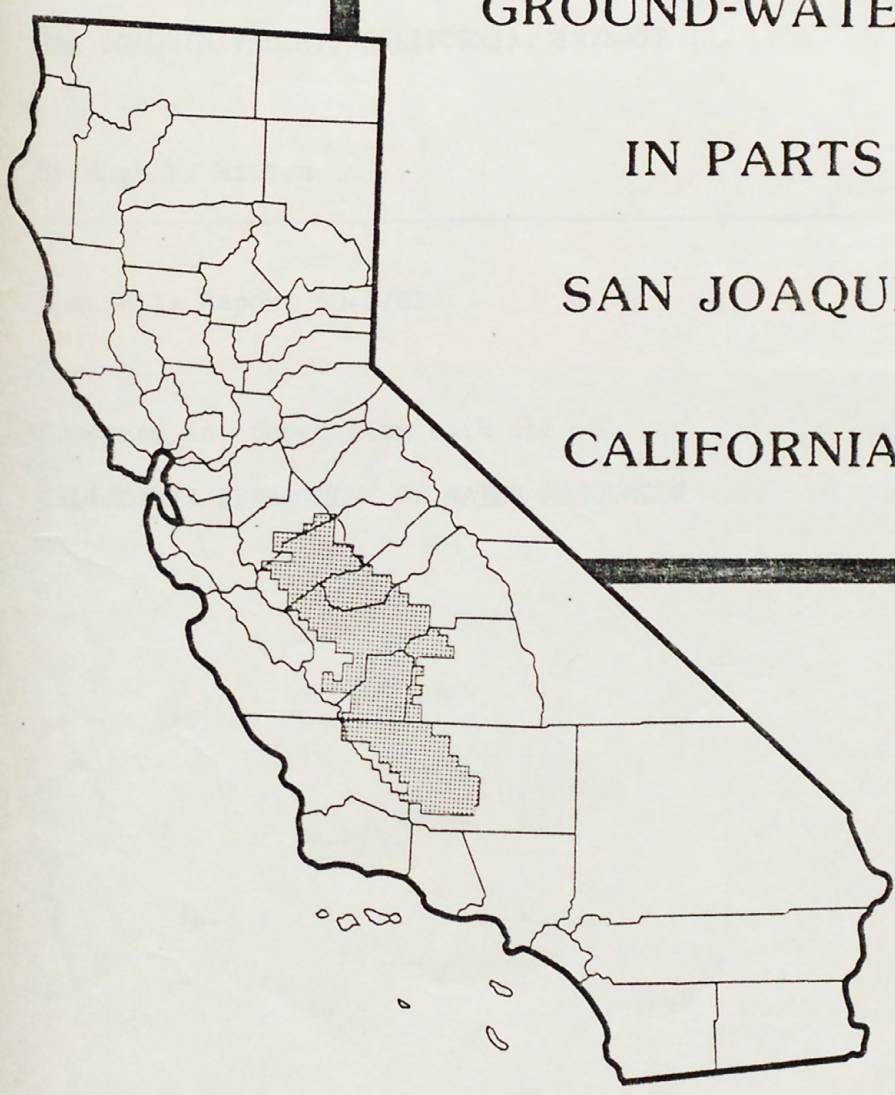


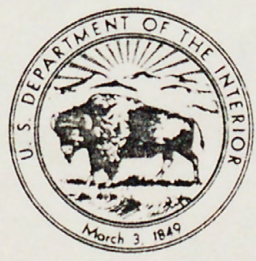
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ESTIMATED AGRICULTURAL
GROUND-WATER PUMPAGE
IN PARTS OF THE
SAN JOAQUIN VALLEY,
CALIFORNIA, 1975-77



U.S. GEOLOGICAL SURVEY
Open-File Report 80-1281



Prepared in cooperation with the
CALIFORNIA DEPARTMENT OF WATER RESOURCES

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UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

✓ U.S. Geological Survey

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Menlo Park, California
December 1980

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UNITED STATES DEPARTMENT OF THE INTERIOR

CECIL D. ANDRUS, Secretary

GEOLOGICAL SURVEY

H. William Menard, Director

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Water Resources Division
U.S. Geological Survey
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Menlo Park, Calif. 94025

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CONVERSION FACTORS

The inch-pound system of units is used in this report. For readers who prefer metric units, the conversion factors for the terms used in this report are listed below:

