STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF WATER RESOURCES

EARL WARREN, Governor
C. H. PURCELL, Director of Public Works
EDWARD HYATT, State Engineer

REPORT OF

SACRAMENTO-SAN JOAQUIN

WATER SUPERVISION

FOR YEAR

1943

JUNE, 1944

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STATE PRINTING OFFICE

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF WATER RESOURCES

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SACRAMENTO - SAN JOAQUIN

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1943

Sacramento
June, 1944

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ACKNOWLEDGMENT

In the conduct of the activities and investigations under the heading of "Sacramento-San Joaquin Water Supervision", valuable assistance has been rendered by many individuals and public and private agencies.

Landowners and water users and executives, engineers, managers, and water superintendents of the various water organizations throughout the territory covered by this work have cooperated fully in furnishing the many and varied data requested.

For the compilation of pumped diversions the Pacific Gas and Electric Company, and Merced, Modesto and Turlock irrigation districts, have furnished a large number of power consumption records.

Valuable cooperation has been extended by the Water Resources Branch of the United States Geological Survey, Department of the Interior, in gathering and assembling stream flow data.

In the San Joaquin Valley the City of San Francisco Public Utilities Commission, Hetch Hetchy Water Supply and the United States Bureau of Reclamation make available a large amount of stream flow data.

The Merced, Modesto, Oakdale, South San Joaquin and Turlock irrigation districts and Miller and Lux, Incorporated, have assisted in observing and maintaining recording and staff gages in the San Joaquin Valley as has the United States Bureau of Reclamation.

ORGANIZATION

C. H. Purcell - - - - - - - - - Director of Public Works
Edward Hyatt - - - - - - - - - - - - - - - State Engineer

-0-

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ADVISORY COMMITTEE

PERMANENT COMMITTEE OF THE SACRAMENTO-SAN JOAQUIN RIVER PROBLEMS CONFERENCE

This Committee, representing the water users and other interests involved, was appointed by the First Sacramento-San Joaquin River Problems Conference in January 1924. Its continued interest and cooperation and particular activity in the promulgation of effective conservation measures in the seasons of critical water supply have contributed in large measure to the successful prosecution of the Water Supervision work.

Herbert E. White, Chairman, Sacramento

E. L. Adams, Chico	Wm. N. L. Hutchinson, Walnut Grove
Alden Anderson, Sacramento	Warren H. McBride, San Francisco
P. M. Downing, San Francisco	R. V. Meikle, Turlock
William Durbrow, Grass Valley	Jesse Poundstone, Grimes
Manley S. Harris, San Francisco	F. T. Robson, Vina

CHAPTER I

INTRODUCTION

The purpose of this report is to make of record the measurements made and data collected in connection with Water Supervision in the Sacramento-San Joaquin Valley area during 1943.

Origin and History of Work

Water Supervision was inaugurated in 1924 through the efforts of the first Sacramento-San Joaquin River Problems Conference and its Permanent Committee working with the former Division of Water Rights. A complete description of the origin, history and conduct of this work will be found in the 1924 and 1926 Biennial Reports of the former Division of Water Rights, in Bulletin Number 4 of the same Division, and in Bulletin Number 23 of the Division of Water Resources. The latter bulletin brings together all data and measurements obtained in the five-year period, 1924 to 1928, inclusive. The Water Supervision reports for subsequent years are mimeographed as is the present report.

Objectives

The work of supervision is a measure of relief in the difficulties attendant upon water supply conditions and the use of water throughout the Sacramento-San Joaquin territory, particularly on the Sacramento River and in the Delta region. The situation involves the major problem of satisfying the water requirements for irrigation in both the upriver areas and the Delta, for the control of salinity in the Delta and Upper Bay areas, and for navigation above Sacramento as demanded by the U. S. War Department. In nearly every season of the last twenty years, each one of these requirements

has exceeded the available summer flow in the rivers. Pending ultimate relief through the development of reservoir storage this situation has been met by mutual agreement through a provisional administration of stream flow and diversions. There has been no agreement, though, under which a water master might definitely and equitably distribute the existing water supply to those entitled to receive it, but it seems inevitable that such an agreement or a definite schedule of water priorities must be developed. Its realization will require, however, that there shall be available reliable and accurate data over a long period of years covering all of the actual diversions and uses of water, the stream flow, return flow, salinity, and all pertinent hydrographic data. Looking to this requirement, the Division of Water Resources is, concurrently with the provisional stream administration, continuing the investigations and all measurements necessary to complete the record of basic data.

Investigational Work

During 1943 as in the past years, the investigational work comprised: Measurements and record of the diversions of water from Sacramento, Feather, Yuba, American, Merced, Tuolumne, Stanislaus and San Joaquin rivers on the valley floor and above the Delta; stream flow measurements throughout the territory partially in cooperation with the Water Resources branch of the U. S. Geological Survey, measurements and records of waters returned to the Sacramento and San Joaquin rivers; an annual census of irrigated acreages and crops under all diversions recorded; and at intervals a complete survey of irrigated acreage in the Sacramento-San Joaquin Delta; maintenance and operation of recording tide gages in the Delta area. The salinity sampling in the Delta, by which the rate of advance and retreat of salinity was studied, was discontinued on July 15, 1941. Prior to this date samples were taken at

four-day intervals at key stations throughout the Delta area and upper bays.

History of State and Water Users' Cooperative Financing

The complete history of the State and water users' cooperative financing for previous years has been published in prior reports.

Conservation Features

A comparison of the runoff and water supply conditions of the 1943 season with those of previous seasons is indicated in Tables 1 and 3. Tables 2 and 4 show for streams in Sacramento and San Joaquin valley a summary of the average minimum 10-day flow occurring during the years 1924-1943 for period March 1 to September 30. It will be noted in Tables 1 and 3 that under the column "Runoff in Per Cent of Normal", the 40-year and 50-year mean percentages are given. The 50-year figure is based on a recent recalculation of mean full natural flow of the Sierra streams. Table 5 gives a comparison between the 40-year and 50-year mean full natural flow for all major streams entering the Great Central Valley.

TABLE 1

COMPARATIVE SACRAMENTO VALLEY WATER SUPPLY 1920 - 1943

Year	Run-off in per cent of Normal*				Minimum Mean Daily Flow in Second Feet (1)									Rice Acreage Served By Sacramento River & Tributaries
					Sacramento River		Feather River			Yuba River		American River		
	Sacto-San Joaquin to Delta		Sacramento at Red Bluff		Red Bluff	Colusa	Sacramento	Oroville	Nicolaus	Smartville	Mouth	Fairoaks	Sacramento	
	40 Yr.	50 Yr.	40 Yr.	50 Yr.										
1920	50	52	45	48	3240	660	(2) 540	905	(3) 19	106		100	(2) 114	
1924	28	28	35	38	2810	1470	705	720	Zero	71		5	Zero	88500
1925	83	86	86	92	3240	1870	2760	1330	334	150		219	203	94700
1926	57	60	61	65	2980	1030	1330	1480	264	114		109	161	128600
1927	114	121	117	125	3580	1960	3420	1460	565	240		274	334	123300
1928	80	84	82	87	3400	1960	2510	1210	310	180		109	178	101100
1929	42	44	47	50	3060	1550	2300	1640	520	119		59	50	73700
1930	63	65	65	70	2980	1680	2350	1560	586	220		105	130	88000
1931	28	30	35	38	2480	820	-131	950	Zero	130	(2)22	30	28	126500
1932	74	78	54	58	2620	1530	1900	685	284	181		178	159	90700
1933	45	48	49	52	2620	1350	1340	1050	200	165		32	30	87400
1934	40	43	48	51	2400	1320	1050	1180	208	144	(2)45	77	75	91800
1935	86	91	80	86	2860	1780	2700	1470	690	250		178	185	78100
1936	91	96	76	81	2700	1540	2150	1560	603	266		356	415	104400
1937	75	80	64	68	2780	1370	1640	1420	230	219		234	230	109400
1938	160	170	157	168	3880	3000	4950	1690	772	295		455	439	94800
1939	41	43	47	50	2700	1320	556	1360	68	168	38	37	44	103800
1940	108	115	112	120	3220	2040	2430	1600	438	177	118	279	274	94200
1941	130	137	143	164	4180	2700	4020	1680	575	230	106	255	261	119800
1942	120	129	120	129	4010	2670	3560	1990	495	358	220	270	282	158100
1943	107	114	91	97	3610	2220	2460	1500	168	343	211	180	169	185400

(1) Minimum mean daily flow that occurred prior to September 30th. For average minimum 10 day flow see Table 2.
(2) No continuous record. Lowest measured discharge.
(3) Lowest measured discharge at mouth of river, August 19th.

*40-year normal taken as 40-year mean (1889-1929) of natural run-off at foothill stations of major tributaries.
50-year normal taken as 50-year mean (1889-1939) of natural run-off at foothill stations of major tributaries.

TABLE 2

AVERAGE MINIMUM 10-DAY FLOW FOR SACRAMENTO VALLEY STREAMS
FOR PERIOD MARCH 1 TO SEPTEMBER 30, 1924-1943

Year	SACRAMENTO RIVER																	
	At Keswick		Near Red Bluff		At Butte City		At Colusa		At Wilkins Slu.		At Knights Ldg.		At Verona		At Sacramento	
	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.
1924	No record		8/8	2840	7/21	1580	7/23	1540	No record prior to 1931		7/20	1060	No record		7/14	858
1925	No record		8/9	3400	9/1	2150	8/7	2030			8/8	1990	No record		8/7	2860
1926	8/8	2710	9/20	3030	8/10	1350	8/11	1060			8/1	1120	8/1	1620	7/28	1460
1927	8/20	3240	9/9	3680	8/20	2330	8/22	1990			8/20	2220	8/13	3420	8/23	3560
1928	9/6	3120	9/7	3490	8/19	2150	8/14	2000			8/15	1920	8/14	2760	8/15	2660
1929	9/1	2820	9/11	3060	8/19	1680	8/19	1570			8/20	1400	7/18	2440	7/18	2460
1930	9/1	2800	8/27	2980	8/20	1880	8/19	1690			8/20	1460	8/22	2640	8/5	2500
1931	8/22	2510	8/10	2550	7/28	1080	7/26	860	7/27	797	7/21	279	7/21	327	7/20	-80
1932	9/25	2570	9/7	2680	9/30	1530	8/27	1550	8/8	958	8/11	1030	8/11	1890	8/11	1980
1933	9/1	2580	8/24	2640	8/19	1370	8/23	1360	8/20	714	8/15	964	8/6	1470	8/21	1450
1934	9/21	2430	9/13	2480	8/20	1320	8/22	1330	8/19	658	8/6	773	8/10	1300	7/20	1150
1935	9/6	2780	9/6	2940	9/28	1820	8/27	1820	8/29	1180	8/10	1610	8/30	2980	8/12	2920
1936	9/30	2580	9/26	2880	8/18	1630	8/19	1580	8/18	1100	8/8	1370	8/20	2420	8/20	2540
1937	9/26	2640	8/25	2900	8/25	1450	8/27	1410	8/28	870	8/16	1120	8/16	1810	8/16	1720
1938	9/22	3680	9/19	3940	9/5	3060	8/23	3130	8/22	2690	8/10	2980	8/12	4920	8/12	5190
1939	8/25	2830	8/25	2850	8/10	1400	8/8	1370	8/5	683	7/30	785	8/5	1030	8/5	630
1940	8/29	3200	8/23	3410	8/25	2040	8/18	2140	8/18	1370	8/18	1670	8/12	2510	8/12	2550
1941	9/25	3950	9/10	4380	8/22	2830	8/24	2980	8/23	2270	8/23	2680	8/25	4010	8/24	4190
1942	9/25	3870	9/17	4140	8/22	2730	8/23	2860	8/24	1840	8/24	2390	8/23	3540	8/22	3740
1943	9/3	3610	9/4	3770	8/21	2380	8/22	2300	8/21	1550	8/17	1710	8/17	2650	8/17	2600

NOTE: For minimum mean daily flow see Table 1.
Prior to 1943 record is for station at Kennett.

