	117° 27' 26"	46.6	2380	10/18 to pres	14
*Cajon Creek near Keenbrook	11063000	34° 16' 01"	117° 27' 33"	40.6	2630	1919-1967	16

(OPERATIVE AT TIME OF SPF STUDY)

Stream Gages near Lytle Creek Basin

Lytle Creek at Colton	11065000	34° 04' 44"	117° 18' 17"	172	975	10/57 to 9/83 and 10/84 to pres	12
Warm Creek near San Bernardino	11060400	34° 04' 22"	117° 17' 58"	11.0	960	2/64 to 9/72 and 10/74 to pres	6
East Twin Creek near Arrowhead Springs	11058500	34° 10' 45"	117° 15' 53"	8.8	1590	12/19 to pres (aka Strawberry Crk near Arr Spgs before 1952)	
San Timoteo Creek near Loma Linda	11057500	34° 03' 46"	117° 16' 16"	125	1030	10/54 to 9/65, 2/68 to 10/73, and 4/79 to pres	4
Santa Ana River at E Street near San Bernardino	11059300	34° 03' 54"	117° 17' 58"	28	940	3/39 to 9/54 and 10/66 to pres	1

LYTLE CREEK (WEST CHANNEL) AT COLTON, CALIFORNIA  
 ELEVATION 980 FEET  
 PERIOD OF RECORD 1929 TO 1945

MONTHLY DISCHARGE (ACRE-FEET)

WATER YR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	ANN
1928-29				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1929-30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1930-31	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1931-32	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1932-33	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1933-34	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1934-35	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1935-36	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1936-37	0.0	0.0	4.2	0.6	7.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.7
1937-38	0.0	0.0	0.0	0.0	3.8	6010.0	0.0	0.0	0.0	0.0	0.0	0.0	6013.8
1938-39	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1939-40	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0
1940-41	0.0	0.0	3.6	0.6	17.0	9.7	4.4	0.0	0.0	0.0	0.0	0.0	35.3
1941-42	0.2	0.0	1.4	0.0	0.0	1.0	0.2	0.0	0.0	0.0	0.0	0.0	2.8
1942-43	0.0	0.0	0.2	3140.0	0.0	16.0	0.0	0.0	0.0	0.0	0.0	0.0	3156.2
1943-44	0.0	0.0	0.0	0.0	568.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	568.0
1944-45	0.0	0.0	2.0	0.4	2.4	0.8	0.0	0.0	0.0	0.0	0.0	0.0	5.6

NOTES:

- AVERAGE DISCHARGE, 16 YEARS: 0.85 CFS (615 ACRE-FEET YEAR)
- MOST FLOWS ONLY LOCAL RUNOFF
- WATER DIVERTED UPSTREAM BY FONTANA PIPELINE AND FOR SPREADING ON GRAVEL CONE
- MOST FLOOD FLOWS OF LYTLE CREEK DIVERTED TO EAST CHANNEL
- CONSTRUCTION OF LYTLE CREEK FLOODWAY PERMANENTLY CUT OFF THIS CHANNEL AT END OF 1945
- DRAINAGE AREA NOT ESTABLISHED APPROXIMATELY 72 SQ-MI
- WAS WEST BRANCH OF LYTLE CREEK BEFORE INTAKE STRUCTURE AT TIME WHEN BOTH WEST AND EAST BRANCHES WERE NATURAL CHANNELS

LYTLE CREEK (EAST CHANNEL) AT SAN BERNARDINO  
 ELEVATION 1050 FEET  
 PERIOD OF RECORD 1929 TO 1957

MONTHLY DISCHARGE (ACRE-FEET)

WATER YR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	ANN
1928-29	0	0	0	0	0	0	0	0	0	0	0	0	0
1929-30	0	0	0	0	0	0	0	0	0	0	0	0	0
1930-31	0	0	0	0	0	0	0	0	0	0	0	0	0
1931-32	0	0	0	0	1100	36	0	0	0	0	0	0	1136
1932-33	0	0	0	0	0	0	0	0	0	0	0	0	0
1933-34	0	0	3	317	0	0	0	0	0	0	0	0	320
1934-35	192	0	32	348	173	3	162	0	0	0	0	0	910
1935-36	0	0	0	0	346	2	22	0	0	0	0	0	370
1936-37	0	0	744	11	2060	533	0	0	0	0	0	0	3348
1937-38	0	0	0	19	1320	29390	1580	2290	206	0	0	0	34805
1938-39	0	0	0	0	5	83	37	6	11	12	12	562	728
1939-40	9	12	12	351	104	28	41	9	12	12	9	12	611
1940-41	18	12	588	58	1270	1960	223	12	110	18	12	9	4290
1941-42	9	30	79	18	17	23	24	12	14	17	19	18	280
1942-43	14	40	31	4840	472	2130	524	172	15	16	19	27	8300
1943-44	36	24	128	58	1300	689	492	262	57	74	37	30	3187
1944-45	61	984	37	37	503	507	1780	93	48	18	18	20	4106
1945-46	35	60	76	60	70	70	61	73	20	34	30	24	613
1946-47	31	48	50	55	54	60	41	37	31	33	27	32	499
1947-48	35	52	51	48	60	67	54	68	42	39	35	38	589
1948-49	38	44	46	48	38	35	38	45	35	30	32	29	458
1949-50	33	63	59	77	79	47	38	43	52	24	31	32	578
1950-51	34	33	19	34	21	29	34	35	23	19	33	24	338
1951-52	40	45	53	85	46	65	60	47	39	35	37	42	594
1952-53	52	51	42	36	33	30	56	66	46	24	31	31	498
1953-54	49	49	77	83	56	55	42	49	18	14	12	17	521
1954-55	29	42	29	51	35	26	41	31	14	19	14	12	343
1955-56	12	20	18	53	29	19	32	22	29	29	31	20	314
1956-57	22	17	31	142	14	18	20	63	28	23	27	16	421
SUM	749	1626	2205	6829	9205	35905	5402	3435	850	490	466	995	68157
MEAN	26	56	76	235	317	1238	186	118	29	17	16	34	2350
MAX	192	984	744	4840	2060	29390	1780	2290	206	74	37	562	34805
YEAR	1934	1944	1936	1943	1937	1938	1945	1938	1938	44	44,52	1939	1937-38

NOTES:

- Flows upstream diverted for irrigation and to debris cone for ground water recharge.
  - Lytle Creek flood-control dam, 1.5 miles above this station, has diverted flow away from this channel and carried it directly to Warm Creek since 1945.
  - A maximum of 300 cfs of low stage flow can be diverted to east channel at dam when desired. Water over spillway of dam would enter east channel.
- DRAINAGE AREA NOT ESTABLISHED, WAS EAST BRANCH OF LYTLE CREEK BEFORE (APPROX 94 SQ-MI) INTAKE STRUCTURE AS NATURAL EAST BRANCH OF LYTLE CREEK

LYTLE CREEK AT COLTON  
WEST CHANNEL  
ELEV 980 FEET

LYTLE CREEK AT SAN BERNARDINO  
EAST CHANNEL  
ELEV 1050

WATER YEAR ENDING SEP 30	MAX			DATE	*	MAX			DATE(S)
	MEAN DAILY FLOW CFS	MEAN DAILY FLOW CFS	PEAK FLOW CFS			MEAN DAILY FLOW CFS	MEAN DAILY FLOW CFS	PEAK FLOW CFS	
1929	0	0	0		*	0	0	0	
1930	0	0	0		*	0.032	6		MAR15
1931	0	0	0		*	0	0	0	
1932	0	0	0		*	1.573	383	700	FEB09
1933	0	0	0		*	0.264	62	610	JAN19
1934	0	0	0		*	0.442	159	555	JAN01
1935	0.009	1.6	20	JAN05	*	1.256	80	500	OCT18
1936	0.017	5	M	FEB13	*	0.511	37	208	FEB12/FEB11
1937	0.018	4	16	FEB06	*	4.624	521	1060	FEB14
1938	8.295	2180	7900	MAR02	*	48.03	7640	21500	MAR02
1939	0	0	0		*	1.005	277	1760	SEP25
1940	0.011	0	M		*	0.845	160	1180	JAN08
1941	0.05	4.8	M	FEB20	*	5.921	970	368	DEC24/FEB20
1942	0.004	0.5	M	TWICE	*	0.386	20	20	DEC29
1943	4.362	1570	13000	JAN23	*	11.46	1440	7800	JAN23
1944	0.784	286	2000	FEB22	*	4.403	617	1300	FEB22
1945	0.008	0.6	4.4	FEB01	*	5.673	100	425	NOV12
1946						0.86	4.5	15	DEC22
1947						0.689	3	13	DEC26/NOV13
1948						0.813	3.4	12	FEB05/DEC01
1949						0.632	1.8	9.2	NOV08/MAY19
1950						0.798	9.2	36	NOV10
1951						0.467	1.9	15	MAY14/MAY13
1952						0.82	5.4	5.4	JAN16
1953						0.687	2.8	14	APR27/NOV14
1954						0.719	7.2	19	JAN19/FEB02
1955						0.473	4.4	21	NOV11
1956						0.429	9.8	20	JAN26
1957						0.581	11	20	JAN13

MONTHLY RUNOFF IN ACRE-FEET---LYTLE CREEK AT COLTON  
 STATION NUMBER 11065000 ELEVATION 975 FEET  
 DRAINAGE AREA 186 SQUARE MILES  
 PERIOD OF RECORD 1957 TO 1988 (WY 1984 MISSING)