<u>Multiply</u>	<u>By</u>	<u>To obtain</u>
acre-ft (acre-foot)	1,233	m^3 (cubic meter)
mi (mile)	1.609	km (kilometer)
mi^2 (square mile)	2.590	km^2 (square kilometer)

ESTIMATED AGRICULTURAL GROUND-WATER PUMPAGE IN PARTS
OF THE SAN JOAQUIN VALLEY, CALIFORNIA

1975-77

By Hugh T. Mitten

Quantitative estimates of ground-water pumpage from the principal ground-water basins in California are necessary for future appraisal studies and for systematic planning of water use and conservation. This report was prepared by the U.S. Geological Survey, in cooperation with the California Department of Water Resources.

The area of this report lies within the Pacific Gas and Electric Co. service area and includes parts of Merced, Madera, Fresno, Kings, Tulare, and Kern Counties (fig. 1). It does not include areas to the west in the valley where pumpage was previously reported by Mitten (1978) for a similar period. The pumpage estimates for 1972-74 are not included because data for 1972 and 1973 are not available, and computed results from 1974 data are believed inaccurate. Other publications (Ogilbee and Rose, 1969; Mitten and Ogilbee, 1971; Mitten, 1972; and Mitten, 1976) give pumpage estimates for the area of this report plus the area to the west for the period 1962-71.

Agricultural pumpage is estimated on the basis of electric power used and the average coefficient of power consumption, using principles described by Ogilbee and Mitten (1970). Data used to assemble this report were obtained through the cooperation of the Pacific Gas and Electric Co. All locations refer to the Mount Diablo or San Bernardino base and meridian. Parts of the area are in old Mexican land grants and have never been public land; for those, the rectangular system of subdivision has been projected for reference purposes only.