TABLE 2 (CONTINUED)

AVERAGE MINIMUM 10-DAY FLOW FOR SACRAMENTO VALLEY STREAMS
FOR PERIOD MARCH 1 TO SEPTEMBER 30, 1924-1943

Year	FEATHER RIVER				YUBA RIVER				AMERICAN RIVER				MOKELUMNE RIVER		CALAVERAS RIVER	
	Near Oroville		At Nicolaus		At Smartville		Near Marysville		At Fairoaks		At Sacramento		At Woodbridge		At Jenny Lind	
	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.
1924	7/8	823	8/10	0	7/31	84	No continuous		8/5	5	8/4	5	9/1	1	No record	
1925	9/3	1600	8/22	460	8/31	158	record prior		8/26	237	8/27	240	8/23	33	8/15	0
1926	7/1	1720	8/15	470	9/16	126	to		8/25	157	8/27	180	8/11	3	8/15	0
1927	9/20	1720	8/27	670	9/25	261	1939		9/21	309	8/27	370	9/20	2	9/15	0
1928	9/20	1330	8/13	330	9/25	212			8/23	188	8/22	230	8/30	2	9/15	0
1929	7/8	1770	7/16	583	9/25	124			9/25	94	9/30	69	7/17	33	9/10	0
1930	7/16	1840	7/18	694	9/22	235			8/20	166	8/21	162	7/1	4	9/10	1
1931	9/23	1060	7/15	0	8/31	133	8/9*	22	8/15	53	8/17	43	9/25	3	9/10	0
1932	9/23	820	9/5	293	9/10	186			9/10	202	9/14	193	8/11	249	9/10	0
1933	9/20	1120	9/5	222	9/20	169			9/9	72	9/9	70	6/23	140	8/15	0
1934	9/12	1300	9/7	308	9/7	150	8/23	45	9/1	93	9/6	110	6/25	8	8/15	0
1935	9/12	1500	9/17	975	9/16	266			9/6	204	9/6	199	8/16	206	9/10	0
1936	9/9	1880	8/30	835	9/22	278			8/28	410	8/30	438	7/17	162	9/15	0
1937	9/9	1440	8/11	265	8/20	230			9/17	264	9/16	287	7/31	140	9/15	0
1938	9/7	2070	9/7	1020	9/8	324			9/20	462	9/16	448	9/10	212	9/15	2
1939	8/5	1380	8/6	87	9/25	182	8/15	42	9/9	47	8/8	49	4/25	44	9/10	0
1940	8/7	1650	8/10	490	8/17	280	9/1	120	8/26	340	8/26	330	8/16	122	9/15	0
1941	9/17	1820	8/23	640	9/12	260	9/14	120	9/17	320	9/19	340	7/20	146	9/25	1
1942	8/20	2090	8/21	562	9/23	399	9/23	235	9/25	270	9/25	302	7/29	139	8/27	1
1943	9/22	1530	9/8	198	9/6	1	9/10	223	9/25	209	9/25	201	8/27	210	8/20	0

NOTE: For minimum mean daily flow see Table 1.
* Single measurements only.

TABLE 3

COMPARATIVE SAN JOAQUIN VALLEY WATER SUPPLY 1920-1943

Year	Run-off in per cent of normal*		Minimum Mean Daily Flow in Second-feet (1)											
	Sacramento and San Joaquin to Delta	San Joaquin at Vernalis	San Joaquin River near Vernalis	San Joaquin River near Newman	San Joaquin River at (3) Fremont Ford Br.	Merced River at Yosemite Val.R.R.	Merced River near Mouth	Tuolumne River at La Grange Br.(4)	Tuolumne River at Tuolumne City	Stanislaus River at Orange Blossom Bridge	Stanislaus River at Hatmark Ranch(5)	Calaveras River at Jenny Lind	Mokelumne River at Woodbridge	Cosumnes River at Michigan Bar
	40Yr: 50 Yr	40Yr: 50Yr												
1920	50: 52	63: 66	(2) 450	62								0		1
1924	20: 28	24: 24	391	15	0	0	(2) 2	(2) 29	(2)245	(2) 14	(2) 95	0	1	0
1925	83: 86	86: 88	660	114	0	(2) 4	(2) 73	(2) 35	(2)299	(2) 19	(2)161	0	3	6
1926	57: 60	55: 56	565	62	0	(2) 5	(2) 53	(2) 32	(2)286	(2) 15	(2)116	0	3	0
1927	114: 121	100: 104	1290	305	0	(2) 12	(2) 204	(2)204	(2)391	(2) 29	(2)275	0	1	6
1928	80: 84	67: 79	840	205	0	6	53	38	292	31	194	0	2	2
1929	42: 44	44: 46	565	105	0	4	65	32	287	30	205	0	3	1
1930	63: 65	50: 53	645	170	0	7	92	60	344	32	216	0	3	1
1931	28: 30	26: 27	200	22	0	1	17	25	243	25	81	0	3	0
1932	74: 78	101: 106	965	251	0	27	165	37	348	35	223	0	150	1
1933	45: 48	51: 54	569	187	0	7	127	39	280	19	185	0	81	0
1934	40: 43	35: 37	315	62	(2) 5	7	36	26	270	20	104	0	6	0
1935	86: 91	98: 103	850	306	(2) 97	46	206	34	345	28	199	0	84	2
1936	91: 96	100: 104	980	360	150	25	190	33	375	28	194	0	65	4
1937	75: 80	100: 105	950	333	115	12	211	3	355	17	212	0	106	2
1938	150: 170	172: 180	2030	702	280	66	335	8	460	22	270	1	143	14
1939	41: 43	44: 46	545	202	32	2	155	3	310	13	140	0	36	0
1940	108: 115	101: 105	996	340	99	7	200	3	365	17	217	0	71	1
1941	130: 137	121: 127	1300	412	187	18	238	19	300	13	252	0	55	5
1942	120: 129	113: 118	1450	472	200	16	242	14	520	20	210	1	64	17
1943	107: 114	112: 117	1420	405	157	18	207	22	490	18	205	0	133	12

* 40-year normal taken as 40-year mean (1889-1929) of natural run-off at foothill stations of major tributaries.
* 50-year normal taken as 50-year mean (1889-1939) of natural run-off at foothill stations of major tributaries.
(1) Minimum mean daily flow that occurred prior to September 30th. For average minimum 10-day flow see Table 4.
(2) No continuous record. Lowest discharge measured.
(3) Prior to 1934 station maintained at Delta Bridge.
(4) Prior to 1937 station maintained at Roberts Ferry Bridge. Minimum flow at Roberts Ferry for 1937, 1938 and 1939 was 18, 20 and 34 cubic feet per second, respectively.
(5) Station at Hatmark abandoned Sept. 30, 1940. New station established at Bret Harte pump Sept. 30, 1940.

TABLE 4

AVERAGE MINIMUM 10-DAY FLOW FOR SAN JOAQUIN VALLEY STREAMS
FOR PERIOD MARCH 1 TO SEPTEMBER 30, 1924-1943

Year	SAN JOAQUIN RIVER																	
	Near Friant		At Fremont Ford Br		Near Newman		At Grayson		At Hetch Hetchy Cross		Near Vernalis	
	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.
1924	9/17	185			8/9	17					9/2	410
1925	9/23	596			9/25	122					9/29	740
1926	9/16	578	No continuous record prior to 1936		9/19	77	No continuous record prior to 1930		No continuous record prior to 1936		8/21	590
1927	9/25	787			9/2	326					8/23	1300
1928	9/25	813			8/20	234					8/22	870
1929	9/25	477			7/21	116					8/13	591
1930	9/25	678			7/20	184	8/8	230			8/4	740
1931	9/22	111			8/23	33	8/26	24			7/20	211
1932	9/21	1040			9/5	267	9/7	410			9/6	1020
1933	9/21	1090			8/15	196	8/15	270			8/14	607
1934	9/14	360			9/3	706	8/12	123			8/14	347
1935	9/25	1210			8/27	333	9/11	449			8/13	922
1936	9/24	1200	8/18	161	8/12	387	8/17	557	8/16	835	8/11	1040
1937	9/22	1130	8/21	122	8/23	364	9/24	517	8/23	744	8/23	1022
1938	9/21	1200	9/25	306	9/24	725	9/14	941	8/26	1800	8/27	2130
1939	*9/20	727	8/10	36	8/20	219	7/25	235	7/26	443	7/25	610
1940	9/23	896	8/23	101	8/20	345	8/24	520	8/13	875	8/10	1070
1941	9/11	1220	9/12	220	9/25	470	9/15	720	9/15	1360	9/14	1480
1942	9/23	1260	9/22	211	8/30	481	9/19	688	9/14	1245	8/20	1520
1943	9/24	1000	9/3	168	9/1	422	8/16	605	8/4	1216	8/4	1480

* New station started "Below Friant".

NOTE: For minimum mean daily flow see Table 3.

TABLE 4 (CONTINUED)

AVERAGE MINIMUM 10-DAY FLOW FOR SAN JOAQUIN VALLEY STREAMS
FOR PERIOD MARCH 1 TO SEPTEMBER 30, 1924-1943

Year	STANISLAUS RIVER										MERCED RIVER									
	At Orange Blossom Br.		At Burneyville Br.		At Ripon		At Bret Harte		At Hatmark Ranch		At Yosemite Valley R. R.		At Cressey Br.		Near Livingston		Near Mouth	
	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	
1924															8/1	26		
1925	No record		No record		No record		No record		No record		No record		No record		No record		No record	
1926	prior		prior		prior		prior		prior		prior		prior		9/24	53	prior	
1927	to 1930		to 1940		to 1940		to 1941		to 1930		to 1930		to 1941		8/28	121	to 1930	
1928															8/15	118		
1929															9/25	89		
1930	9/15	32							8/11	241	9/25	3			6/9	97	8/16	126
1931	9/15	25							8/17	96	9/18	1			9/20	55	8/23	258
1932	9/25	35							8/11	241	8/6	18			8/7	140	8/8	190
1933	9/22	19							9/5	215	9/25	11			8/21	121	8/13	141
1934	9/20	20							8/15	137	9/25	2			9/3	82	8/18	68
1935	9/1	28							9/22	230	9/9	48			9/22	159	9/16	220
1936	8/25	28							9/26	230	8/8	37			8/10	178	9/24	216
1937	9/21	17							9/10	226	9/25	21			9/20	199	8/16	228
1938	9/11	20					Station established 10/1/40		9/16	280	8/10	76			9/12	258	9/18	342
1939	9/11	14							8/20	144	9/21	7			8/8	124	8/8	174
1940	9/24	19	9/25	98	9/24	212			8/13	248	9/14	7			9/16	160	9/17	218
1941	9/15	18	9/25	86	9/15	209	9/22	262	Station discontinued 9/30/40		7/21	24	9/15	108	9/10	164	9/14	257
1942	9/26	22	9/21	99	8/15	207	8/20	232			9/24	18	9/18	104	9/18	175	9/19	250
1943	9/20	23	9/25	76	9/18	217	9/8	228			9/15	21	8/10	67	8/10	164	8/30	237

NOTE: For minimum mean daily flow see Table 3.