WATER YR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	ANN
1957-58	0.0	0.0	95.0	22.0	1040.0	386.0	1980.0	1.8	0.0	0.0	0.0	0.0	3524.8
1958-59	0.0	0.0	0.0	24.0	292.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	316.8
1959-60	0.0	1.4	7.3	11.0	9.9	1.8	3.4	0.0	0.0	0.0	0.0	0.0	34.8
1960-61	0.0	7.9	0.4	0.2	0.0	6.9	0.0	0.0	0.0	0.0	4.6	0.0	20.0
1961-62	0.0	4.8	17.0	31.0	1300.0	3.4	0.0	0.2	0.0	0.0	0.0	0.0	1356.4
1962-63	0.0	0.0	0.0	0.0	74.0	18.0	24.0	0.0	0.6	0.0	0.0	42.0	158.6
1963-64	1.0	31.0	0.2	85.0	0.4	228.0	104.0	0.0	0.0	0.0	0.0	0.0	449.6
1964-65	0.0	223.0	175.0	5.8	0.8	31.0	428.0	0.0	0.0	0.0	0.0	0.0	863.6
1965-66	0.0	4700.0	6380.0	382.0	455.0	506.0	569.0	34.0	0.0	0.0	0.0	0.0	13026.0
1966-67	1.0	88.0	4840.0	1130.0	0.0	159.0	294.0	0.0	21.0	0.0	178.0	41.0	6752.0
1967-68	0.0	376.0	41.0	9.5	0.2	458.0	8.5	0.0	0.0	0.2	0.0	0.0	893.4
1968-69	0.0	0.1	0.5	19550.0	12930.0	3360.0	3410.0	5390.0	1100.0	241.0	1050.0	352.0	47383.6
1969-70	65.0	250.0	0.0	27.0	155.0	454.0	1.7	4.0	0.0	0.8	0.4	0.0	957.9
1970-71	0.0	713.0	466.0	15.0	2.7	48.0	6.9	6.3	0.0	0.0	0.0	0.0	1257.9
1971-72	5.1	1.5	1130.0	0.0	0.0	12.0	0.0	0.0	0.2	0.0	0.3	0.0	1149.1
1972-73	0.4	131.0	32.0	145.0	2210.0	221.0	0.0	3300.0	0.0	0.0	0.0	0.2	6039.6
1973-74	0.0	28.0	0.1	795.0	16.0	87.0	33.0	0.0	0.0	0.0	0.0	0.0	959.1
1974-75	14.0	0.0	115.0	0.0	31.0	91.0	2.6	0.0	0.0	0.0	0.0	3.2	256.8
1975-76	1.2	0.7	0.7	0.8	463.0	81.0	2.7	0.6	0.7	0.0	0.0	501.0	1052.4
1976-77	0.0	6.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.1
1977-78	0.0	0.0	635.0	3060.0	4810.0	20050.0	1750.0	1470.0	3650.0	2180.0	0.0	63.0	37668.0
1978-79	1.2	178.0	159.0	340.0	248.0	2110.0	0.0	24.0	0.0	0.0	0.0	0.0	3060.2
1979-80	22.0	0.0	0.0	3890.0	20870.0	1650.0	105.0	1.5	119.0	0.0	48.0	570.0	27275.5
1980-81	972.0	1060.0	709.0	513.0	147.0	353.0	50.0	25.0	23.0	22.0	24.0	22.0	3920.0
1981-82	3.7	17.0	5.0	103.0	53.0	537.0	298.0	0.0	0.0	3.2	0.0	22.0	1041.9
1982-83	31.0	1380.0	585.0	844.0	1460.0	9000.0	308.0	2.4	292.0	407.0	562.0	41.0	14912.4
1983-84													
1984-85	1.1	27.0	1170.0	74.0	109.0	54.0	0.0	0.0	0.0	0.0	0.0	18.0	1453.1
1985-86	44.0	1040.0	52.0	488.0	1860.0	1550.0	359.0	13.0	32.0	8.0	1.0	183.0	5630.0
1986-87	5.6	55.0	107.0	341.0	95.0	177.0	16.0	0.0	0.0	0.0	1.2	0.0	797.8
1987-88	309.0	475.0	319.0	654.0	54.0	132.0	276.0	5.2	0.0	0.0	0.0	0.0	2224.2
1988-89													
MEAN	49.2	359.8	568.0	1084.7	1622.9	1392.2	334.4	342.6	174.6	95.4	62.3	61.9	6148.1
MAX	972.0	4700.0	6380.0	19550.0	20870.0	20050.0	3410.0	5390.0	3650.0	2180.0	1050.0	570.0	47383.6
YEAR	1980	1965	1965	1969	1980	1978	1969	1969	1978	1978	1969	1980	1968-69
MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.1 1976-77

LITTLE CREEK AT COLTON  
 STATION NUMBER 11065000 ELEVATION 975 FEET  
 DRAINAGE AREA--186 SQUARE MILES  
 PERIOD OF RECORD--1957 TO PRESENT (WY 1984 MISSING)

WATER YEAR ENDING SEP 30	MEAN DAILY FLOW CFS	MAX	PEAK FLOW CFS	DATE	DATE
		MEAN DAILY FLOW CFS			
1958	4.86	488	4080	APR04	APR04
1959	0.44	118	1120	FEB16	FEB16
1960	0.05	2.5	52	DEC24	JAN12
1961	0.03	2.6	64	NOV07	AUG04
1962	1.88	371	1520	FEB11	FEB11
1963	0.22	28	139	FEB10	SEP18
1964	0.62	67	594	MAR22	MAR22
1965	1.19	87	470	NOV17	DEC28
1966	18	2740	14800	DEC29	DEC29
1967	9.32	1630	4600	DEC06	DEC06
1968	1.23	230	730	MAR08	MAR08
1969	65.4	5040	16800	JAN25	JAN25
1970	1.32	110	726	MAR01	NOV07
1971	1.74	340	1600	NOV29	NOV29
1972	1.59	319	2830	DEC24	DEC24
1973	8.34	1020	4810	FEB11	FEB11
1974	1.3	208	814	JAN07	JAN08
1975	0.35	52	462	DEC04	DEC04
1976	1.45	184	1170	SEP11	SEP11
1977	0.01	3.1	77	NOV12	NOV12
1978	52	3870	17500	MAR04	MAR04
1979	4.22	340	1035	MAR27	MAR27
1980	37.6	2530	8070	FEB16	FEB16
1981	5.41	135	620	JAN29	JAN29
1982	1.44	203	722	MAR17	MAR17
1983	20.5	2040	4000	MAR02	MAR01
1984	M				
1985	2	152	348	DEC27	DEC19
1986	7.77	508	908	FEB15	JAN30
1987	1.1	81	572	JAN05	JAN04
1988	3.06	271	1010	JAN17	JAN17

MAXIMUM DISCHARGE OF RECORD--17,500 CFS ON MARCH 4, 1978





Lytle Creek near Fontana (8 Mi North of Fontana)  
 Station Number 11062000  
 Drainage Area 46.3 square miles  
 Elevation 2380 feet (slightly lower gage sites before 1963)  
 Period of Record 1919 to present  
 No regulation upstream, SoCal Edison and Fontana Union Water Co  
 divert and collect Lytle Creek flow within 2 and 1/2 miles upstream

WATER YEAR ENDING SEP 30	MEAN DAILY FLOW	PEAK FLOW		MAX DAILY		COMBINED RUNOFF	UNDVTRD RUNOFF	DIVERTED RUNOFF	PERCENT DIVERTED
	CMBND CFS	CFS	DATE	CFS	DATE	AC-FT	AC-FT	AC-FT	
1919	24.6			48	OCT04	17800	0	17800	100
1920	36.6			329	MAR02	26500	1950	24550	92.6
1921	29.1			160	MAR13	21100	100	21000	99.5
1922									
1923	34.5			55	OCT01	25000	0	25000	100
1924	21.7			42	MAR27	15700	0	15700	100
1925	14.6			34	APR05	10600	0	10600	100
1926	20.3			354	APR06	14700		14700	100
1927	46.6			1370	FEB16	33800	7090	26710	79
1928	23.2			42	FEB04	16800	0	16800	100
1929	17.5			53	MAR10	12700	0	12700	100
1930	21			57	MAY04	15200	0	15200	100
1931	18.3	417	APR26	108	APR26	13300	0	13300	100
1932	39.7	865	FEB08	659	FEB09	28800	4500	24300	84.4
1933	24.3	100	JAN19	55	JAN19	17600	100	17500	99.4
1934	18.2	560	JAN01	250	JAN01	13200	920	12280	93
1935	38.3	1500	APR08	296	APR08	27780	3500	24280	87.4
1936	28.8	730	FEB02	148	FEB02	20890	1280	19610	93.9
1937	70.8	1250	FEB14	480	FEB06	51350	16190	35160	68.5
1938	143	25200	MAR02	8960	MAR02	103900	68200	35700	34.4
1939	36.1	568	SEP25			26180	1880	24300	92.8
1940	35.5			327	JAN08	25760	1650	24110	93.6
1941	102			573	MAR04	74180	36990	37190	50.1
1942	37.2			76	DEC10	26970	640	26330	97.6
1943	90	4800	JAN23	1310	JAN23	65260	31070	34190	52.4
1944	67.4		FEB22	338	FEB22	48830	10440	38390	78.6
1945	44.4		FEB02	204	FEB02	32220	1550	30670	95.2
1946	41.6		MAR30	571	MAR30	30150	4640	25510	84.6
1947	45.1	1000	NOV20	440	DEC26	32730	6960	25770	78.7
1948	21.4	140	APR03	49	APR29	15490	100	15390	99.4
1949	16.4	200	JAN20	26	MAY	11900	70	11830	99.4
1950	15	207	DEC19	73	DEC19	10860	314	10546	97.1
1951	10.7	65	APR28	17	APR28	7760	33	7727	99.6
1952	46.8	1500	JAN16	469	JAN16	33930	17130	16800	49.5
1953	24.4	98	DEC01	54	NOV15	17710	2000	15710	88.7
1954	23.6	780	JAN25	123	JAN25	17140	2750	14390	84
1955	20.4	114	NOV11	69	NOV11	14800	320	14480	97.8
1956	18.6	964	JAN26	382	JAN26	13450	1370	12080	89.8
1957	16.6	575	JAN12	204	JAN13	12060	1230	10830	89.8