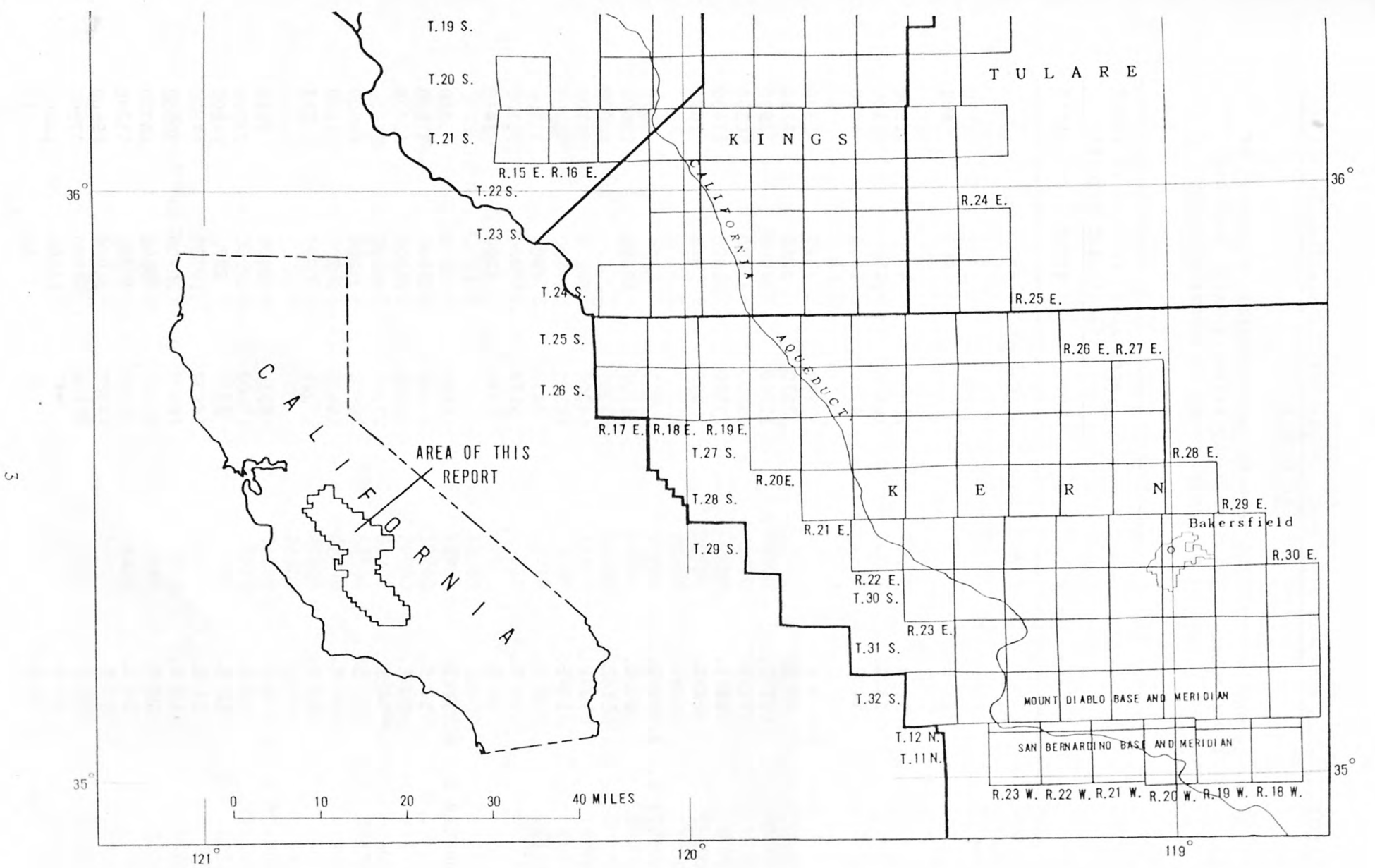
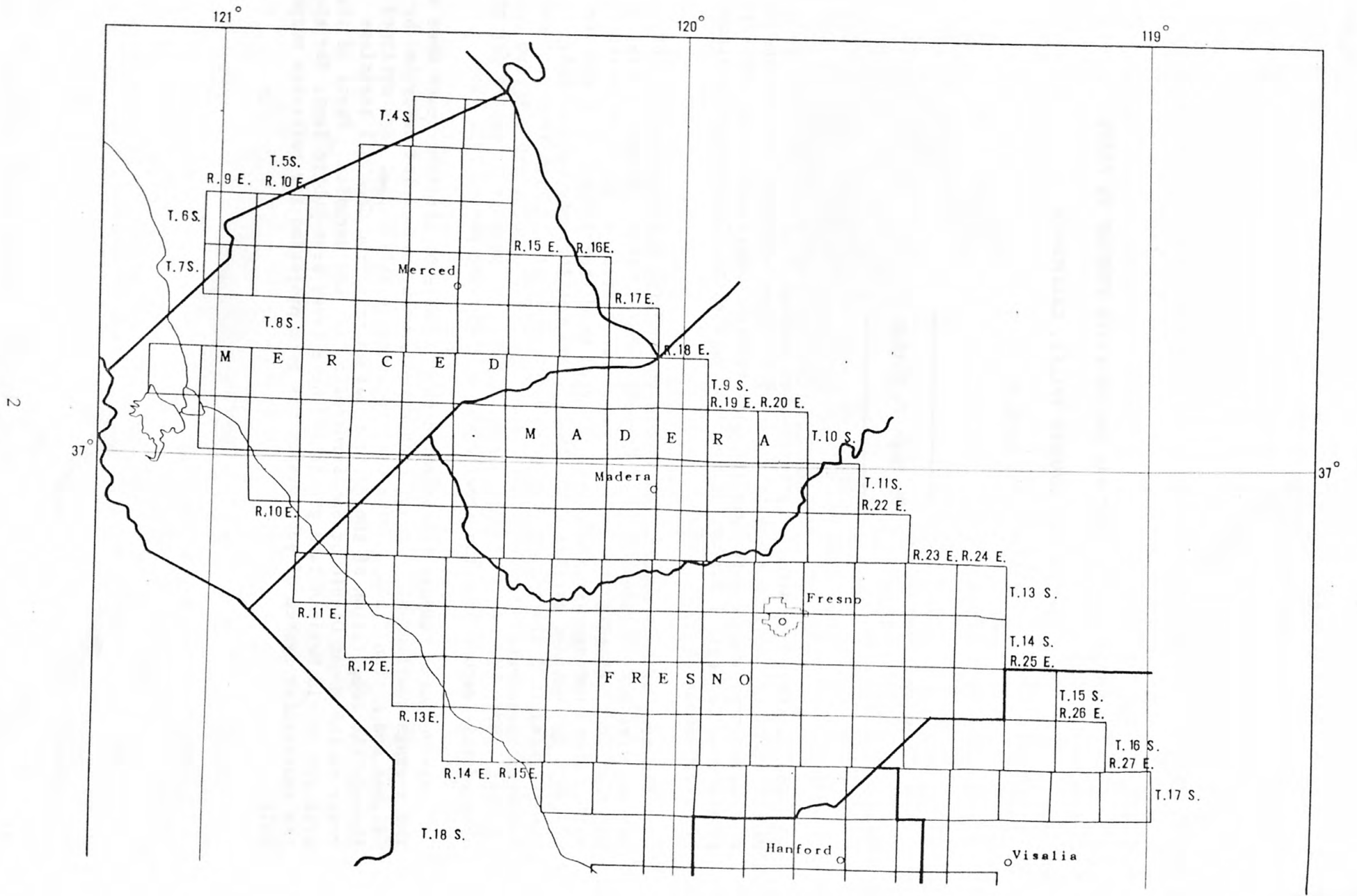