TABLE 4 (CONTINUED)

AVERAGE MINIMUM 10-DAY FLOW FOR SAN JOAQUIN VALLEY STREAMS
FOR PERIOD MARCH 1 TO SEPTEMBER 30, 1924-1943

Year	TUOLUMNE RIVER										DRY CREEK	
	At La Grange Br.		At Roberts Ferry Br.		At Hickman Br.		At Modesto Br.		At Tuolumne City		Near Modesto	
	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.
1924												
1925												
1926	No record		No record		No record		No record		No record		No record	
1927	prior to 1936		prior to 1930		prior to 1932		prior to 1940		prior to 1930		prior to 1930	
1928												
1929												
1930			8/1	78					8/3	366	7/7	41
1931			9/25	25					7/28	249	9/16	19
1932			8/27	40	8/26	105			8/28	358	8/18	50
1933			8/19	37	8/11	102			8/3	310	7/18	41
1934			9/7	28	7/1	94			9/17	284	9/25	38
1935			8/31	35	9/6	100			8/10	370	8/15	48
1936			8/28	36	8/14	123			9/13	385	9/30	62
1937	8/15	3	8/17	19	8/21	123			8/15	363	9/18	51
1938	8/21	10	8/20	29	8/24	155			8/25	468	7/31	69
1939	6/10	3	6/15	36	4/20	138			6/18	326	9/4	38
1940	8/3	4	7/21	40	7/25	110	8/14	290	8/7	380	9/9	45
1941	8/5	137	8/6	190	8/6	211	9/13	480	9/13	595	7/25	55
1942	8/5	76	8/5	127	8/6	240	8/7	577	8/6	565	8/28	58
1943	7/1	55	7/13	65	7/15	230	7/15	392	7/15	538	9/20	44

NOTE: For minimum mean daily flow see Table 3.

TABLE 5

COMPARISONS BETWEEN 40 AND 50 YEAR MEAN FULL NATURAL FLOWS*

River and Station	40-Year Mean Full Natural Flow 1889-90 to 1928-29 (Acre-feet)	50-Year Mean Full Natural Flow 1889-90 to 1938-39 (Acre-feet)	Changes in Mean
Sacramento at Red Bluff	9,354,000	8,747,000	-7%
Feather at Oroville	5,201,000	4,853,000	-7%
Yuba at Smartville	2,653,000	2,490,000	-6%
Bear at Wheatland	402,000	373,000	-7%
American at Fairoaks	3,069,000	2,879,000	-6%
Sacramento at Sacramento	20,679,000	19,342,000	-6%
Cosumnes at Michigan Bar	407,000	382,000	-6%
Mokelumne at Mokelumne Hill	853,000	802,000	-6%
Calaveras at Jenny Lind	227,000	210,000	-7%
Stanislaus below Melones	1,350,000	1,273,000	-6%
Tuolumne at La Grange	2,070,000	1,985,000	-4%
Merced at Exchequer	1,115,000	1,069,000	-4%
San Joaquin at Friant	1,995,000	1,914,000	-4%
San Joaquin at Vernalis	6,530,000	6,241,000	-4%
Combined flow to Delta	28,695,000	26,977,000	-6%
Kings at Piedra	1,889,000	1,818,000	-4%
Kaweah at Three Rivers	443,000	433,000	-2%
Kern at Bakersfield	725,000	710,000	-2%

(40-year normal taken as 40-year mean (1889-1929) of natural run-off (at foothill stations of major tributaries.

*

(50-year normal taken as 50-year mean (1889-1939) of natural run-off (at foothill stations of major tributaries.

CHAPTER II

MEASUREMENTS OF STREAM FLOW

During the season of 1943 annual stream flow measurements and records were obtained through cooperation with the Water Resources Branch of the U. S. Geological Survey for stations on the Sacramento River at Kennett, Red Bluff, Butte City, Colusa, Wilkins Slough, Knights Landing and Verona; on the Feather River at Oroville and Nicolaus; on the Yuba River at Smartville and Marysville; on the American River at Fairoaks and Sacramento; on the Mokelumne River at Woodbridge; on the San Joaquin River below Friant, near Newman and near Vernalis; on the Merced River near Livingston; on the Tuolumne River at Tuolumne City; Stanislaus River near Ripon and Bret Harte Pump.

The above cooperative stations were supplemented by stations maintained by the Division of Water Resources in connection with the San Joaquin return water measurements (See Chapter IV), and in cooperation with the Merced, Modesto, Oakdale, South San Joaquin and Turlock Irrigation Districts, the City and County of San Francisco through the Hetch Hetchy Water Supply Division and the U. S. Bureau of Reclamation, at the following places: San Joaquin River at Delta Bridge, Fremont Ford Bridge, Mud Slough, Grayson (Laird Slough) and Hetch Hetchy Aqueduct Crossing; Merced River at Yosemite Valley Railroad Crossing, Cressey Bridge, and near the mouth; Tuolumne River at La Grange Bridge, Roberts Ferry Bridge, Hickman-Waterford Bridge, Modesto and Tuolumne City; Dry Creek near Modesto; Stanislaus River at Orange Blossom Bridge and Riverbank (Burneyville Bridge). For a majority of the stations maintained by the Division of Water Resources in cooperation with various irrigation districts, et al., the records have been compiled on an annual basis.

It is expected that in subsequent reports the flow of the Feather River during the low water period will be given for stations at Shanghai Bend, Marysville and Gridley.

Sacramento River at Sacramento

The record of the flow of the Sacramento River at Sacramento for the periods of low flow as given in this and previous reports, does not represent actual measurements at a station below the City of Sacramento intake. Because of tidal action during periods of low flow, a gaging station at this point is not maintained. The daily discharge record as given has been computed for the periods of low flow by using the Verona record and making due allowance for the measured inflow and draft between that station and Sacramento. When the flow is above 25,000 cubic feet per second at a staff gage reading of about 10.0 (13.1 U.S.E.D. datum) the effect of the tidal influence is lost and a direct ratio between gage height and discharge is used to determine the daily flow. In this computation it is not practicable and no attempt has been made to allow for the time required for the flow to travel from Verona to Sacramento and to make the various deductions and additions enroute at the exact time that the given Verona flow would have passed the respective points of inflow or draft. During the summer period velocities between Verona and Sacramento are low and a given flow may require a day's time or more to travel this distance. Under these conditions the computed flow at Sacramento may differ somewhat from that which would have been found if the actual flow could have been measured. Contributing to this difference also, there are the accretions or losses which cannot be measured. In the upper sections of the river the invisible accretions or losses between two points are susceptible of computation as the remaining quantity required to satisfy the equation when the flow at the

upper and lower points and all definite intermediate inflows and drafts are known. With no actual measurement of the flow at Sacramento, the invisible accretions or losses between Verona and Sacramento cannot be thus defined and hence they are unaccounted for in the computed flow at Sacramento. From the data presented subsequently in Chapter IV, it appears that some return flow might be expected in the Verona-Sacramento section, but as indicated in the tabulation of return water (Table 89) no figure for it has been given (except for the measured drains - Table 88), because it could not be derived without a record of the actual flow at Sacramento.

Table 6 is given to show the water surface elevation which could be expected to occur at various points on the Sacramento River for stream flows from 1000 to 10,000 cubic feet per second. These elevations are based on data obtained during 1943, and are subject to changes from year to year should the channel show any scour or fill at the control points. Table 7 gives, for the period March to October 1943, the average water surface elevations at various points on the Sacramento River for 15-day periods. Similar data for the San Joaquin valley streams is given in Table 7A. This is the information used to determine the seasonal pumping heads for the various Sacramento River pumping plants. Tables 8 to 27, inclusive, list in downstream order discharge records for the Sacramento valley stream flow stations while similar data for the San Joaquin valley stations are given in Tables 28 to 50, inclusive.

TABLE 6

ELEVATION OF WATER SURFACE AT VARIOUS POINTS ALONG SACRAMENTO RIVER FOR DIFFERENT DISCHARGES

Station	Elevation of Zero of Staff Gage U.S.E.D.	July 1939		July 1943		U.S.E.D. Elevation of Water Surface*									
		Av.W.L. U.S.E.D.	Av. Disch. c.f.s.	Av.W.L. U.S.E.D.	Av. Disch. c.f.s.	1000 c.f.s.	2000 c.f.s.	3000 c.f.s.	4000 c.f.s.	5000 c.f.s.	6000 c.f.s.	7000 c.f.s.	8000 c.f.s.	9000 c.f.s.	10000 c.f.s.
Sacramento	3.10	5.3	980	6.7	4860	Flows under 10000 c.f.s. will have no appreciable effect on average gage heights due to tidal action. Tidal effect lost at elevation 13.0. Flow 25000 c.f.s.									
Verona	0.0	7.6	1280	9.8	4130	6.5	7.7	8.7	9.6	10.5	11.3	12.0	12.6	13.2	13.7
Knights Landing	(1) 0.0	9.4	997	13.0	2540	10.0	12.0	14.0	15.8	(4)17.0	(4)17.7	(4)18.7	(4)20.1	(4)21.4	(4)23.5
Wilkins Slough	0.0	19.0	920	22.3	2510	19.4	21.5	23.1	24.7	26.1	27.5	28.9	30.3	31.6	32.9
Colusa	(2) 0.0	36.5	1660	38.8	3300	35.9	37.3	38.4	39.5	40.4	41.4	42.5	43.4	44.6	45.6
Butte City	0.0	68.9	1620	70.6	3450	67.4	69.4	70.4	70.9	71.4	71.9	72.3	72.7	73.2	73.6
Red Bluff (Iron Canyon)	(5)252.6	253.0	(3)3150	253.8	4600	-	252.2	252.9	253.5	254.0	254.4	254.8	255.2	255.5	255.9
Keswick	(5)495.0	No record		503.6	4300	499.3	500.9	502.1	503.3	504.3	505.2	Not yet determined			

* Elevations are subject to variation because of channel changes due to scour or fill. Figures given are based upon data obtained in 1943. For Red Bluff and Keswick stations elevations given to U.S.G.S. datum.

(1) Weather Bureau gage 0° = 7.6 U.S.E.D.

(2) Weather Bureau gage 0° = 40.4 U.S.E.D.

(3) Average flow during August 2926 c.f.s.

(4) When discharge at Knights Landing exceeds 5000 c.f.s. there is usually some backwater effect. Elevations as given take average backwater into account.

(5) Elevations are given to U.S.G.S. datum.