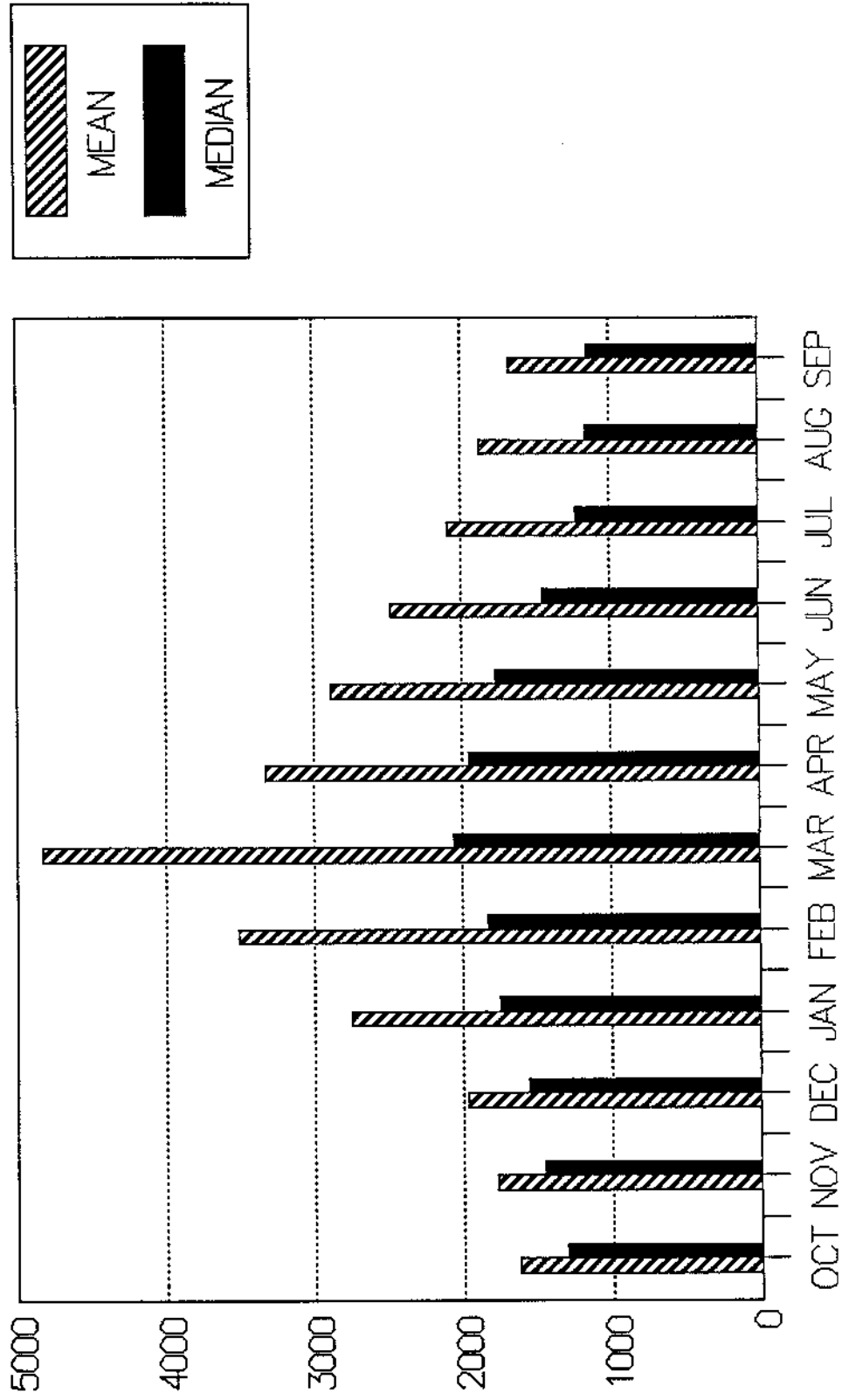
Lytle Creek near Fontana (8 Mi North of Fontana)  
 Station Number 11062000  
 Drainage Area 46.3 square miles  
 Elevation 2380 feet (slightly lower gage sites before 1963)  
 Period of Record 1919 to present  
 No regulation upstream, SoCal Edison and Fontana Union Water Co  
 divert and collect Lytle Creek flow within 2 and 1/2 miles upstream

WATER YEAR ENDING SEP 30	MEAN DAILY FLOW CMBND CFS	PEAK FLOW CFS	MAX DAILY DATE	MAX DAILY CFS	DATE	COMBINED RUNOFF AC-FT	UNDVTRD RUNOFF AC-FT	DIVERTED RUNOFF AC-FT	PERCENT DIVERTED
1958	72.9	1190	APR03	687	APR03	52840	35400	17440	33
1959	29	832	FEB16	276	FEB16	20990	3660	17330	82.6
1960	15.8	96	JAN10	27	JAN10	11440	48	11392	99.6
1961	11.6	102	JAN26	27	JAN26	8400	91	8309	98.9
1962	23.5	760	DEC02	180	FEB09	17020	4360	12660	74.4
1963	19.3	122	FEB10	75	FEB10	13980	345	13635	97.5
1964	13.1	277	APR01	122	APR01	9500	381	9119	96
1965	13.9	80	APR09	49	APR10	10060	332	9728	96.7
1966	75.3	9120	DEC29	3010	NOV23	54620	36330	18290	33.5
1967	70.7	7200	DEC06	2260	DEC06	51280	33130	18150	35.4
1968	29.7	336	NOV19	138	NOV19	21560	7540	14020	65
1969	194	35900	JAN25	8330	JAN25	140300	128100	12200	8.7
1970	34.8	145	FEB28	92	MAR01	25210	7350	17860	70.8
1971	23.7	1100	NOV29	116	DEC21	17200	2880	14320	83.3
1972	21	1360	DEC24	373	DEC24	15250	2880	12370	81.1
1973	37	1580	FEB11	945	FEB11	26840	9360	17480	65.1
1974	33.3	266	JAN07	166	JAN07	24140	5400	18740	77.6
1975	23.5	199	MAR06	81	MAR08	17010	868	16142	94.9
1976	21	403	SEP10	92	SEP11	15240	899	14341	94.1
1977	20.1	305	JAN03	139	AUG17	14570	1500	13070	89.7
1978	171	8600	MAR04	3510	MAR04	123800	105700	18100	14.6
1979	74.2	356	MAR27	199	MAR27	53810	27570	26240	48.8
1980	163	10330	FEB16	2830	FEB16	118100	91630	26470	22.4
1981	31.8	266	JAN29	90	JAN29	23060	5580	17480	75.8
1982	33.6	835	MAR17	369	MAR17	24360	7820	16540	67.9
1983	132	4000	MAR02	1530	MAR02	95910	78990	16920	17.6
1984	42.3	420	DEC25	200	DEC25	30690	13530	17160	55.9
1985	22.9	253	DEC27	135	DEC27	16620	1980	14640	88.1
1986	36	372	JAN30	203	FEB15	26130	11180	14950	57.2
1987	20.3	243	JAN04	102	JAN04	14690	2050	12640	86
1988	22.5	480	JAN17	208	JAN17	16310	3560	12750	78.2
AVERAGE	42.3					30652	12397	18255	59.6
MAXIMUM		35900		8960		140300	128100	37190	
DATE			25JAN69		02MAR38	WY 1969	WY 1969	WY 1941	

Average Discharge, Creek only, 70 years: 18.1 cfs (13110 acre-feet per year)  
 Average Discharge, Combined creek and diversions, 85 years (WYs 1899, 1905-88):  
 45.0 cfs (32,600 acre-feet/year)  
 Maximum Discharge on record, Creek only: 35,900 cfs on Jan. 25, 1969  
 (same maximum for creek and diversions)  
 Minimum Discharge on record, combined creek and diversions: 0.12 cfs (ave. daily)  
 for June 21 and 22, 1976

# LYTLE CREEK NEAR FONTANA

## AVERAGE MONTHLY DISCHARGE (1918 - 1988)

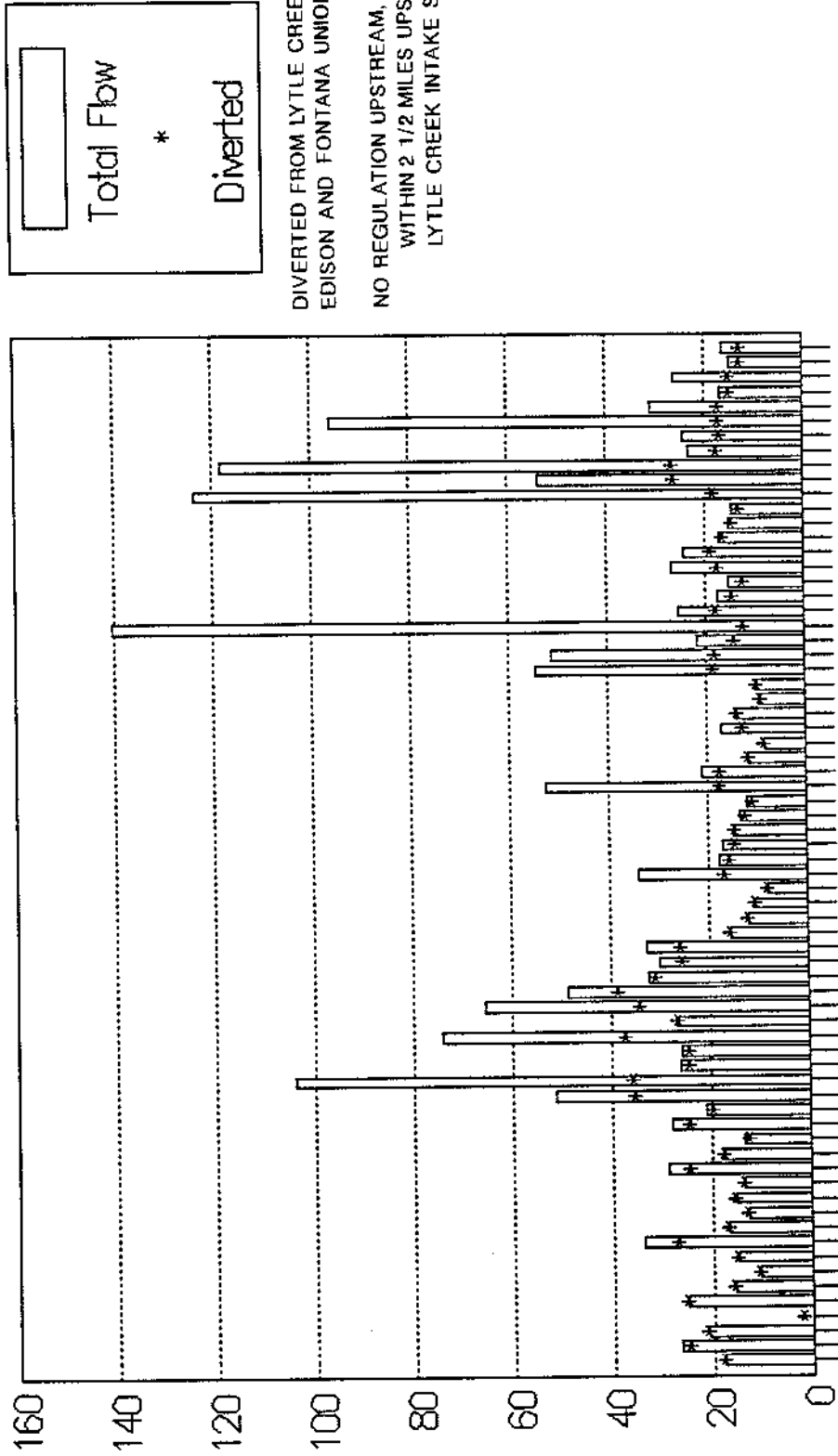


Water Year (Oct - Sep)