FIGURE 1.—Study area.

TABLE 1.--Pumpages, in acre-feet, in part of the San Joaquin Valley, California

[Pumpage exceeding 92,200 acre-ft (approximately 4 acre-ft of water per acre per year) probably reflects water that has been transported out of the township or incorrect power totals]

Location	Acre-feet, rounded to three significant figures		
	1975	1976	1977
MOUNT DIABLO BASE LINE AND MERIDIAN			
T. 4 S., R. 13 E.	849	1730	1970
14 E.	562	963	692
T. 5 S., R. 12 E.	16000	19500	22500
13 E.	18500	29700	31300
14 E.	4820	5460	4490
T. 6 S., R. 9 E.	889	1290	1300
10 E.	2070	3260	3180
11 E.	12700	24900	23900
12 E.	19700	41500	50200
13 E.	17300	28800	28400
14 E.	475	948	1090
T. 7 S., R. 9 E.	772	2170	3090
10 E.	11700	14100	20600
11 E.	61300	73100	80000
12 E.	44200	68100	78800
13 E.	15500	47800	63900
14 E.	7430	18600	33400
15 E.	9170	11400	20100
16 E.	1030	1290	1410
T. 8 S., R. 11 E.	5890	8370	5340
12 E.	17900	27500	37900
13 E.	18600	25200	38700
14 E.	27200	45100	67500
15 E.	26800	38000	48000
16 E.	16400	20200	21100
17 E.	325	397	254
T. 9 S., R. 8 E.	8310	12400	7240
9 E.	19100	27000	25700
10 E.	8770	8370	14800
11 E.	14900	19200	15600
12 E.	18500	20700	30000
13 E.	32900	49200	56700
14 E.	36700	48300	55200
15 E.	44300	64900	65500
16 E.	25500	34900	42000
17 E.	7040	13100	18000
18 E.	23	41	17

TABLE 1.--Pumpages, in acre-feet, in part of the San Joaquin Valley,
California--Continued

Location	Acre-feet, rounded to three significant figures		
	1975	1976	1977
MOUNT DIABLO BASE LINE AND MERIDIAN			
T. 10 S., R. 9 E.	11300	14500	7900
10 E.	30400	34700	41200
11 E.	14300	17500	19400
12 E.	19200	17600	33500
13 E.	38300	57700	51800
14 E.	59900	91800	105000
15 E.	36800	75400	89600
16 E.	22600	51600	61700
17 E.	12900	20600	24400
18 E.	4920	7800	7190
19 E.	859	874	1100
20 E.	73	0	28
T. 11 S., R. 10 E.	30300	37700	35700
11 E.	1010	1570	1970
12 E.	4890	8400	6170
13 E.	25500	28800	26200
14 E.	60600	76100	79500
15 E.	96200	120000	120000
16 E.	52800	80700	89000
17 E.	15000	35300	39000
18 E.	11800	16900	16600
19 E.	3990	4140	5100
20 E.	2710	3050	2350
21 E.	222	302	225
T. 12 S., R. 11 E.	12200	12400	19400
12 E.	15900	19800	15100
13 E.	12200	13500	10100
14 E.	29000	37600	37300
15 E.	91200	105000	90300
16 E.	68100	80500	79700
17 E.	47200	87200	94900
18 E.	28900	51700	59100
19 E.	24300	31700	35900
20 E.	21800	23000	24900
21 E.	7920	13100	17500
22 E.	3720	4120	3830
T. 13 S., R. 11 E.	3060	3740	711
12 E.	8380	11000	7470
13 E.	4450	3300	1890
14 E.	13600	15200	15700
15 E.	62500	56800	68600