TABLE 7

1943 (MARCH TO OCTOBER) AVERAGE WATER SURFACE ELEVATIONS AT VARIOUS POINTS ON SACRAMENTO RIVER
FOR BI-MONTHLY PERIODS
ELEVATIONS ARE U.S.E.D. DATUM

Station	Miles above Sacramento	Month and Period																Staff Gage U.S.E.D. datum
		March		April		May		June		July		August		September		October		
		1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-31	1-15	16-30	1-15	16-31	
Sacramento	0	24.0	23.9	22.8	20.1	17.5	10.9	11.3	8.1	6.8	6.6	5.8	5.7	5.7	6.0	6.2	6.1	3.10
Conaway Ranch	12.0	NR	NR	NR	NR	21.4	14.2	14.8	10.6	8.5	7.8	7.3	7.1	7.5	8.3	NR	NR	0.0
Central M.W.Co.	16.0	NR	NR	NR	NR	23.7	15.8	16.4	12.2	9.9	8.9	8.3	8.3	8.7	10.4	NR	NR	0.0
Verona	19.6	32.1	31.9	30.8	27.2	24.3	16.5	17.0	12.7	10.3	9.2	8.5	8.6	9.1	11.0	11.7	11.9	0.0
Knights Landing	34.0	23.5	35.3	34.6	30.7	28.0	19.9	20.3	16.4	13.7	12.3	11.5	11.8	12.5	15.2	15.8	16.0	0.0
State Ranch Bend	40.6	37.8	37.6	37.0	32.7	30.2	21.6	21.9	17.9	14.9	13.2	12.3	12.5	13.2	16.1	17.1	17.8	0.0
Rough and Ready	44.0	39.0	38.8	38.1	34.1	31.5	22.7	22.9	19.1	16.1	14.7	13.8	13.6	14.1	16.9	18.2	18.6	0.0
Wilkins Slough	62.9	46.5	46.1	45.6	41.0	38.3	29.6	29.0	25.5	22.9	21.6	20.6	20.4	20.9	23.3	24.9	25.7	0.0
R.D. 70 Drain	68.8	49.2	48.6	47.9	42.9	40.2	31.0	31.0	27.5	24.9	24.0	23.1	22.8	23.3	24.8	26.7	27.4	0.0
Meridian	79.8	54.5	53.2	52.1	47.3	45.2	38.1	37.6	35.2	33.6	32.8	32.0	31.7	31.7	32.6	33.3	33.8	0.0
Colusa	89.4	59.2	57.5	56.2	51.7	49.6	43.4	43.1	40.9	36.9	38.6	38.0	37.7	37.7	38.4	39.3	40.1	0.0
Butte City	115.8	80.5	78.3	77.5	76.1	75.0	72.6	72.5	71.4	70.5	70.1	69.8	69.7	69.7	70.0	70.4	70.8	0.0
M. & T. Inc.	141.5	122.6	121.2	120.6	119.6	118.6	116.2	116.1	115.2	114.5	114.2	113.6	113.5	112.8	113.6	114.3	116.1	4.2
Gianella Br.	150.0	135.0	133.5	133.1	132.0	131.2	129.2	128.3	128.1	127.7	127.3	126.9	126.7	126.8	127.3	127.6	127.8	127.9
Glenn Colusa I.D.	154.8	148.1	146.6	145.8	144.9	143.7	142.0	143.4	142.1	141.1	140.9	140.7	140.6	140.7	141.9	142.5	142.7	3.1
Red Bluff	193.4	251.6	249.6	249.4	248.4	247.4	245.4	245.6	244.5	243.9	243.7	243.5	243.2	243.2	243.3	243.3	243.7	240.6
Iron Canyon	198.6	259.7	258.1	257.7	256.9	256.0	254.5	254.7	253.8	253.2	253.1	260.9	252.8	252.8	252.8	252.8	253.1	252.6

TABLE 7A

1943 (MARCH TO OCTOBER) AVERAGE WATER SURFACE ELEVATIONS AT VARIOUS POINTS ON SAN JOAQUIN VALLEY STREAMS FOR BI-MONTHLY PERIODS
ELEVATIONS ARE U.S.E.D. DATUM

Station	Miles above Mouth	Month and Period																Datum of 0° of Staff Gage	
		March		April		May		June		July		August		September		October			
		1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-31	1-15	16-30	1-15	16-31		
San Joaquin River																			
at Mossdale	58.9	16.1	18.8	16.3	15.2	15.4	12.7	14.9	9.9	6.9	6.7	6.1	6.0	5.9	5.9	5.9	6.0	5.2	U.S.E.D.
at Vernalis	76.7	29.0	31.2	29.1	28.2	28.1	25.3	27.4	22.1	18.1	16.9	16.3	16.4	16.2	16.5	16.9	16.8	8.4	U.S.E.D.
at Maze Road	81.8	No record prior to October														20.6	20.4	0.0	U.S.E.D.
at Grayson	96.1	40.5	43.6	41.4	40.2	40.4	37.7	39.8	35.0	30.6	28.9	28.0	28.7	27.9	28.1	28.3	27.9	0.0	U.S.E.D.
at Patterson	104.4		No record			48.5	45.8	47.6	43.7	40.4	39.0	38.2	38.2	38.0	38.2	38.3	37.9	0.0	U.S.E.D.
at Newman	123.7	63.7	66.7	64.4	63.4	63.6	61.0	62.6	58.8	55.6	54.1	53.4	53.4	53.3	53.3	53.3	53.2	51.0	U.S.E.D.
at Fremont Ford	129.5	67.9	69.6	68.6	67.9	68.2	66.7	67.9	65.2	62.4	60.7	60.2	60.1	60.1	60.2	60.1	60.3	0.0	U.S.E.D.
Merced River																			
near Mouth	1.1	No record		65.2	65.2	63.2	64.3	61.1	59.1	58.3	58.0	57.9	57.8	57.8	57.8	57.8	57.5	0.0	U.S.G.S.
at Livingston	17.1	97.2	97.2	94.8	95.9	95.2	92.1	92.2	89.3	86.8	86.6	86.3	86.4	86.3	86.3	86.4	86.2	8.3	U.S.E.D.
at Cressey Br.	27.7	11.6	11.0	8.8	9.8	9.1	6.4	6.3	4.0	1.5	1.2	1.0		No record			1.2	?	
at Yos. Valley R.R.	42.1	6.9	6.8	6.1	6.6	6.1	5.0	4.8	3.7	2.5	2.5	2.5	2.5	2.4	2.4	2.5	2.4	?	
Tuolumne River																			
at Tuolumne City	3.4	39.8	40.3	38.1	37.3	36.7	37.2	37.9	33.2	29.9	29.8	29.7	29.6	29.5	30.0	30.3	30.1	0.0	U.S.E.D.
at Modesto	15.8	53.9	51.1	49.2	49.1	47.7	50.6	50.1	45.5	42.1	42.2	42.1	42.1	41.9	42.6	43.0	42.9	0.0	U.S.G.S.
at Hickman Br.	31.7	85.2	83.9	82.5	82.3	81.5	83.4	82.8	80.0	78.0	78.1	78.0	78.0	78.0	78.6	78.9	78.8	0.0	U.S.G.S.
at Roberts Ferry Br.	39.9	117.7	116.3	115.5	115.4	114.7	116.4	115.7	113.4	111.5	112.0	111.9	111.9	111.9	112.5	112.7	112.6	0.0	U.S.G.S.
at La Grange Br.	50.4	177.8	176.4	175.7	175.6	174.7	176.3	175.6	172.9	170.2	170.9	170.6	170.5	170.8	171.8	171.9	171.7	0.0[f]	U.S.G.S.
Stanislaus River																			
at Bret Harte	5.9	35.4	35.6	34.6	34.8	34.5	31.4	31.9	28.5	26.6	26.1	25.9	25.8	25.6	25.6	25.6	25.8	0.0	U.S.G.S.
at Ripon	16.0	55.9	55.2	55.4	56.2	55.0	50.5	50.1	45.5	42.6	42.0	41.9	41.9	41.8	41.9	41.9	42.1	0.0	U.S.G.S.
at Riverbank	35.6	90.1	87.6	87.6	88.6	87.2	84.2	83.7	80.5	77.8	77.4	77.4	77.4	77.4	77.4	77.3	77.4	0.0[f]	U.S.G.S.
at Orange Blossom Br.	44.7	139.8	137.5	137.7	138.3	137.1	134.9	134.2	132.0	130.5	130.4	130.4	130.4	130.4	130.4	130.4	130.4	125.0*	U.S.G.S.

* Assumed
f Assumed to be U.S.G.S. Datum.
NOTE: 3.6 feet has been added to elevations on U.S.G.S. Datum to convert to U.S.E.D. Datum.

TABLE 8

DISCHARGE OF SACRAMENTO RIVER AT KESWICK - 1943

Day	Daily Discharge in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	12300	17400	12700	15000	12200	8510	4990	3840	3730	3920	3800	4150
2	13500	14700	12200	14300	11400	8320	5050	3780	3740	3800	3910	4210
3	11900	12600	11800	13900	11300	7340	4920	3900	3750	3580	4040	4230
4	10500	11700	11500	13400	11200	6960	4620	4000	3650	3490	4130	4130
5	9350	11600	11300	15500	10500	6550	4580	4010	3510	3640	4150	3920
6	8560	11400	11600	16200	10200	6140	*3180	4020	3490	3770	4060	3800
7	8110	12700	15600	14900	9830	5060	3650	4050	3620	3830	3860	3930
8	7760	14500	20200	14800	9380	6540	4340	3820	3730	3850	3760	4110
9	7510	13700	22800	14300	8980	6380	4390	3640	3750	3760	3870	4110
10	6400	12700	22200	13400	8400	6460	4400	3820	3720	3560	4000	4150
11	5640	11400	21200	12500	8770	6610	4330	4080	3720	3540	4120	4110
12	5640	10600	19800	12100	8290	6550	4240	4060	3660	3620	4150	3760
13	5930	10200	19000	12200	8070	6130	4340	4020	3610	3730	4030	3580
14	5920	10200	23600	12100	7760	6180	4420	3840	3690	3820	3760	3760
15	5850	10400	22500	12100	7820	6290	4460	3690	3840	3930	3660	4030
16	5670	10500	19800	12100	7660	6110	4480	3660	3920	3840	3780	4160
17	5470	10800	18200	11500	6250	5960	4550	3770	3930	3520	4000	4150
18	5410	11500	16200	11200	7140	5780	4290	3860	3880	3490	4110	3990
19	5490	11300	14900	11100	7080	5480	4130	3880	3730	3790	4700	3710
20	5960	11400	14100	11200	7020	5210	4300	3850	3640	3880	6120	3670
21	25600	11500	13100	11000	6840	5260	4410	3750	3710	4050	6340	4040
22	38200	13600	12200	10700	6770	5010	4340	3640	3840	3940	5330	4120
23	44200	19200	11400	10600	6440	4900	4290	3550	3860	3730	4740	4430
24	29400	18900	11200	10700	6370	5350	4180	3660	3830	3560	4500	4240
25	22000	17900	10800	10400	6340	5200	4060	3780	3750	3570	4340	4170
26	21600	15700	11900	10200	6250	5200	4010	3830	3630	3730	4250	4040
27	21800	14400	14000	10400	6160	4970	4060	3800	3530	3830	4070	3940
28	20400	13500	14200	12100	6040	4760	4140	3720	3610	3830	3950	4080
29	26300		14900	13900	5810	5220	4180	3550	3840	3830	3870	4200
30	32400		18000	12600	5660	5160	4170	3500	3930	3830	4010	3990
31	22600		16000		6310		4030	3600		3830		3810
Mean	14750	13070	15770	12550	8008	5986	4307	3805	3728	3745	4247	4023
Ac. Ft. for Month	907200	726000	969700	746600	492400	356200	264900	234000	221800	230300	252700	247400

NOTE: This is a permanent station maintained throughout the year under Federal-State cooperation by the Water Resources Branch of the U. S. Geological Survey.