(ACRE-FEET)

# LYTLE CREEK NEAR FONTANA

## Discharge (1919 to 1988)



ANNUAL DISCHARGE (ACRE - FEET) (Thousands)

DIVERTED FROM LYTLE CREEK BY SO CAL EDISON AND FONTANA UNION WATER CO.  
 NO REGULATION UPSTREAM, BUT DIVERTED WITHIN 2 1/2 MILES UPSTREAM OF LYTLE CREEK INTAKE STRUCTURE

RAINGAUGES  
IN OR NEAR LYTLE-CAJON CREEKS

Precipitation Stations in Lytle Creek Basin<sup>1</sup>

Recording Rain Gages	Source <sup>2</sup>	Elev. ft.	Period of Record	ID
Cajon West Summit	HPD	4779	1945-pr	8-0-386
Lytle Creek Ranger Station	HPD	2730	1927-pr	8-0-158
Lytle Creek Foothill Blvd.	HPD, LATS	1160	1948-pr	8-0-376
Devore Fire Station	LATS	2080		
Lytle Creek Ranger Sth.	HPD	2730	1922-pr	8-0-158

Non-recording Rain Gages

Fontana 5N	CD	2023	1954-84	
Devore	SBCFCD	2435	1927-pr	
Cajon Junction	SBCFCD	3118	1944-pr	8-0-367
Panorama Point	SBCFCD	3775	1935-pr	8-0-160
Lake Arrowhead	CD	5203	1940-pr	8-0-266

Precipitation Stations near Lytle Creek Basin

Recording Rain Gages

Wrightwood	SBCFCD	6038	1957-pr	
Crestline FS2	HPD	4900	1971-pr	
San Bern Cty Fld Cont Dist Ofc	LATS	1040		8-0-327
Demens Creek Debris Basin	LATS	1900		
Mount Baldy Forest Serv. Station	LATS	4300		8-0-29
Running Springs	HPD	5965		8-0-213

Non-recording raingages

Del Rosa Ranger Station	SBCFCD	1580	1954-pr	8-0-186B
Day Canyon	SBCFCD	2576	1946-pr	8-0-371
San Bernardino County Hospital	CD	1125	1870-pr	8-0-24A

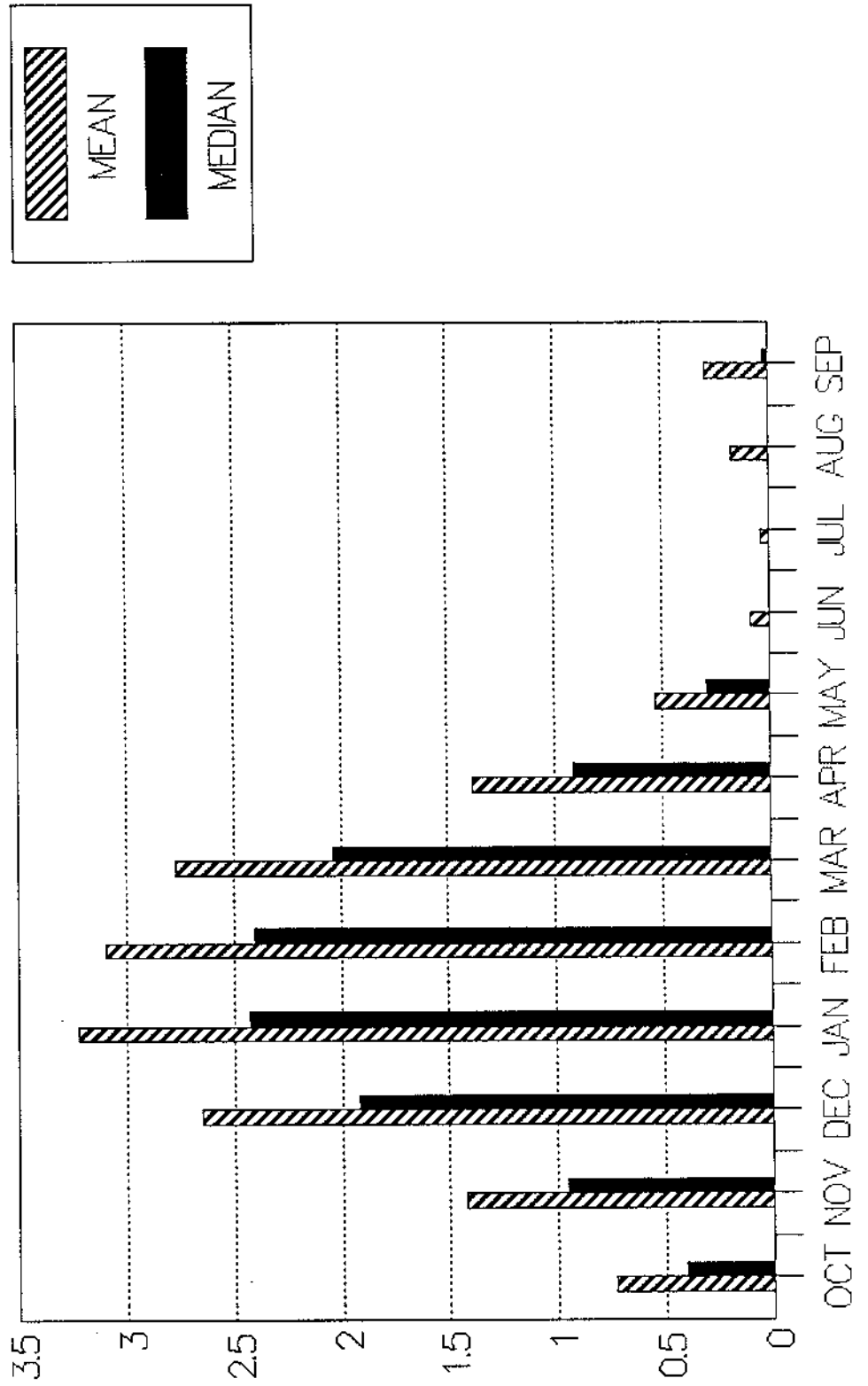
1 LOCATIONS SHOWN ON PLATE 7

2 LEGEND: CD  
HPD  
LATS  
SBCFCD



# SAN BERNARDINO

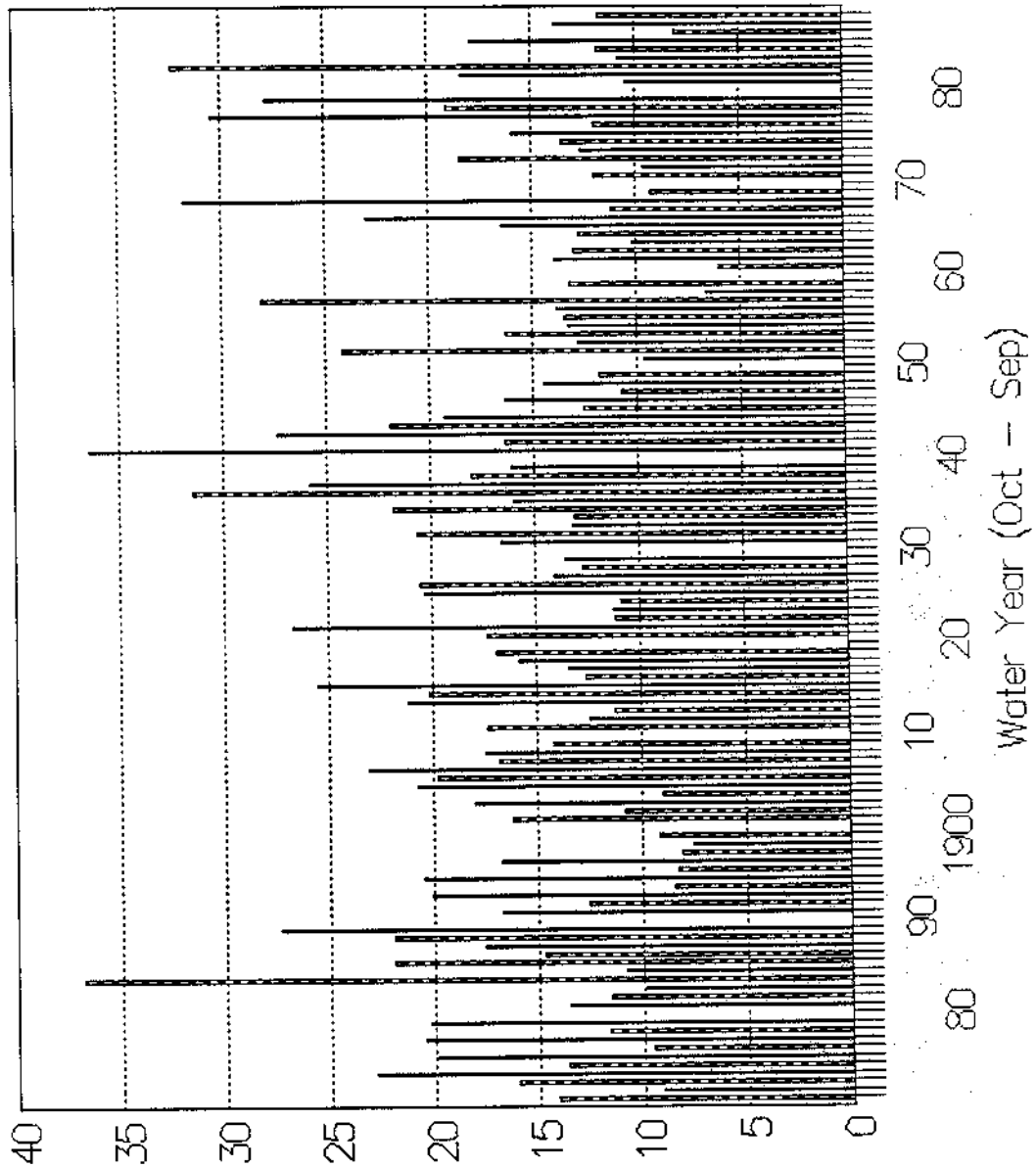
## Monthly Precipitation (1870-1989)