TABLE 1.--Pumpages, in acre-feet, in part of the San Joaquin Valley,
California--Continued

Location	Acre-feet, rounded to three significant figures		
	1975	1976	1977
MOUNT DIABLO BASE LINE AND MERIDIAN			
T. 13 S., R. 16 E.	89500	104000	104000
17 E.	43700	78600	91300
18 E.	14100	37200	46900
19 E.	12200	19100	20300
20 E.	4450	4960	4940
21 E.	12100	17400	17600
22 E.	12600	18200	22900
23 E.	30200	42600	42800
24 E.	4860	4020	5350
T. 14 S., R. 12 E.	2500	2610	129
13 E.	4870	4340	0
14 E.	1440	0	1390
15 E.	2140	2060	1262
16 E.	37900	38800	34700
17 E.	62400	73100	89100
18 E.	49700	76500	97900
19 E.	27000	41800	46700
20 E.	10500	17100	21900
21 E.	28900	40400	46400
22 E.	28700	37400	44200
23 E.	16200	22100	31100
24 E.	10500	7960	13700
T. 15 S., R. 12 E.	127	177	0
13 E.	6240	5930	0
14 E.	4370	6080	0
15 E.	498	281	0
16 E.	3600	1770	6490
17 E.	76800	72400	90700
18 E.	80600	92600	101000
19 E.	71700	85600	94400
20 E.	44800	63500	64700
21 E.	25400	46500	53400
22 E.	23400	43300	50600
23 E.	25100	32900	42300
24 E.	13300	18600	36400
25 E.	13600	9780	17400
T. 16 S., R. 14 E.	9790	3740	0
15 E.	2280	148	0
16 E.	4960	623	9110
17 E.	11700	14100	30600
18 E.	41500	53000	60400
19 E.	69500	76300	79900

TABLE 1.--Pumpages, in acre-feet, in part of the San Joaquin Valley,
California--Continued

Location	Acre-feet, rounded to three significant figures		
	1975	1976	1977
MOUNT DIABLO BASE LINE AND MERIDIAN			
T. 16 S., R. 20 E.	74900	99200	108000
21 E.	76400	92100	104000
22 E.	35300	52400	58700
23 E.	22300	38300	55300
24 E.	29300	43800	72200
25 E.	21600	23800	46800
26 E.	8060	5320	9400
T. 17 S., R. 16 E.	640	0	22
17 E.	4120	0	6270
18 E.	14000	19200	25800
19 E.	27500	40300	53700
20 E.	25300	44500	48900
21 E.	60200	65800	71900
22 E.	55800	65700	73600
23 E.	55800	61000	69600
24 E.	36900	28400	54000
25 E.	2920	1750	6780
26 E.	12800	10200	20800
27 E.	175	153	165
T. 18 S., R. 15 E.	0	0	0
18 E.	913	0	2710
19 E.	10300	12100	24735
20 E.	10600	16600	28400
21 E.	26600	29000	42200
22 E.	19000	23500	25500
23 E.	7510	7850	6820
T. 19 S., R. 17 E.	2330	0	0
18 E.	242	0	0
19 E.	3160	3600	3090
20 E.	4080	3210	10300
21 E.	20600	18600	38800
22 E.	13200	21100	40100
24 E.	0	0	9
T. 20 S., R. 15 E.	18700	5420	21800
17 E.	2370	0	0
18 E.	1360	0	0
19 E.	1440	0	6690
20 E.	2580	2550	12800
21 E.	3250	21700	52600
22 E.	21100	62000	81300
23 E.	13400	11400	26900

TABLE 1.--Pumpages, in acre-feet, in part of the San Joaquin Valley,
California--Continued