* Drop in flow due to construction operations at Shasta Dam when river channel plugged and flow shifted to temporary diversion tunnel.

TABLE 9

DISCHARGE OF SACRAMENTO RIVER NEAR RED BLUFF - 1943

Day	Daily Discharge in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	16000	27900	17000	19200	16600	10800	5480	4090	3840	4130	4320	4790
2	18500	22800	16300	18200	15500	11800	5370	3940	3940	4050	4380	4870
3	16400	19300	15500	17500	14600	9860	5410	3980	3940	3860	4560	4870
4	14000	17800	15100	16900	14200	8950	5080	4110	3880	3650	4700	4870
5	12300	18600	15100	18500	13700	8430	4850	4220	3720	3630	4700	4680
6	10900	16700	16500	21800	13100	7750	4980	4160	3610	3830	4680	4460
7	10000	18800	24300	19300	12500	6220	*3230	4260	3650	3990	4480	4460
8	9500	22700	28600	21200	12000	7430	4360	4150	3830	4070	4320	4660
9	9080	20100	46900	19400	11500	7460	4740	3920	3940	4030	4320	4700
10	8440	17900	41800	17700	11000	7290	4740	3790	3940	3810	4480	4740
11	7240	16400	33600	16600	10600	7540	4680	4110	3940	3660	4600	4790
12	6890	15000	29100	15600	10300	7940	4580	4200	3830	3680	4700	4580
13	7020	14100	26500	15500	9890	7860	4520	4150	3680	3830	4700	4300
14	7120	13800	32300	15300	9520	7210	4660	4070	3650	3940	4500	4220
15	6990	13800	33200	15200	9430	7190	4680	3810	3840	4090	4260	4540
16	6890	14200	27400	15300	9350	7010	4700	3720	3980	4150	4240	4740
17	6560	14100	24800	15000	8900	6770	4760	3740	4050	3840	4380	4810
18	6390	14600	22400	14300	7810	6570	4680	3900	4050	3630	4600	4740
19	6360	14800	20300	13900	8510	6370	4360	3960	3920	3920	4830	4520
20	8830	14600	18800	14400	8400	6080	4420	4010	3770	4440	5800	4540
21	88800	14700	17600	14200	8290	5960	4640	4010	3740	4870	7510	4680
22	92500	20100	16600	14500	8080	6520	4640	3900	3860	4930	6900	4950
23	105000	37400	15300	13500	7860	5060	4560	3830	3980	4660	5800	4890
24	53600	28500	14900	13700	7640	6100	4440	3790	3960	4460	5450	5060
25	40400	25900	14200	13300	7620	5960	4260	3980	3940	4360	5210	5020
26	44000	22200	14600	13000	7540	5840	4160	4090	3810	4420	5020	4890
27	38500	20100	17900	13100	7380	5610	4200	4070	3680	4790	4890	4700
28	31600	18300	17700	19900	7240	5230	4320	4030	3630	5040	4700	4640
29	41700		17900	20400	7010	5370	4380	3830	3840	5020	4600	4790
30	61600		23600	17800	6820	5640	4380	3630	4070	4810	4580	5100
31	38800		20800		7290		4320	3680		4540		4810
Mean	26840	19110	22470	16470	10010	7127	4599	3972	3850	4198	4874	4723
Ac. Ft. for Month	1650000	1062000	1382000	980200	615200	424100	282800	244200	229100	258100	290000	290400

* Drop in flow due to construction operations at Shasta Dam when river channel plugged and flow shifted to temporary diversion tunnel.

TABLE 10

DISCHARGE OF SACRAMENTO RIVER AT BUTTE CITY - 1943

Day	Daily Discharge in Second-Feet											
	Jan	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	18400	55800	22200	24000	19900	6990	4520	2880	2310	3700	4840	5370
2	18700	38000	20900	22600	18700	9830	4420	2710	2390	3800	4620	5480
3	20300	30900	19600	21600	17400	10300	4310	2550	2470	3700	4620	5480
4	18000	26400	19000	20900	16200	9110	4420	2550	2550	3500	4840	5370
5	15900	25400	18700	20300	15600	8150	4200	2630	2470	3310	4940	5260
6	14100	24600	20600	22900	15000	7910	3900	2630	2390	3310	4940	5040
7	12800	22600	23600	24300	14100	7220	3900	2630	2230	3800	5040	5040
8	11800	27100	29400	22200	13300	6300	*3130	2710	2230	4000	4940	4940
9	11300	28200	42200	24300	12500	6760	3220	2710	2390	4100	4730	4940
10	10800	25000	62400	22200	12000	7220	3600	2550	2550	4310	4520	4940
11	10100	22600	70100	20600	11300	6530	3600	2390	2630	4100	4730	5040
12	9110	20900	49200	19300	11000	6760	3400	2470	2630	3500	4940	5150
13	8630	19300	38800	18400	10600	6990	3400	2630	2630	3500	4940	4940
14	8630	18400	34800	18000	10100	6990	3310	2630	2470	4100	4940	4730
15	8630	18000	40500	17700	9590	6530	3400	2550	2470	4310	4840	4420
16	8390	17700	38400	17700	9350	6300	3500	2390	2630	4310	4620	4730
17	8150	17700	33200	17700	9350	6390	3400	2310	2790	4520	4520	4940
18	7910	17700	30500	17100	8630	5860	3400	2230	2790	4310	4940	5040
19	7680	18000	27900	16200	8150	5860	3500	2310	2880	4100	5370	5150
20	7910	18000	25000	15600	8390	5640	3220	2390	2880	3600	5590	5480
21	18700	17700	23200	15900	8150	5420	3040	2470	2880	4200	6910	6030
22	[illegible]000	18400	21900	16200	7910	5200	3220	2470	2790	4730	7830	5810
23	132000	30100	20900	15900	7680	5530	3310	2470	2880	4840	7140	5590
24	141000	40500	19300	14700	7450	4620	3220	2390	2960	4730	6470	5590
25	105000	35600	18700	14700	7220	5040	3130	2390	2960	4620	6250	5810
26	71100	30900	18000	14100	7220	4940	3040	2550	2960	4420	5810	5810
27	72100	26400	19300	13800	6990	4840	2880	2630	3040	4420	5810	5810
28	58500	24300	21600	16500	6990	4620	2790	2710	3040	4730	5590	5810
29	44100		21200	25400	6530	4310	2790	2630	2960	5040	5480	5590
30	72100		22900	23200	6300	4310	2880	2550	3220	5150	5370	5480
31	93000		26400		6300		2880	2390		4940		5810
Mean	36640	25580	29050	19130	10640	6413	3449	2532	2682	4184	5337	5310
Ac. Ft. for Month	2253000	1421000	1786000	1139000	654300	381600	212100	155700	159600	257300	317600	326500

NOTE: Station is maintained jointly by the Division of Water Resources (Water Supervision) and the Water Resources Branch of the U. S. Geological Survey. Records above 100,000 c.f.s. are from extended rating curve. Station is near Butte City Bridge and is at mile 115.8 above Sacramento.

* Drop in flow due to construction operations at Shasta Dam when river channel plugged and flow shifted to temporary diversion tunnel.

TABLE 11

DISCHARGE OF SACRAMENTO RIVER AT COLUSA - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	19300	35700	24400	25600	22500	6500	4330	2710	2320	3500	4910	5500
2	19300	32200	22600	24100	20600	8500	4330	2640	2320	3800	4700	5500
3	20400	30000	21500	22900	19100	10200	4230	2500	2380	3800	4600	5600
4	20200	28000	20600	22200	17700	9450	4230	2440	2440	3700	4700	5500
5	18000	25800	19900	21600	16500	8510	4230	2440	2440	3500	5010	5410
6	15700	25600	20100	21900	15700	8000	3920	2500	2380	3400	5010	5310
7	14000	24000	22600	24600	14800	7490	3720	2570	2380	3500	5010	5210
8	12700	24100	26700	23800	13900	6780	3520	2500	2270	4100	5010	5110
9	11800	28200	31000	24100	13100	6370	3050	2570	2270	3900	4810	5110
10	11100	27200	34400	24100	12400	7080	3320	2500	2380	4300	4600	5110
11	10600	24800	35900	22300	11800	6570	3520	2380	2500	4300	4600	5110
12	9560	22600	34600	21000	11100	6470	3320	2320	2570	4000	4810	5210
13	8920	21000	32400	19900	10800	6680	3230	2380	2570	3600	4910	5210
14	8610	19900	31000	19100	10200	6980	3140	2500	2570	3900	4910	4920
15	8610	19100	31400	18700	9780	6570	3140	2440	2480	4300	4910	4720
16	8500	18700	32000	18400	9450	6270	3230	2380	2540	4400	4700	4720
17	8400	18600	30800	18300	9240	6170	3140	2270	2690	4500	4500	5010
18	8100	18500	29600	18000	9030	5860	3140	2220	2760	4500	4700	5110
19	7800	18600	28700	17200	8200	5760	3230	2220	2930	4300	5010	5210
20	7800	18800	27200	16600	8400	5550	3050	2270	2930	4000	5320	5500
21	10400	18600	25100	16400	8200	5350	2870	2320	2930	4000	5930	5800
22	30600	18800	23500	16200	8000	5150	2960	2380	2840	4500	7170	5800
23	39900	21600	22200	16500	8200	5150	3140	2380	2840	4810	7280	5800
24	41700	31800	21000	15600	7700	5040	3050	2320	3020	4810	6780	5800
25	40400	31200	20100	15200	7400	4740	2960	2320	3120	4700	6290	5900
26	36400	30200	19400	14700	7300	4940	2870	2320	3120	4500	6090	5900
27	35700	28500	19200	14300	7200	4840	2790	2440	3210	4500	5900	5900
28	35300	26600	21100	14700	7000	4740	2640	2570	3210	4600	5800	5700
29	33100		21900	20900	6900	4430	2640	2500	3300	4910	5700	5600
30	34200		22300	24500	6600	4230	2640	2500	3300	5110	5600	5700
31	37400		25500		6400		2710	2380		5110		5900
Mean	20150	24600	25760	19780	11140	6346	3300	2425	2700	4221	5309	5415
Ac. Ft. for Month	1239000	1366000	1584000	1177000	684700	377600	202900	149100	160700	259500	315900	333000

NOTE: Station is maintained jointly by the Division of Water Resources (Water Supervision) and the Water Resources Branch of the U. S. Geological Survey. Station is at Colusa Bridge and is at mile 89.4 above Sacramento.