# SAN BERNARDINO

## Water Year Precipitation

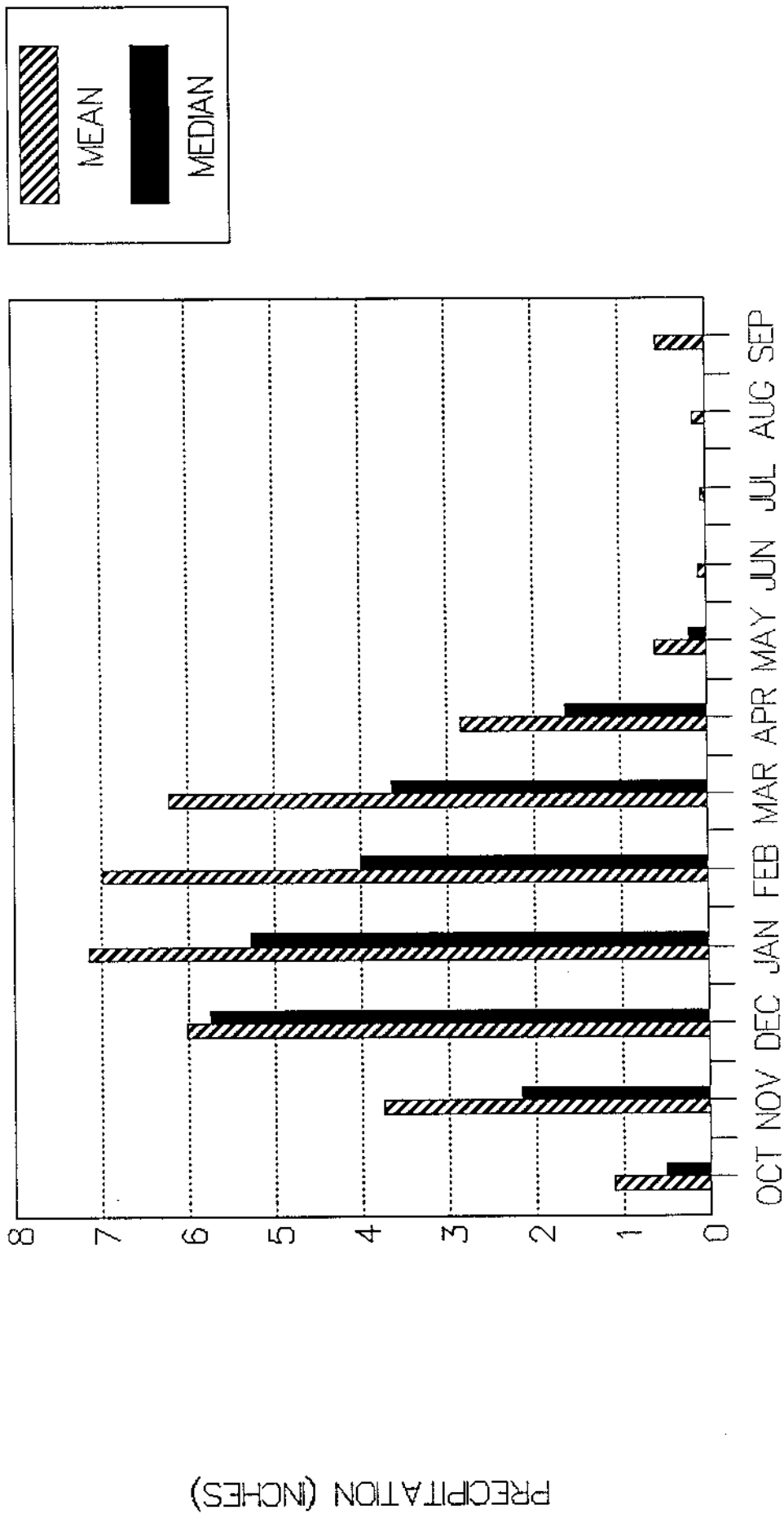


PRECIPITATION (INCHES)



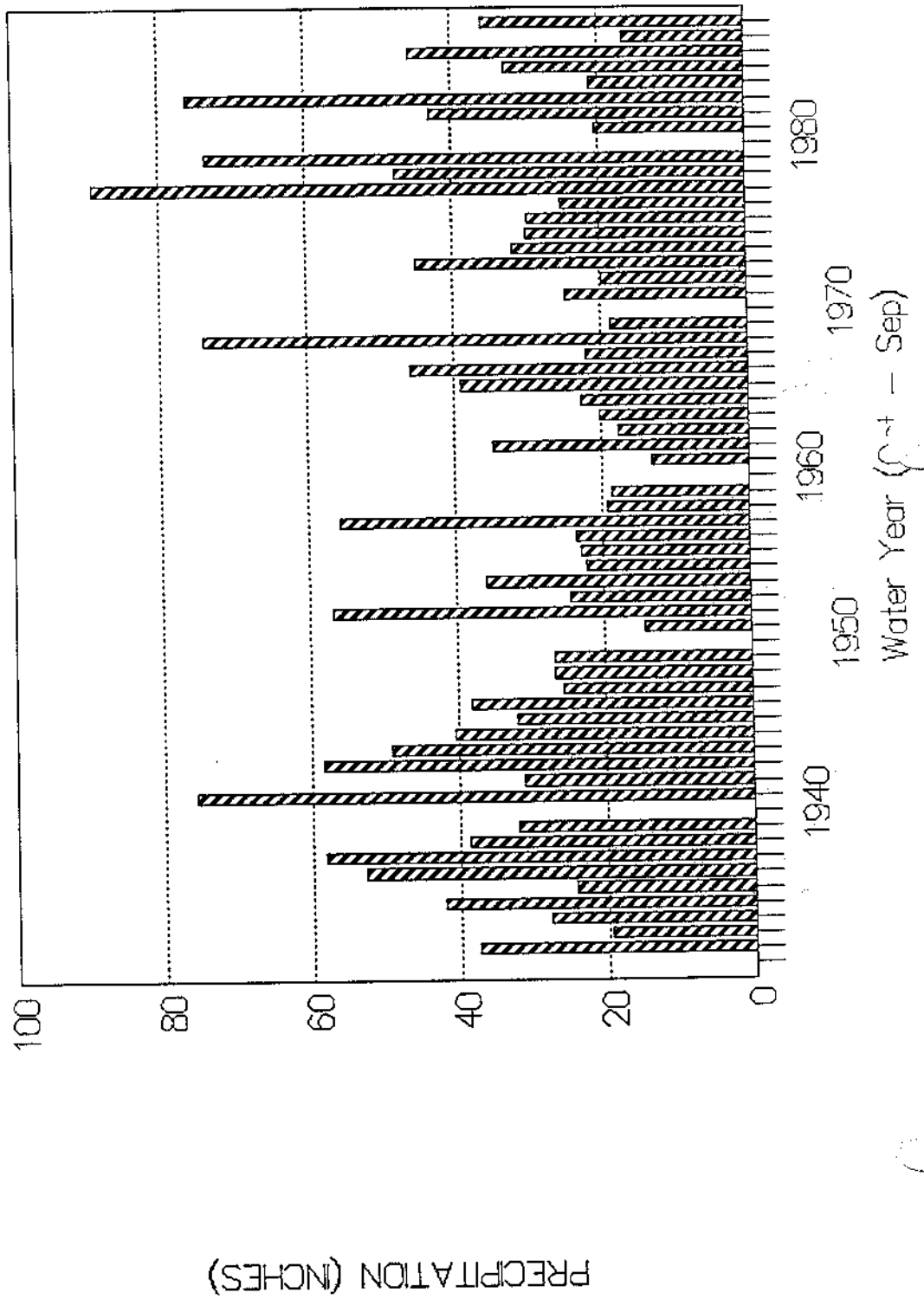
# LYTLE CREEK RANGER STATION

## Monthly Precipitation (1930-1989)



# LYTLE CREEK RANGER STATION

## Water Year Precipitation



## Standard Project Flood Determination

The SPF for Lytle Creek was developed and presented in the 1964 Corps of Engineers Review Report for Flood Control, Lytle and Warm Creeks, San Bernardino County, California, October 30, 1964. (Plate 1, Ref. 16)

A standard project flood is an estimated or hypothetical flood that might be expected from the most severe combination of meteorological and hydrological conditions that are considered reasonably characteristic of the geographical region involved, excluding extraordinarily rare combinations. The magnitude of such a flood constitutes a reasonable appraisal of the flood-producing potentialities of the stream, and is considered a reasonable upper limit in determining the size of the flood for which flood-control improvements might be designed.

Estimates of the magnitude of the standard project floods in the areas considered in that report are based on calculations of runoff that would result if a storm having the characteristics of the storm of January 21-24, 1943, which centered in the Los Angeles area, were to center over the considered drainage areas. The estimates are also based on the assumption that future developments in the drainage areas would render much of the foothill and valley areas impervious to percolation and that the Lytle Creek channel would be paved at some future time from the mouths of Lytle Creek and Cajon Creek Canyons to the Foothill Boulevard inlet structure.

Floods of record. - Little information is available on the magnitude of floods before 1884. The largest flood of record during the period 1884 to 1962 occurred on February 23, 1891, at which time the peak discharge in the East Branch of Lytle Creek at the foot of "F" Street (present Colton Avenue crossing) in San Bernardino was estimated to be 30,000 cubic feet per second. No information is available regarding the flow along the West Branch of Lytle Creek at that time. However, assuming the same percent of total flow in the East and West Branches of Lytle Creek in 1891 as occurred in 1938, the peak discharge during the 1891 flood for Lytle Creek at Foothill Boulevard is estimated at 41,200 cubic feet per second. Large floods also occurred on March 2, 1938, and January 23, 1943, when estimated flows of 30,000 and 14,000 cubic feet per second, respectively, occurred on Lytle Creek at Foothill Boulevard. Other medium to large floods occurred in 1884, 1886, 1889, 1894, 1903, 1910, 1914, 1916, 1921, 1922, 1927, and 1958. After the 1964 SPF study was completed, other medium to large floods occurred in 1966, 1967, 1969, 1978, 1980 and 1983.

Floods along the Santa Ana River have generally occurred at the same time as floods along Lytle Creek. Estimates of discharges of the Santa Ana River at Riverside Narrows, near Riverside, Calif., indicate that the 1891 and 1938 floods were about the same magnitude - about 100,000 cubic feet per second.