Location	Acre-feet, rounded to three significant figures		
	1975	1976	1977
MOUNT DIABLO BASE LINE AND MERIDIAN			
T. 21 S., R. 15 E.	12700	4730	15400
16 E.	13400	4060	30500
17 E.	955	0	0
18 E.	7480	4520	5570
19 E.	0	0	1110
20 E.	714	1960	2920
21 E.	1720	1360	9110
22 E.	9250	8400	11200
23 E.	15000	26000	38500
24 E.	0	270	0
T. 22 S., R. 18 E.	3260	3340	1920
19 E.	2830	1920	3090
20 E.	395	176	242
21 E.	291	433	283
22 E.	513	2170	5470
23 E.	21100	27500	48200
T. 23 S., R. 18 E.	2280	0	2460
19 E.	2720	1740	682
20 E.	218	233	396
21 E.	1430	1430	1140
22 E.	170	83	129
23 E.	10500	9670	18400
24 E.	9300	8510	13500
T. 24 S., R. 17 E.	0	0	437
18 E.	5530	6080	10300
19 E.	3510	1440	1720
20 E.	3500	564	321
21 E.	144	0	2
22 E.	1480	4300	5150
23 E.	5620	6480	13700
24 E.	10300	7590	9680
T. 25 S., R. 18 E.	312	235	247
19 E. ¹	11600	11900	6810
20 E. ²	0	0	0
21 E.	572	1950	3670
22 E.	1500	7200	13000
23 E.	7710	12500	14000
24 E.	48900	58200	54900
25 E.	4390	11200	14000

See footnotes at end of table.

TABLE 1.--Pumpages, in acre-feet, in part of the San Joaquin Valley,
California--Continued

Location	Acre-feet, rounded to three significant figures		
	1975	1976	1977
MOUNT DIABLO BASE LINE AND MERIDIAN			
T. 26 S., R. 17 E. ²	0	0	0
18 E. ²	0	0	0
19 E. ²	0	0	0
20 E. ²	0	0	0
21 E.	4060	4540	8700
22 E.	3270	3410	7950
23 E.	30100	31400	33600
24 E.	55000	64000	60900
25 E.	18100	36200	39600
26 E.	9030	12300	13900
27 E.	5050	3940	4280
T. 27 S., R. 20 E. ²	0	0	0
21 E. ²	0	0	0
22 E.	7720	7670	20700
23 E.	41000	48400	66700
24 E.	48800	61100	61500
25 E.	37000	60900	67600
26 E.	40800	51400	61300
27 E.	8310	6530	5470
T. 28 S., R. 21 E. ²	0	0	0
22 E.	23200	35000	41700
23 E.	35000	42400	54500
24 E.	52500	56800	57800
25 E.	37100	50900	56200
26 E.	43600	59100	65000
27 E.	19500	11800	20400
28 E.	32	48	16
T. 29 S., R. 22 E.	12500	20700	15500
23 E.	29700	49700	60400
24 E.	42400	47500	53700
25 E.	69900	49200	78600
26 E.	81800	63600	91700
27 E.	29600	23400	34600
28 E.	1360	1270	1510
29 E.	3290	1930	5620
T. 30 S., R. 23 E.	642	1640	2230
24 E.	12400	25900	30300
25 E.	23000	15800	32500
26 E.	37700	28100	47100

See footnotes at end of table.

TABLE 1.--Pumpages in acre-feet in part of the San Joaquin Valley,
California--Continued

Location	Acre-feet, rounded to three significant figures		
	1975	1976	1977
MOUNT DIABLO BASE LINE AND MERIDIAN			
T. 30 S., R. 27 E.	29000	23300	39000
28 E.	19600	16500	25800
29 E.	36100	39900	48200
30 E.	3920	3470	6030
T. 31 S., R. 24 E.	4430	4720	4580
25 E.	6900	18300	27200
26 E.	34600	22400	43200
27 E.	58000	47600	83000
28 E.	38100	29300	47000
29 E.	56200	58300	71900
30 E.	11600	10400	12900
T. 32 S., R. 23 E.	0	0	58
24 E.	2660	3840	2060
25 E.	4980	10700	12700
26 E.	25800	14000	34600
27 E.	16400	15700	20000
28 E.	38700	33300	45300
29 E.	39300	39100	46300
30 E.	30	59	75
SAN BERNARDINO BASE LINE AND MERIDIAN			
Tps. 11 & 12 N. 18 W.	8940	7710	13400
19 W.	36100	29400	46800
20 W.	15300	17800	25300
21 W.	4980	5720	8860
22 W.	1580	1990	4620
23 W.	753	1700	1350

¹According to the California Department of Water Resources, values are probably overestimated (written commun., 1980).

²Values are from California Department of Water Resources (written commun., 1980).

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