TABLE 12

DISCHARGE OF SACRAMENTO RIVER BELOW WILKINS SLOUGH - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	18900	22100	20500	20700	20000	5540	3490	1950	1630	3990	5180	5470
2	18700	21800	20200	20400	19400	6840	3610	1910	1590	4190	5040	5470
3	18900	21400	19900	20200	18400	9450	3610	1790	1670	4330	4900	5540
4	19100	21100	19500	20000	17300	9600	3360	1670	1710	4260	4830	5540
5	18000	20900	19000	19900	16200	8850	3430	1630	1750	4120	5040	5470
6	16200	20700	18900	19800	15400	8100	3180	1670	1750	3860	5180	5470
7	14700	20500	19900	20400	14500	7500	2930	1750	1750	3800	5180	5330
8	13500	20400	20600	20300	13800	6910	2810	1830	1710	4190	5180	5260
9	12500	21000	21200	20300	12900	5970	2300	1750	1710	4330	5040	5330
10	11800	21000	21700	20400	12200	6260	2350	1710	1790	4400	4900	5470
11	11200	20600	22000	20000	11400	6400	2630	1630	1950	4470	4830	5470
12	10600	20200	21900	19700	10700	5900	2630	1550	2050	4330	4900	5540
13	9750	19700	21700	19200	10200	6040	2510	1590	2100	3930	5040	5540
14	9300	19100	21500	18500	9820	6400	2400	1670	2200	3860	5040	5400
15	9150	18400	21500	18000	9380	6190	2350	1670	2150	4260	5110	5180
16	9080	18000	21600	17800	8920	5830	2350	1630	2150	4470	4970	4900
17	9000	17700	21500	17700	8700	5610	2350	1510	2350	4540	4760	5110
18	8780	17600	21300	17400	8400	5400	2300	1470	2450	4620	4830	5330
19	8480	17600	21200	17000	7880	5110	2350	1430	2630	4470	4110	5470
20	8020	17700	21000	16400	7430	4900	2350	1470	2810	4260	5400	5610
21	9080	17700	20700	16000	7360	4690	2150	1510	2930	3990	5680	5830
22	19200	17700	20400	15700	7280	4470	2050	1630	2870	4330	6700	6190
23	22400	18400	20100	15700	7130	4330	2200	1630	2990	4760	7360	6110
24	22900	21100	19800	15200	6910	4540	2250	1590	3180	4970	6910	6260
25	23200	21300	19400	14600	6700	4060	2200	1590	3430	4900	6400	6260
26	22600	21300	19000	14300	6480	4260	2150	1630	3610	4760	6110	6400
27	22100	21100	18600	14000	6330	4260	2050	1750	3740	4690	5900	6330
28	22000	20900	19400	13900	6190	4060	1950	1870	3800	4690	5750	6190
29	21900		19800	17000	5970	3930	1870	1870	3800	4970	5610	6040
30	21900		19900	20100	5830	3490	1870	1830	3800	5180	5540	6040
31	22100		20400		5610		1910	1790		5260		6260
Mean	15650	19890	20450	18020	10470	5830	2514	1676	2468	4425	5414	5671
Ac. Ft. for Month	962100	1105000	1258000	1072000	644100	346900	154600	103100	146900	272100	322200	348700

NOTE: Station is maintained jointly by the Division of Water Resources (Water Supervision) and the Water Resources Branch of the U. S. Geological Survey. Station is located at mile 62.9 above Sacramento, a short distance below Wilkins Slough pumping plant of Reclamation District 108.

TABLE 13

DISCHARGE OF SACRAMENTO RIVER AT KNIGHTS LANDING - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	20700	23600	22700	22100	21100	5470	3430	1980	2070	4730	5510	5550
2	20100	23600	22200	21700	20300	6110	3490	2060	1940	4910	5290	5540
3	20000	22900	21700	21600	19000	8930	3590	1950	1990	5120	5150	5550
4	21000	22800	20900	21600	17600	10300	3410	1830	2020	4880	5060	5640
5	20100	22400	20300	21100	16300	9880	3440	1700	2100	4710	5090	5650
6	18100	22400	19400	20900	15400	9210	3350	1640	2180	4410	5280	5700
7	16300	22400	19700	21600	14500	8240	3090	1720	2200	4200	5330	5540
8	14800	22200	21400	21800	13600	7280	2980	1820	2180	4430	5270	5460
9	13600	22800	21500	21300	12900	6580	2670	1940	2160	4740	5090	5480
10	12800	23100	20700	22000	12100	6310	2330	1870	2330	4620	4930	5600
11	12300	22900	22300	21800	11400	6780	2490	1800	2460	4730	4740	5550
12	11700	22400	23000	21100	10800	6340	2610	1680	2850	4530	4840	5570
13	10800	21500	23000	20200	10200	6190	2470	1630	2790	4180	4970	5600
14	10100	20700	22500	19200	9900	6450	2350	1680	2910	3840	5060	5580
15	9840	20000	21900	18500	9490	6590	2280	1780	3020	4080	5080	5350
16	9790	19300	22400	18100	9110	6270	2190	1790	3160	4350	5020	5120
17	9580	18900	22500	17600	8840	6200	2190	1740	3590	4540	4880	4970
18	9380	18900	22300	17400	8520	5950	2180	1710	3710	4640	4790	5270
19	9090	18900	22200	16700	8050	5570	2200	1650	3830	4540	5040	5580
20	8880	19100	22200	16100	7590	4990	2310	1650	3370	4310	5370	5660
21	8650	19200	21900	15600	7520	4940	2200	1760	3940	4010	5740	6010
22	14500	19000	21600	15400	7390	4660	2110	1850	3870	4190	6520	6550
23	22300	18900	21500	15400	7320	4400	2130	1930	3960	4650	7520	6620
24	23900	22100	21400	14900	7030	4560	2300	1970	4100	5110	7460	6720
25	25100	23100	21000	14400	6790	4260	2290	1980	4390	5090	6820	6780
26	24900	23200	20300	14000	6610	4150	2270	2030	4710	4970	6370	6960
27	24300	23300	19400	13700	6530	4340	2210	2040	4820	4770	6130	6760
28	24100	23000	19800	13400	6350	4190	2090	2210	4830	4770	5920	6560
29	23600		20700	15500	6200	4010	2020	2420	4810	5010	5800	6270
30	22800		20700	20400	6030	3630	1950	2370	4740	5340	5620	6250
31	22600		21500		6030		1970	2210		5570		6420
Mean	16640	21520	21440	18500	10660	6093	2535	1884	3244	4644	5523	5866
Ac. Ft. for Month	1023000	1195000	1318000	1101000	655500	362500	155900	115800	193100	285600	328600	360700

NOTE: Station is maintained jointly by the Division of Water Resources (Water Supervision) and the Water Resources Branch of the U. S. Geological Survey. It is located at the Knights Landing Railroad Bridge, mile 34.0 above Sacramento, below the point of discharge of the river of Colusa Basin drainage via the Back Borrow Pit of Reclamation Districts 108 and 787.

TABLE 14

DISCHARGE OF SACRAMENTO RIVER AT VERONA - 1943

Date	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	50200	61700	50500	50700	45500	13800	5980	3160	3160	7080	8200	8370
2	46600	60400	48400	51500	44800	21200	5850	3050	3060	7400	8040	8370
3	43000	58500	45500	50500	43500	25800	5850	2940	3160	7720	7880	8370
4	40000	56800	43000	49400	41500	24000	5720	2830	3060	7400	7720	8540
5	36500	55500	40800	48600	39200	21700	5590	2630	3260	7240	7720	8540
6	32900	54200	40200	48600	36500	19400	5350	2540	3260	6920	7880	8540
7	29200	52800	44200	49200	34600	16800	4990	2540	3160	6760	7880	8540
8	26300	51800	48100	49400	32700	14600	4750	2730	3260	6760	8040	8370
9	23700	52000	51500	50200	30400	12700	4390	2730	3360	7080	7720	8040
10	21700	51800	56800	50700	27400	11900	3930	2730	3260	7080	7720	8200
11	20300	50700	60600	50200	24200	12100	3930	2730	3470	7080	7400	8370
12	19000	48600	61400	48100	22800	11700	4150	2630	4050	6920	7560	8710
13	17900	45800	60400	45800	21900	11700	4040	2540	3930	6760	7560	8710
14	17000	42800	59300	43500	20300	12700	3930	2730	4050	6300	7720	8370
15	16400	40000	58500	42000	19000	11900	3820	2830	4170	6450	7720	8200
16	15900	37500	58200	41500	18100	11100	3710	2830	4290	6760	7560	7880
17	15700	36100	57700	41500	16800	10500	3710	2730	4810	6920	7400	7720
18	15300	35100	56800	42000	15900	9760	3710	2630	5070	6920	7240	7720
19	14800	34600	56300	42000	15500	9040	3710	2540	5460	6760	7400	7880
20	14600	34100	55500	41500	14200	8860	3710	2540	5200	6760	7720	8200
21	19000	34100	54700	40500	14200	8340	3710	2540	5330	6600	8370	9220
22	50700	34100	53600	39000	14200	8000	3490	2960	5590	6760	9390	10300
23	61400	36100	52800	38000	14400	7660	3380	2960	5590	7240	9930	10100
24	65500	40800	51200	37000	14800	7490	3600	2960	5860	7720	9930	9930
25	67100	45300	49400	36300	15500	7320	3600	2960	6150	7720	9570	9930
26	65800	49200	47100	35600	15000	6850	3380	3060	6760	7560	9050	9930
27	63600	51200	45000	33900	14600	7000	3270	3060	6760	7400	8880	9390
28	62000	51500	44000	33200	14400	6700	3270	3160	6920	7400	8710	9050
29	60600		44200	38000	14400	6550	3160	3470	6920	7560	8540	9390
30	59800		45500	43800	13800	6260	3160	3360	7080	7880	8370	9390
31	61400		48600		12900		3160	3260		7880		9390
Mean	37220	46540	51280	43740	23320	12110	4129	2850	4649	7122	8161	8763
Ac. Ft. for Month	2289000	2585000	3153000	2603000	1434000	720900	253900	175300	276600	437900	485600	538800

NOTE: Station is maintained jointly by the Division of Water Resources (Water Supervision) and the Water Resources Branch of the U. S. Geological Survey. It is located at mile 19.6 above Sacramento at the mouth of "Cross Canal" main drain of Reclamation District 1001, and below the mouth of the Feather River.