Flood Characteristics - The rate of infiltration of rainfall in the mountainous parts of the drainage area is low, and the rate of runoff from the steep slopes is high. During periods of intense rainfall, runoff quickly concentrates in the canyons and discharges upon the alluvial cones. Heavy

loads of debris and silt are carried by the streams during large floods. Floodwaters emerging from Lytle Creek and Cajon Creek Canyons and the Devil Creek diversion, which empties into Cajon Creek at its confluence with Lytle Creek are effectively confined above Foothill Boulevard between the levees of the existing project.

Flood Frequencies - A study was made of the runoff records in and near the Lytle Creek basin during the 79-year period, 1884-1962, and the peak flows of all major floods were determined for Lytle Creek at Foothill Boulevard and for the Santa Ana River at Riverside Narrows. Lytle Creek flows were adjusted to reflect the 1958 diversion of Devil and Badger Creek (a small creek to the east of Devil Creek) to Lytle Creek. The Santa Ana River flow data for Riverside Narrows were adjusted to reflect average future conditions at a point downstream from Warm Creek.

Estimates Of Peak Discharge - Peak-discharge data used to develop the discharge-frequency curves for Lytle Creek at Foothill Boulevard and for the Santa Ana River at Riverside Narrows for the 79-year period 1884-1962 are given in the following table:

Estimated and recorded peak discharges for Lytle Creek at Foothill Blvd.  
1884-1962 - Santa Ana River basin, Calif.

Floods in order of decreasing magnitude		Estimated discharge	Adjusted discharge*	Source of information
No.	Date	of record		
		Cubic feet per second	Cubic feet per second	
1.....	Feb. 23, 1891	41,200	42,400	USGS - WSP-447***.
2.....	Mar. 2, 1938	30,000	31,300	(**).
3.....	Mar. 6, 1884	20,000	21,200	(***).
4.....	Jan. 27, 1916	15,500	17,100	USGS - WSP-426.
5.....	Jan. 18, 1916	16,000	16,400	Do.
6.....	Feb. 21, 1914	16,000	16,100	USGS - WSP-447.
7.....	Feb. 17, 1884	14,000	14,600	USGS - WSP-981.
8.....	Jan. 23, 1943	14,000	14,400	USGS - WSP-1315B.
9.....	Mar. 15, 1889	11,000	11,500	(***).
10.....	Dec. 25, 1889	10,000	10,600	(***).
11.....	Jan. 1, 1910	9,500	9,900	(***).
12.....	Jan. 19, 1886	9,000	9,500	(***).
13.....	Feb. 9, 1922	8,000	8,100	(***).
14.....	Apr. 1, 1903	7,000	7,500	(***).
15.....	Dec. 20, 1921	6,000	6,300	(***).
16.....	Dec. 19, 1894	6,000	6,300	(***).
17.....	Jan. 18, 1914	4,900	5,000	(***).
18.....	Feb. 16, 1927	3,500	3,800	(***).
19.....	Feb. 22, 1944	3,700	3,700	(***).
20.....	Jan. 26, 1890	3,500	3,700	(***).
21.....	Jan. 8, 1940	3,600	3,600	(***).
22.....	Mar. 4, 1943	3,400	3,400	(***).
23.....	Mar. 4, 1941	2,800	3,200	(***).
24.....	Mar. 22, 1893	3,000	3,100	(***).

\* All discharges were adjusted to include the inflow from Devil and Badger Creeks, which were diverted into Lytle Creek in 1958.

\*\* Computed by U.S. Army Engineer District, Los Angeles.

\*\*\* Estimated from discharges of tributaries and nearby streams.

The tables on pages B-24 - B-27 are extracted from the 1964 reference previously cited. Precipitation and runoff data were gathered from stations as shown on Plate 7 and identified in tables 2 & 3. Table 1 shows a summary of climatological data for San Bernardino (1870-1961); Table 2 gives identification of precipitation stations to determine the SPF; Table 3 gives information on stream gauges located within the Lytle-Cajon drainage area.

Determination Of The Standard Project Flood - The standard project flood was determined at each of the selected concentration points by the following procedure: (a) Determination of unit-time increments of precipitation for each subarea, (b) determination of effective precipitation by subtraction of loss rate, (c) determination of subarea surface-runoff hydrograph by application of subarea synthetic unit-hydrograph values to the unit-period effective precipitation, (d) determination of subarea total runoff hydrograph by addition of base flow and subtraction of channel-percolation losses, and (e) determination of total flood hydrograph for the concentration points by channel routing and combining subarea hydrographs as required.

Discharge-frequency curves for Lytle Creek at Foothill Boulevard and Santa Ana River downstream from Warm Creek were developed. (see plate B-1) The estimated frequencies of uncontrolled floods of various magnitudes for the two points are given in the following table:

Estimated flood frequencies - Lytle Creek at Foothill Blvd. and the Santa Ana River at Warm Creek, Santa Ana River basin, Calif.

NOTE: LYTLE CREEK AT FOOTHILL REPRESENTS INFLOW TO LYTLE CREEK INTAKE STRUCTURE

Number of times that flood would be equaled or exceeded in 100 years	Uncontrolled peak discharges	
	Lytle Creek at Foothill Blvd.	Santa Ana River downstream from Warm Creek
	<u>Cubic feet per second</u>	<u>Cubic feet per second</u>
0.30.....	*88,000	*227,000
0.36.....	80,000	218,000
0.64.....	60,000	178,000
0.97.....	48,000	150,000
1.2.....	42,000	136,000
1.8.....	33,000	110,000
2.6.....		90,000
4.0.....		65,000
5.5.....		50,000
7.5.....		38,000

\* Standard project flood.

PERIOD OF RECORD: 1884-1962

NOTE: THE FOLLOWING SPF WAS DEVELOPED IN 1964.

The peak discharges of the standard project flood at pertinent points on Lytle and Warm Creeks and on the Santa Ana River are given in the following table:

Estimated peak discharges of the standard project flood on Lytle and Warm Creeks and on the Santa Ana River, Santa Ana River basin, Calif.

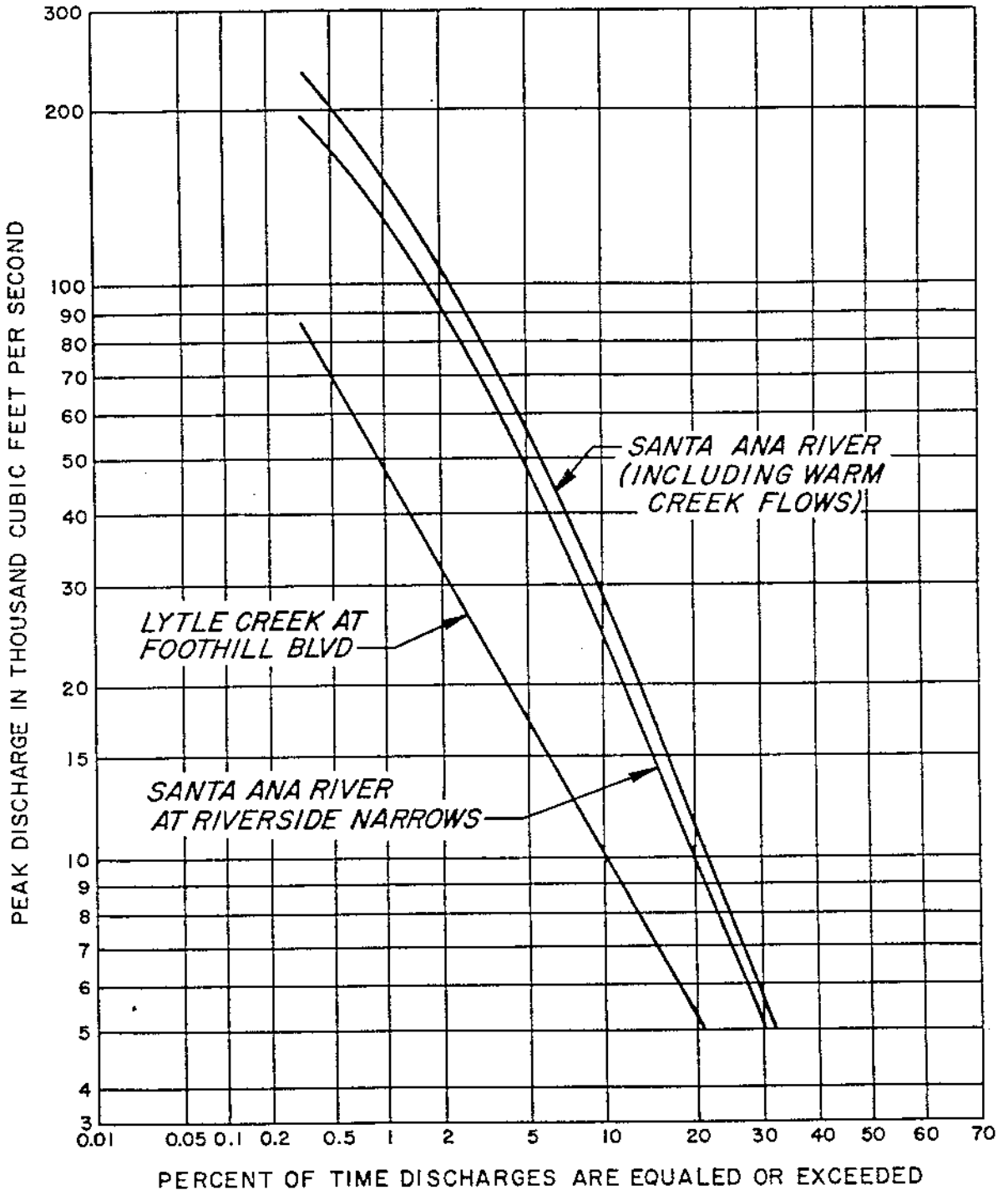
Location	Peak discharges*
	Cubic feet per second
Lytle Creek:	
At Foothill Blvd.....	88,000
East Branch of Lytle Creek at Warm Creek.....	58,000
West Branch of Lytle Creek at Warm Creek.....	30,500
Warm Creek:	
Upstream from East Branch of Lytle Creek.....	**9,000
Downstream from East Branch of Lytle Creek.....	60,000
Downstream from West Branch of Lytle Creek.....	90,000
Santa Ana River:	
Upstream from Warm Creek.....	156,000
Downstream from Warm Creek.....	227,000

\* Peak discharges are based on the assumption that much of the foothill and valley areas will be impervious to percolation due to future urban and commercial developments and that Lytle Creek would be a paved channel from the mouths of Lytle and Cajon Creek Canyons to the Foothill Blvd. inlet structure.