TABLE 15

DISCHARGE OF SACRAMENTO RIVER AT SACRAMENTO - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	54800	75500	55100	55400	52100	27800	7550	3310	3120	7250	8770	9160
2	51500	69000	53300	56600	53300	36600	7330	3180	3010	7660	8710	9170
3	47000	65400	50600	56900	53600	33000	7200	3010	3100	7980	8520	9120
4	43100	62600	47900	56600	50300	29300	7060	2860	2990	7530	8420	9320
5	39900	60500	46100	56000	48200	26200	6880	2650	3200	7420	8400	9320
6	36200	59300	50000	57200	45200	23500	6570	2520	3180	7090	8500	9260
7	32100	57500	56300	56000	42800	20800	6250	2490	3090	6980	8510	9310
8	28600	57200	57500	56000	40500	18500	5950	2690	3160	7010	8610	9160
9	26000	56300	65400	57500	37300	16700	5470	2670	3280	7380	8310	8840
10	23400	55700	93600	56600	33900	15800	4920	2670	3150	7390	8300	8920
11	22100	54800	90200	55400	30900	15900	4790	2650	3400	7310	7940	9070
12	20100	53000	78000	53900	28900	15300	4920	2590	4020	7290	8040	9350
13	18900	50600	71500	51800	26900	15100	4790	2490	3990	7150	8070	9290
14	18100	47300	69500	50300	25400	15800	4670	2700	4140	6650	8260	9060
15	17400	44600	73500	50000	24300	14800	4500	2820	4230	6960	8200	8900
16	16900	42000	69500	49500*	22400	14000	4360	2810	4430	7170	8120	8600
17	16600	39900	66900	50000	21300	13500	4320	2700	4980	7390	7980	8450
18	16200	38800	66600	49700	20400	12800	4230	2590	5210	7400	7840	8460
19	15800	37900	64400	49400	20000	12200	4200	2480	5600	7210	8060	8600
20	15600	37000	62600	47900	18800	11800	4170	2460	5350	7360	8460	9090
21	20300	37000	61100	45800	19100	11000	4120	2500	5460	7230	9210	10500
22	90800	37600	60200	45500	19500	10400	3940	2970	5770	7450	10200	11500
23	87700	40800	59000	45500	20500	9690	3830	2950	5740	7950	10800	11100
24	88900	44000	60500	45200	21900	9280	4020	3010	6030	8390	10700	10900
25	80500	48200	55700	44000	21500	8960	4000	2960	6270	8230	10400	10700
26	76000	53000	53900	41100	22300	8370	3720	3080	6920	8120	9710	10700
27	72000	55400	51800	39650	21300	8470	3550	3060	6870	8060	9640	10200
28	70000	56000	50300	50600	21500	8120	3520	3150	7050	8100	9380	9900
29	67800		50300	50600	20600	8010	3340	3460	7040	8220	9140	10300
30	69000		53300	50600	19300	7830	3290	3370	7220	8590	9160	10300
31	82700		54500		19200		3270	3260		8540		10300
Mean	44060	51320	61250	51140*	29780	15980	4862	2842	4700	7563	8812	9576
Ac. Ft. for Month	2709000	2850000	3766000	3037200*	1831000	951100	299000	174800	279700	465000	524400	588800

* In related tables in this report a figure of 26,300 was used for April 16 instead of the correct figure above.

NOTE: This represents the flow of the Sacramento River past Sacramento (below the City of Sacramento intake) to the Delta. Additional water flows to the Delta via the East Borrow Pit of Yolo By-Pass. (See Tables 117 and 118.) The discharges of this table have been computed as follows: January 1 to May 16 by gage height discharge relation; balance of year based on flows at Verona and making due allowance for draft and measured return flow. A gaging station is not maintained at Sacramento during periods of low flow because of tidal action.

TABLE 16

DISCHARGE OF FEATHER RIVER NEAR OROVILLE - 1943

Day	Daily Discharge in Second-Feet											
	Jan	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	9700	15200	9260	15200	11700	9820	2630	1910	1800	1660	2010	2160
2	8620	12900	8620	15000	11600	11100	2690	1870	1760	1540	1910	2160
3	7140	11400	8420	15100	11100	8910	2640	1900	1740	1520	1920	2110
4	6380	10900	8940	14600	10800	8100	2420	2070	1720	1520	1940	2110
5	5860	10500	11000	16900	10200	7040	2370	2190	1770	1550	1900	2310
6	5440	9660	15100	15800	10400	6630	2450	2220	1760	1560	1900	2210
7	5070	10800	17400	15000	10300	5540	2380	2130	1770	1570	1840	2060
8	4740	12200	24500	16500	8800	5150	2370	2120	1790	1560	1970	2100
9	4590	10800	36200	15000	7480	4920	2360	2080	1800	1650	1920	1950
10	4320	9840	39400	13500	7140	4690	2130	2020	1800	1590	1870	1970
11	4110	9210	36300	12400	7170	4510	2140	2040	1780	1570	1830	2020
12	4080	8580	31500	12100	6760	4880	2080	2010	1740	1600	1920	1940
13	3930	8340	26800	12300	6450	5680	2210	2000	1720	1600	1920	1790
14	3840	8100	28300	12800	6220	4200	2210	2000	1690	1640	1630	2070
15	3690	8140	25200	13500	6170	4220	2270	2000	1620	1630	1890	2030
16	3660	8300	21400	14000	5750	3940	2200	1940	1560	1620	1910	1830
17	3510	8420	18700	15000	5380	3770	2240	1980	1540	1580	2090	1640
18	3330	8580	17500	15300	5500	3690	2090	1990	1540	1680	2030	1780
19	3360	8580	16000	15900	5380	3560	2150	1970	1530	1870	2200	1850
20	4440	8850	14700	14600	5410	3440	2170	1940	1520	1910	2860	2930
21	57100	9210	14100	13000	5380	3220	2160	1850	1520	2220	2590	2290
22	59400	11500	14000	12500	5470	3370	2160	1770	1520	2100	2380	2060
23	64500	13000	13400	11900	5840	3140	2200	1840	1540	2050	2230	1820
24	38000	12400	12900	11800	5820	3030	2160	1950	1560	1880	2220	1980
25	26200	11800	12400	11200	5680	2980	2130	2040	1560	1920	1970	1670
26	23200	10800	12900	10200	5570	2740	2130	1950	1500	1930	2080	1390
27	21000	10200	14300	11100	5920	2480	2110	1950	1520	2000	2020	1930
28	17200	9800	14600	17600	5920	2660	2060	1930	1600	1970	1740	1940
29	17700		17000	16200	5490	2690	2060	1910	1620	1920	1920	2010
30	29700		18800	13700	5160	2700	2010	1840	1620	1920	2180	2020
31	19900		16600		6640		1930	1840		1830		1920
Mean	15280	10290	18590	13960	7178	4739	2236	1976	1650	1747	2026	2002
Ac. Ft. for Month	939600	571300	1143000	830700	441300	282000	137500	121500	98200	107400	120600	123100

NOTE: This is a permanent station maintained throughout the year under Federal-State cooperation by the Water Resources Branch of the U. S. Geological Survey. It is located at highway crossing about 4.5 miles above Oroville.

TABLE 17

DISCHARGE OF FEATHER RIVER AT NICOLAUS - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	22000	42000	13000	24300	21200	9600	1680	386	352	1600	2260	2530
2	17000	34200	12000	19500	19400	15800	1600	434	372	1720	2260	2530
3	14000	29300	12000	19500	19000	15100	1600	393	333	1760	2260	2530
4	12000	20000	11000	19600	18000	11100	1600	393	198	1760	2260	2530
5	11000	18000	12000	21000	17400	9770	1550	379	180	1720	2350	2530
6	10300	16000	18800	23600	16300	8320	1350	372	174	1760	2260	2620
7	9300	15000	24800	23400	15800	7400	1430	379	180	1760	2350	2720
8	8480	17000	26000	22600	14900	6290	1390	420	174	1840	2350	2620
9	8000	17000	31100	24100	13300	5640	1310	434	168	1760	2350	2620
10	7550	15500	48000	23300	11600	5380	1270	441	186	1760	2350	2530
11	7110	16000	56000	18500	10400	4990	1100	441	186	1800	2260	2530
12	6690	13000	48000	17000	10300	4860	1010	406	259	1800	2260	2530
13	6550	12000	41000	17000	10100	4990	878	340	271	1800	2260	2440
14	6290	12000	41000	19900	9440	5640	808	333	247	1800	2350	2260
15	6160	11500	36900	19600	8640	4470	762	346	247	1800	2260	2440
16	6030	14000	34600	20400	8000	4080	755	315	284	1890	2090	2440
17	5900	13800	31400	21200	7250	3690	770	309	406	1840	2220	2350
18	5770	13700	28000	21700	6830	3190	762	309	511	1840	2140	2180
19	5510	13500	24500	21900	6690	3070	755	290	575	1890	2180	2180
20	5510	13300	22000	21200	6420	2950	710	278	612	1970	2350	2350
21	13200	13500	19500	20600	6420	2830	695	302	650	2090	2720	3310
22	53000	14000	18500	19400	6830	2620	680	366	725	2260	2950	3310
23	67500	17800	18000	19200	7110	2530	642	346	755	2350	2530	2950
24	71000	19400	17000	18800	8000	2440	620	321	800	2260	2530	2720
25	64000	20000	16000	18800	8800	2260	539	321	901	2180	2440	2720
26	51000	20400	17000	18000	8320	2180	490	302	1140	2180	2350	2440
27	44000	20200	19600	16300	7850	2090	455	315	1220	2140	2350	2090
28	39000	20000	20200	18200	8160	1930	427	321	1270	2180	2350	2260
29	35000		20800	24100	8000	1760	427	346	1390	2180	2350	2620
30	36900		23600	23600	7250	1760	434	406	1550	2140	2180	2620
31	49000		25600		6690		413	366		2180		2530
Mean	22730	17930	25420	20510	10790	5290	933	358	544	1936	2339	2549
Ac. Ft. for Month	1397800	995900	1562800	1220600	663300	314800	57350	22040	32360	119000	139200	156800
Diversions (1)	0	0	0	0	10	220	260	360	140	0	0	0
Contributions (1)	—	—	—	—	0	0	6000	6000	6000	1200	0	0
Discharge to Sacramento River, Ac. Ft.	1397800	995900	1562800	1220600	663300	314600	63100	27680	38220	120200	139200	156800

NOTE: Station maintained jointly by Division of Water Resources (Water Supervision) and the Water Resources Branch of the U. S. Geological Survey. Record from May 1 to December 31 compiled by U.S.G.S. Balance of year by Water Supervisor.

(1) All below Nicolaus. Contributions are through Nelson Slough cut from Sutter By-pass.

TABLE 18

DISCHARGE OF YUBA RIVER AT NARROWS DAM - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	4960	8290	3700	6240	6420	10100	1030	537	418	659	618	419
2	4360	6750	3510	6050	7530	9540	1000	381	418	666	583	415
3	3640	5640	3380	6400	7160	4700	986	528	406	663	612	444
4	3160	5080	3700	6290	7140	4000	920	520	342	670	560	511
5	2850	4860	4810	7520	6650	3270	930	503	397	657	595	401
6	2580	4380	11000	7360	6340	2770	920	519	402	674	590	570
7	2300	4710	10000	6860	5900	2640	890*	500	402	671	596	576
8	2100	5570	10100	8200	5330	2390	830*	500	402	676	557	581
9	2000	4780	22800	7280	4870	2380	767*	500	402	593	578	586
10	1910	4210	29700	6140	4100	2470	731	507	402	662	575	581
11	1790	3900	19600	5460	3970	2380	730	507	402	652	566	572
12	1690	3640	13500	5350	4630	2290	729	476	402	646	573	494
13	1610	3510	10800	5710	3940	2260	726	466	402	634	570	537
14	1560	3440	12300	6720	3370	2100	726	323	402	638	565	474
15	1500	3510	10500	7520	2940	1970	726	466	412	642	555	460
16	1490	3510	8740	8320	2760	1790	726	466	560	640	414	387
17	1440	3510	7960	8250	2610	1650	722	468	554	628	299	278
18	1320	3440	7320	7680	2570	1610	729	470	554	618	299	248
19	1280	3350	6370	7210	2580	1600	729	470	557	622	297	233
20	1870	3410	5760	6790	2580	1550	731	470	561	627	310	499
21	38200	3570	5350	6070	2990	1510	731	470	627	624	308	524
22	37600	4810	5470	7050	3780	1480	734	470	627	621	328	538
23	31400	5990	5050	7280	4160	1420	734	468	630	622	340	540
24	17900	5320	4690	8100	5360	1330	547	471	635	612	371	544
25	11600	5320	4650	7770	5220	1290	505	466	639	620	378	80
26	10300	4700	4670	6330	4670	1220	535	443	645	616	399	80
27	10600	4350	5070	5700	4630	1210	540	443	652	620	414	340
28	8600	3970	5490	11200	4570	1200	540	443	652	610	414	589
29	8840		6920	8690	4140	1160	542	446	652	527	414	598
30	18200		8840	6790	3200	1110	537	446	652	608	415	358
31	11700		6970		4500		537	436		612		323
Mean	8066	4554	8668	7078	4536	2546	734	470	507	633	470	445
Ac. Ft. for Month	496000	252900	533000	421200	278900	151500	45140	28920	30160	38940	27950	27330

NOTE: This is a permanent station maintained throughout the year under Federal-State cooperation by the Water Resources Branch of the U. S. Geological Survey. For total flow of Yuba River near Smartville combine with flows in Table 19.