\*\* Based on local storm of March 3-4, 1943.

Discharges for locations on the Santa Ana River downstream and upstream of Warm Creek were recomputed for subareas contributing downstream of Lytle Creek Intake Structure to account for increased impervious area than previously calculated. The 1969 COE General Design Memorandum No. 1 for Lytle and Warm Creeks San Bernardino County, California computed design values of 234,000 and 167,000 cubic feet per second respectively for these locations. Subsequent hydrologic studies performed in support of the Santa Ana River Project produced revised SPF and discharge frequency estimates on the mainstream Santa Ana River from those shown above and in Plate B-1.





PERIOD OF RECORD: 1884-1962

SANTA ANA RIVER BASIN, CALIFORNIA  
 LYTLE AND WARM CREEKS  
 AND SANTA ANA RIVER

**DISCHARGE-FREQUENCY  
 CURVES**

U.S. ARMY ENGINEER DISTRICT  
 LOS ANGELES, CORPS OF ENGINEERS  
 DESIGN MEMO. NO. 1 DATED: MAY, 1969

SOURCE: PLATE 1.REF.17

Table 1

Summary of climatological data at San Bernardino (station No. 8-0-24A)\*, Lytle and Warm Creeks, Santa Ana River basin, Calif.

Month	Temperature (period of record 1891-1961)**			Precipitation (period of record 1870-1961)***		
	Mean monthly	Record highest	Record lowest	Mean monthly	Maximum monthly	Minimum monthly
	Degrees Fahrenheit	Degrees Fahrenheit	Degrees Fahrenheit	Inches	Inches	Inches
Jan.....	47.0	92	17	3.26	15.51	0
Feb.....	58.0	93	21	3.21	12.20	0
Mar.....	56.2	97	26	2.73	10.10	0
Apr.....	60.3	103	27	1.41	9.35	0
May.....	64.5	109	33	.58	3.34	0
June.....	70.5	116	37	.09	1.02	0
July.....	76.9	116	42	.03	.42	0
Aug.....	76.8	116	42	.20	2.16	0
Sept.....	72.9	115	36	.21	2.37	0
Oct.....	65.4	107	29	.73	4.63	0
Nov.....	58.1	99	24	1.29	7.50	0
Dec.....	52.9	93	17	2.71	10.85	0

\* See pl. 1 for location of station, which is numbered in accordance with quadrangle-index system of the U.S. Army Engineer District, Los Angeles, Corps of Engineers.

\*\* Mean-annual temperature for period of record is 63.3 degrees Fahrenheit.

\*\*\* Mean-annual precipitation for period of record is 16.41 inches.

NOTE.--Above data from U.S. Weather Bureau climatological data.

STATIONS SHOWN ON PLATE 7

Table 2

## Precipitation stations in and near drainage areas of Lytle and Warm Creeks, Santa Ana River basin, Calif.

No.*	Station**	Elevation	Geographic coordinates		Period of record		Complete years of record	73-year mean seasonal precipitation***	Authority†
			Latitude	Longitude	Recording gage	Non-recording gage			
		Feet	Degrees and minutes	Degrees and minutes			Inches		
8-0-11A...	Glenn Ranch.....	3,250	34-15	117-31	(#)	1879-1948	21	31.2	USWB.
8-0-11B...	Glenn Ranch.....	3,250	34-15	117-29	1942-63	(#)	22	(###)	Do.
8-0-12A...	Squirrel Inn No. 1.....	5,239	34-14	117-15	(#)	1919-63	44	42.7	SBCFCD.
8-0-12B...	Squirrel Inn No. 2.....	5,680	34-14	117-14	(#)	1931-63	32	40.6	Do.
8-0-15...	Lytle Creek Powerhouse.....	2,250	34-12	117-27	(#)	1906-63	57	34.2	USWB.
8-0-24A...	San Bernardino County Hospital.....	1,125	34-08	117-16	(#)	1870-1963	93	16.9	Do.
8-0-24B...	Perris Hill.....	1,280	34-08	117-16	(#)	1935-63	28	16.9	SBCFCD.
8-0-25...	Santa Ana River PH No. 1.....	2,765	34-09	117-03	(#)	1904-63	59	26.8	USWB.
8-0-26...	Mill Creek No. 2.....	2,940	34-05	117-02	(#)	1903-63	60	22.8	Do.
8-0-27...	Redlands.....	1,318	34-03	117-11	(#)	1888-1963	75	14.8	Do.
8-0-29...	Camp Baldy.....	4,275	34-14	117-40	1927-63	1920-63	43	32.5	Do.
8-0-30...	Arrowhead Springs.....	2,000	34-11	117-16	(#)	1909-25	16	23.0	Do.
8-0-32...	Atopa Ranch-Reche Canyon.....	1,750	34-00	117-15	(#)	1920-63	43	14.6	DWR.
8-0-77...	Kelly's Camp.....	8,300	34-14	117-36	(#)	1930-43	13	47.6	LACFCD.
8-0-98...	Bennett Ranch.....	1,850	34-10	117-27	(#)	1918-53	35	25.7	DWR.
8-0-99...	Lytle Creek Intake.....	2,360	34-12	117-27	(#)	1926-63	37	40.3	Do.
8-0-100...	Devore Ranch.....	2,500	34-14	117-25	(#)	1919-63	44	32.6	USWB.
8-0-101...	Devil Canyon Gate.....	1,880	34-12	117-20	1912-63	1912-63	41	23.4	SBCFCD.
8-0-103...	Devil Canyon Panorama.....	3,758	34-14	117-19	1929-38	1929-38	9	29.4	DWR.
8-0-104...	Lake Arrowhead.....	5,150	34-15	117-12	(#)	1891-1940	49	35.8	LA Corp.
8-0-105...	Running Springs.....	6,050	34-12	117-06	(#)	1934-63	29	40.3	DWR.
8-0-106...	Lytle Creek PH No. 2.....	1,590	34-09	117-24	(#)	1926-43	16	19.2	Do.
8-0-107...	Lytle Creek Baseline.....	1,225	34-07	117-21	(#)	1926-63	37	17.7	Do.
8-0-108...	San Bernardino-Hanford.....	1,048	34-06	117-17	(#)	1929-63	34	14.6	USWB.
8-0-109...	Colton City Hall.....	975	34-04	117-19	(#)	1923-63	40	15.2	DWR.
8-0-110...	Highland - Corwin.....	1,340	34-08	117-13	(#)	1908-63	55	18.0	Do.
8-0-111...	Highland - Erving.....	1,450	34-08	117-12	(#)	1924-45	20	18.1	Do.
8-0-112...	E. Highland - Orange.....	1,520	34-07	117-10	(#)	1947-63	16	19.1	Do.
8-0-113...	Santa Ana River PH No. 3.....	1,970	34-06	117-06	1939-63	1904-63	59	20.6	USWB.
8-0-114...	Redlands - Crafton Heights.....	2,120	34-03	117-06	(#)	1930-63	33	16.3	DWR.
8-0-115...	Mentone - Crafton Orange Growers.....	1,650	34-04	117-08	(#)	1929-63	34	16.4	Do.
8-0-124...	Crown Jewel - Redlands.....	1,225	34-05	117-13	(#)	1929-45	15	13.8	Do.
8-0-135A...	Yucaipa - Arnett.....	2,850	34-02	117-02	(#)	1924-45	20	18.8	Do.
8-0-135B...	Yucaipa - SBCFCD.....	2,705	34-01	117-04	1943-63	1943-63	20	(###)	SBCFCD.
8-0-137...	Redlands - Anderson.....	1,460	34-03	117-10	(#)	1930-63	33	14.4	Do.
8-0-147...	Colton - SCE Substation.....	940	34-03	117-19	(#)	1929-63	34	13.3	Do.
8-0-154...	Colton - SPRR.....	975	34-04	117-19	(#)	1877-1963	86	15.1	Do.
8-0-158...	Lytle Creek Ranger Sta.....	2,760	34-14	117-29	(#)	1930-63	33	37.8	USWB.
8-0-159...	Lytle Creek R/W Co.....	2,360	34-12	117-27	(#)	1925-63	38	32.8	Do.
8-0-160...	Panorama Maintenance.....	4,000	34-14	117-18	(#)	1935-45	7	29.8	DWR.
8-0-162...	Rialto - Adams.....	1,175	34-05	117-23	(#)	1940-63	23	16.7	Do.
8-0-164...	East Highland - Gold Buckle Assn.....	1,400	34-07	117-10	(#)	1930-63	33	17.2	Do.
8-0-165B...	Redlands Junction.....	1,255	34-02	117-13	1935-63	1935-63	28	(###)	SBCFCD.
8-0-166A...	Craftonville - SPRR.....	1,759	34-04	117-08	(#)	1892-1918	26	15.2	USWB.
8-0-166B...	Crafton - SBCFCD.....	2,120	34-03	117-06	1927-63	1927-63	36	(###)	SBCFCD.
8-0-167...	Cajon Ranger Sta.....	2,900	34-19	117-29	(#)	1921-34	9	23.9	Do.
8-0-174...	Mill Creek Ranger Sta.....	2,750	34-06	117-02	(#)	1926-51	6	22.8	Do.
8-0-181R...	Devil Canyon.....	2,780	34-14	117-20	1937-44	1927-63	36	29.5	Do.
8-0-186B...	Del Rosa Ranger Sta.....	1,580	34-10	117-15	1943-63	1934-63	29	(###)	Do.
8-0-198...	Burton's Ranch.....	4,400	34-17	117-24	(#)	1904-15	11	42.3	LA Corp.
8-0-200...	Grass Valley.....	5,190	34-15	117-13	(#)	1893-1915	14	37.5	Do.
8-0-201...	Cajon Pass Summit No. 2.....	3,820	34-20	117-25	(#)	1904-15	9	17.2	USWB.
8-0-204...	Deep Creek.....	5,200	34-14	117-07	(#)	1893-1915	18	31.6	LA Corp.
8-0-205...	Mores.....	5,250	34-14	117-15	(#)	1892-1915	23	53.9	DWR.
8-0-209A...	Crestline.....	4,865	34-15	117-18	1940-53	1939-53	13	38.3	USWB.
8-0-210...	Devil Canyon USFS.....	2,781	34-12	117-18	1927-44	1927-44	9	31.1	Do.
8-0-213...	Running Springs 1 E.....	5,965	34-12	117-05	1939-63	1939-63	24	36.3	Do.
8-0-227...	Bloomington.....	1,100	34-04	117-24	(#)	1952-63	11	(###)	SBCFCD.
8-0-235...	Cajon Creek Muscoy Ranch.....	1,500	34-10	117-22	(#)	1928-38	7	22.7	DWR.
8-0-253...	Redlands - Erving.....	1,750	34-09	117-13	(#)	1924-45	21	18.1	Do.
8-0-261...	Muscoy.....	1,267	34-08	117-20	(#)	1940-63	23	17.2	Do.
8-0-262...	Etiwanda - Moore.....	1,620	34-09	117-27	(#)	1948-63	15	19.2	Do.
8-0-266...	Lake Arrowhead.....	5,205	34-15	117-11	(#)	1940-63	23	43.7	USWB.
8-0-276...	Fleming's Mill.....	5,010	34-15	117-12	(#)	1893-1900	7	42.6	DWR.
8-0-278...	Talwadge.....	5,750	34-15	117-14	(#)	1893-1900	6	48.2	Do.

See footnotes at end of table.

STATIONS SHOWN ON PLATE 7

Table 2--Continued

## Precipitation stations in and near drainage areas of Lytle and Warm Creeks, Santa Ana River basin, Calif.

No.*	Station**	Elevation	Geographic coordinates		Period of record		Complete years of record	73-year mean seasonal precipitation***	Authority#
			Latitude	Longitude	Recording gage	Non-recording gage			
		Feet	Degrees and minutes	Degrees and minutes			Inches		
8-0-327...	San Bernardino County Garage.	1,040	34-07	117-12	1941-63	1941-63	22	(###)	SBCFCD.
8-0-355...	Strawberry Peak Lookout...	6,150	34-14	117-14	(##)	1953-63	10	(###)	CE.
8-0-367...	Cajon Junction.....	3,120	34-19	117-28	1943-63	1943-63	20	(###)	SBCFCD.
8-0-371...	Day Canyon.....	2,576	34-11	117-32	(##)	1947-63	16	(###)	Do.
8-0-376...	Lytle Creek - Foothill Blvd.	1,160	34-06	117-20	(##)	1947-63	16	(###)	USWB.
8-0-385...	Crestline-Lake Gregory....	4,425	34-14	117-16	1953-63	1953-63	10	(###)	Do.
8-0-386...	Cajon West Summit.....	4,780	34-23	117-34	1939-63	1939-63	24	(###)	Do.
8-0-387...	Etiwanda.....	1,390	34-08	117-31	1948-63	1948-63	15	(###)	Do.
8-0-388...	Blue Jay.....	5,400	34-13	117-14	(##)	1958-63	5	(###)	SBCFCD.
8-P-123...	El Casco Sta. - SFRR.....	1,874	33-59	117-07	(##)	1899-1918	19	(###)	USWB.
8-P-205...	Moreno Mutual Water Co. - Singleton.	2,295	33-58	117-02	(##)	1928-45	16	16.0	DWR.
8-P-206...	Moreno Mutual Water Co. - Hendricks.	1,550	33-55	117-10	(##)	1927-45	14	11.0	SCS.
8-P-292...	San Timoteo.....	1,603	33-58	117-07	(##)	1953-63	10	(###)	SBCFCD.
9-0-3.....	Holcomb.....	7,240	34-18	116-55	(##)	1909-18	9	17.8	DWR.
9-0-4.....	Big Bear Lake - Preston....	6,800	34-14	116-55	(##)	1931-42	11	24.4	Do.
9-0-6.....	Seven Oaks.....	5,057	34-11	116-57	(##)	1909-55	41	27.1	USWB.
9-0-8.....	Big Bear Lake - Rideout....	6,800	34-14	116-57	(##)	1928-43	12	32.0	DWR.
9-0-11.....	Forest Home - Edison Intake.	5,100	34-05	116-56	(##)	1930-45	14	35.2	Do.
9-0-11B...	Mill Creek Intake.....	4,945	34-05	116-56	1948-63	1948-63	15	35.2	USWB.
9-0-12.....	Raywood Flat.....	6,620	34-03	116-49	(##)	1931-63	32	36.3	Do.
9-0-13.....	Big Bear Lake Dam.....	6,815	34-14	116-58	1940-63	1892-1963	71	37.2	Do.
9-0-14.....	Camp Angelus.....	5,770	34-09	116-59	1939-63	1939-63	24	29.8	Do.
9-0-15.....	Converse Nursery.....	6,000	34-12	116-54	(##)	1912-17	5	27.6	Do.
9-0-17.....	Upper Mill Creek.....	5,600	34-05	116-55	1939-57	1939-57	18	38.7	Do.
9-0-25.....	Santa Ana River - Filarea Reservoir.	4,230	34-10	116-57	(##)	1895-1902	7	30.8	DWR.
9-0-26A...	Oak Glen.....	4,900	34-01	116-56	(##)	1900-09	9	30.8	USDA.
9-0-26B...	Oak Glen.....	4,700	34-03	116-57	1934-63	1934-63	29	(###)	SBCFCD.
9-0-37.....	Big Bear Lake F.D.....	6,745	34-15	116-55	(##)	1940-63	23	(###)	USWB.
9-0-38.....	Big Bear Lake City.....	6,800	34-16	116-50	(##)	1942-63	21	(###)	SBCFCD.
9-0-40.....	Oak Glen - SB 122.....	4,080	34-03	116-58	(##)	1952-63	11	(###)	Do.
9-0-41.....	Oak Glen - SB 174.....	5,400	34-02	116-55	(##)	1957-63	6	(###)	Do.
9-P-1.....	Beaumont.....	2,613	33-56	116-59	1957-63	1888-1963	75	18.8	USWB.
9-P-8.....	Beaumont Pumping Plant....	3,045	33-59	116-58	1939-41	1911-63	52	22.2	Do.
9-P-71.....	Beaumont I E.....	2,605	33-56	116-58	1939-57	1939-63	24	15.6	Do.

\* Stations numbered in accordance with quadrangle-index system of the U.S. Army Engineer District, Los Angeles, Corps of Engineers.

\*\* See pl. 1 for locations.

\*\*\* Computed to a common 73-year (1870-1943) mean by index-of-witness method.

# CE indicates Corps of Engineers; DWR, Department of Water Resources; LACFCD, Los Angeles County Flood Control District; LA Corp., Lake Arrowhead Corporation; SBCFCD, San Bernardino County Flood Control District; SCS, Soil Conservation Service; USDA, United States Department of Agriculture; and USWB, United States Weather Bureau.

## Not applicable.

### Not computed.

Table 3

Principal stream-gaging stations and pertinent data in and near the drainage areas of Lytle and Warm Creeks,  
Santa Ana River basin, Calif.

No.	Station		Drain- age area	Period of record	Discharge of record		
	Stream	Location*			Average	Peak	
					Amount	Date	
			Square miles		Cubic feet per second	Cubic feet per second	
1....	Santa Ana River.....	At "E" Street bridge near San Bernardino.	469	1939-54	12.5	7,600	Jan. 24, 1943
2....	do.....	Near San Bernardino.....	302	1928-37 1954-61	7.7	11,200	Feb. 6, 1937
3....	do.....	Near Mentons.....	202	1896-1961	30.0	52,300	Mar. 2, 1938
4....	San Timoteo Creek....	Near Loma Linda.....	125	1954-61	1.3	1,050	Apr. 1, 1958
5....	do.....	Near Redlands.....	123	1926-61	1.4	7,460	Mar. 2, 1938
6....	Warm Creek.....	Near Colton.....	259	1920-61	43.6	27,500	Do.
7....	City Creek.....	Near Highland.....	19.8	1919-61	8.0	6,900	Do.
8....	Plunge Creek.....	Near East Highlands.....	16.6	1919-61	5.7	5,340	Do.
9....	Mill Creek.....	Near Mentone.....	51.7	1939-61	3.1	1,500	Dec. 23, 1945
10....	do.....	Near Craftonville.....	39.9	1919-38 1947-54	12.5	18,100	Mar. 2, 1938
11....	Little San Gorgonio Creek.	Near Beaumont.....	2.6	1948-61	.1	320	Aug. 23, 1955
12....	Lytle Creek.....	(West Branch) at Colton.	(**)	1928-45	.8	13,000	Jan. 23, 1943
13....	do.....	(East Branch) at San Bernardino.	(**)	1929-57	5.3	21,500	Mar. 2, 1938
14....	do.....	Near Fontana.....	46.9	1918-61 1919-38	10.5	25,200	Do.
15....	Lone Pine Creek.....	Near Keenbrook.....	15.0	1949-61	1.2	6,180	Do.
16....	Cajon Creek.....	Near Keenbrook.....	40.9	1919-61	8.6	14,500	Mar. 2, 1938
17....	Devil Canyon Creek..	Near San Bernardino....	6.2	1911-14 1919-61	1.7	3,320	Do.
18....	East Twin Creek.....	Near Arrowhead Springs.	8.6	1919-61	4.5	3,360	Do.
19....	Waterman Canyon Creek.	do.....	4.6	1911-14 1919-61	2.6	2,350	Do.

\* See pl. 1 for location.

\*\* Indeterminate.

NOTE.--Above data are from records published in the U.S. Geological Survey Water Supply Papers.

STATIONS SHOWN ON PLATE 7

Larger Floods - The Lytle Creek Intake Structure was not designed to detain or attenuate floodwaters. No storage is dedicated for flood control and no reservoir routings were done in the original design. The structure solely diverts flows into the two improved downstream channels, the West and East Branch.

Current standards for dam construction require that a hypothetical probable maximum flood (PMF) be routed through the project to ensure its adequacy against overtopping. This standard was not used for this diversion structure, however, the possible occurrence of larger-than-design floods was accounted for by providing gate settings for the West Branch tainter gate that controls outflow to channel capacity for as long as possible. The wider East Branch Channel has more space (100 ft wide channel compared to 40 ft for the West Branch Channel) in the freeboard allowance of 2 ft to pass larger-than-design flows. The Intake Structure could pass 133 percent of the SPF peak flow before being overtopped.