* Estimated.

TABLE 19

DISCHARGE OF DEER CREEK NEAR SMARTVILLE - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	201	727	257	296	183	170	20	2	4	2	15	78
2	190	587	255	274	172	157	20	2	2	4	14	81
3	174	493	252	272	165	101	20	2	1	4	15	82
4	174	450	284	250	144	86	19	2	1	3	21	85
5	157	411	354	371	133	80	16	2	1	2	25	129
6	140	380	1450	284	135	75	14	2	1	2	121	96
7	145	608	639	265	127	70	12	3	1	3	114	81
8	120	496	821	439	118	63	12	2	2	5	101	78
9	121	402	2830	320	108	61	10	3	2	3	71	76
10	61	358	3660	272	104	57	7	2	2	6	31	45
11	43	330	1230	232	103	61	7	4	2	5	24	47
12	40	308	860	181	97	53	8	3	3	6	22	63
13	46	300	692	113	103	68	8	3	2	5	22	67
14	90	287	1040	101	100	67	9	3	2	3	22	74
15	112	275	696	106	101	46	8	2	2	3	19	79
16	118	264	578	108	103	26	6	2	2	4	25	76
17	109	257	620	106	98	23	6	2	2	8	23	78
18	105	248	571	104	94	24	7	2	6	11	24	58
19	102	241	486	114	91	20	7	2	4	14	31	176
20	501	235	442	161	83	19	7	2	4	18	43	289
21	5240	237	442	165	77	22	6	3	2	41	45	168
22	2150	518	436	152	79	28	5	4	2	33	28	122
23	2570	522	388	154	77	31	6	5	2	21	25	90
24	1100	584	362	149	73	33	5	6	2	20	24	42
25	786	490	339	152	67	31	6	6	1	20	23	31
26	935	378	325	147	62	32	5	6	2	16	46	24
27	790	348	303	175	58	36	3	6	2	21	85	22
28	607	287	284	689	57	30	2	5	2	63	86	21
29	1190		489	246	57	23	2	4	2	23	85	20
30	3220		436	204	66	19	2	6	2	16	102	38
31	1090		322		104		1	5		15		33
Mean	723	394	714	220	101	54	9	3	2	13	44	79
Ac. Ft. for Month	44480	21860	43920	13090	6230	3200	524	209	130	801	2640	4860

NOTE: This is a permanent station maintained throughout the year under Federal-State cooperation by the U. S. Geological Survey. For total flow of Yuba River near Smartville combine with flows in Table 18.

TABLE 20

DISCHARGE OF YUBA RIVER AT MARYSVILLE (SIMPSON LANE BRIDGE) - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1						6700	796	322	244	494	552	408
2						7500	746	306	241	506	534	394
3						5580	729	306	239	511	540	408
4						4370	708	306	237	511	540	462
5						3640	642	303	234	511	534	483
6						2980	642	300	232	523	595	534
7						2700	613	292	232	534	640	564
8						2330	593	286	229	534	633	577
9						2320	551	280	229	523	608	589
10						2250	523	286	227	517	571	577
11						2200	514	292	218	517	534	558
12						2100	500	283	218	517	523	552
13						2020	500	272	213	517	506	528
14						1910	487	267	211	511	500	462
15						1770	487	259	218	506	494	457
16						1620	487	259	257	506	417	432
17						1490	479	259	318	506	288	330
18						1370	474	259	334	511	260	315
19						1360	479	259	355	511	257	295
20						1320	474	259	355	523	263	583
21						1280	479	256	394	583	281	878
22						1230	474	256	408	621	274	720
23						1210	474	254	408	595	263	689
24						1150	426	254	408	577	285	669
25						1080	361	251	417	571	307	426
26						1040	338	251	417	564	318	270
27						996	332	251	426	564	351	234
28						968	325	251	467	595	372	403
29						907	325	249	494	571	385	506
30						862	322	249	494	546	412	421
31							316	246		552		408
Mean						2275	503	272	312	536	435	488
Ac. Ft. for Month						135400	30930	16710	18590	32980	25860	30010

NOTE: Station is maintained jointly by the Division of Water Resources (Water Supervision) and the Water Resources Branch of the U.S. Geological Survey. Station is at 7th St. Bridge. Discharge record determined for low water season only. For balance of year see U.S.G.S. Stations "Yuba River at Narrows Dam" and "Deer Creek near Smartville" (Tables 17 and 18). These stations replaced Smartville station in December 1941.

TABLE 21

DISCHARGE OF BEAR RIVER NEAR WHEATLAND - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	716	2790	1110	839	685	530	30	45	8	4	32	66
2	660	2120	1010	752	570	625	30	45	9	6	26	60
3	618	1750	976	724	535	462	27	45	6	5	24	52
4	611	1540	1000	680	520	440	31	43	8	6	23	81
5	590	1440	1050	872	505	422	28	43	6	8	22	91
6	578	1270	3090	730	467	310	28	41	7	6	22	91
7	572	1420	2400	120	505	334	27	38	8	5	21	91
8	560	1700	2470	1020	408	210	29	38	6	6	20	91
9	536	1350	8920	1190	364	120	29	38	4	6	17	86
10	530	1180	11200	988	203	160	29	37	3	5	16	73
11	524	1090	5060	832	115	70	29	38	4	18	15	81
12	518	1020	3350	690	124	168	31	37	4	25	17	78
13	512	962	2480	665	254	182	29	36	4	22	24	70
14	506	898	3170	670	408	185	29	34	6	22	33	60
15	500	865	2600	655	418	100	31	34	5	22	30	76
16	494	832	1900	485	390	75	33	34	5	21	28	90
17	482	839	1810	476	377	50	37	33	6	23	26	93
18	464	788	1960	485	326	50	42	33	5	31	17	95
19	459	764	1630	476	210	50	42	31	5	40	21	100
20	572	752	1480	472	350	50	46	28	5	49	29	126
21	10300	758	1400	472	306	50	47	26	4	43	37	140
22	10500	1210	1460	467	302	50	31	22	4	51	40	147
23	9220	1860	1250	462	302	50	38	19	3	50	51	152
24	4620	1350	1070	530	326	50	40	17	3	48	97	162
25	2980	1650	982	530	180	50	49	16	4	47	83	167
26	2960	1400	962	515	144	50	52	12	4	43	62	167
27	2870	1420	898	467	270	50	49	10	5	40	52	162
28	2290	1210	846	1430	302	50	50	9	5	37	47	157
29	2700		1000	1010	302	50	49	5	4	38	43	157
30	8960		1220	729	306	50	47	8	5	38	46	162
31	4460		956		314		46	8	5	37		175
Mean	2350	1294	2281	681	348	170	37	29	5	26	34	110
Ac. Ft. for Month	144500	71860	140300	40530	21400	10100	2250	1790	300	1590	2010	6740

NOTE: This is a permanent station maintained throughout the year under Federal-State cooperation by the Water Resources Branch of the U. S. Geological Survey.

TABLE 22

DISCHARGE OF AMERICAN RIVER AT FAIR OAKS - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	5460	12600	6270	8680	10300	16200	2180	488	278	209	533	759
2	4990	10200	5980	9070	13200	14100	2090	467	283	331	596	742
3	4490	8540	5790	9700	10500	7220	1970	440	276	261	575	710
4	3920	7600	6220	9780	10400	5650	1940	418	272	212	620	745
5	3610	7440	8970	11200	9490	4830	1940	415	278	249	572	710
6	3340	6900	18900	10700	9210	4410	1860	396	275	259	545	683
7	3070	6790	15500	9780	9020	4340	1930	375	242	273	548	738
8	2870	7950	15800	10600	8190	4360	1860	383	232	254	515	724
9	2670	6840	44000	10000	7220	4430	1740	375	238	311	533	695
10	2530	6300	73700	8190	7160	4310	1630	356	228	297	509	677
11	2480	6060	38300	7560	7400	4230	1460	346	243	256	494	662
12	2400	5820	24000	7400	6920	4090	1420	345	266	386	470	578
13	2310	5700	18900	7950	6370	3830	1370	351	295	377	509	539
14	2230	5640	18600	9570	5940	3540	1260	354	254	392	500	641
15	2190	5720	16700	10500	5440	3290	1190	348	268	419	476	635
16	2220	5720	13700	11300	4970	3340	1170	345	290	335	563	701
17	2220	5650	12700	11200	4550	3410	1120	339	299	412	605	680
18	2020	5510	12600	10600	4490	3540	1040	333	286	390	584	665
19	1810	5400	10700	10300	4540	3610	1000	330	279	498	683	680
20	2040	5440	9780	9620	4640	3440	962	318	264	548	794	1030
21	38400	5770	9160	8320	5040	3170	920	315	230	585	826	1300
22	73800	7200	9390	9340	5410	3000	944	321	238	630	784	1150
23	46700	8440	8440	10200	6370	2600	902	332	200	620	790	955
24	27500	7060	8060	11700	7280	2390	860	334	243	554	752	910
25	17400	9090	8120	10800	7440	2240	795	316	206	527	776	752
26	13900	7900	8260	8950	7320	2140	750	303	180	560	599	790
27	14100	7520	8470	7900	6790	2070	725	303	187	629	752	798
28	12000	6660	8680	16700	6980	2040	685	281	191	620	599	864
29	11200		9730	14300	6340	2121	630	281	202	650	539	857
30	23100		11900	9990	5570	2170	580	278	209	599	770	913
31	18900		9390		6880		530	275		590		888
Mean	11480	7052	15380	10060	7141	4337	1273	350	248	427	614	780
Ac. Ft. for Month	705900	391700	945500	598800	439100	258100	78250	21540	14740	26250	36520	47940

NOTE: This is a permanent station maintained throughout the year under Federal-State cooperation by the Water Resources Branch of the U. S. Geological Survey.

TABLE 23

DISCHARGE OF AMERICAN RIVER AT SACRAMENTO - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1					10300	14100	1980	557	294	213	568	782
2					13000	15700	1900	534	294	300	668	800
3					10200	7480	1770	499	283	294	638	752
4					10000	5600	1720	452	278	204	698	782
5					9800	4790	1720	452	278	256	674	776
6					9500	4330	1670	435	256	240	615	716
7					9230	4230	1720	418	278	278	626	770
8					8450	4210	1670	423	245	267	568	782
9					7370	4300	1550	406	245	328	586	782
10					7040	4250	1440	389	231	333	574	722
11					7370	4150	1300	378	251	256	534	698
12					6930	3950	1230	372	272	395	481	644
13					6310	3700	1190	372	305	418	510	580
14					5820	3400	1120	384	267	372	534	680
15					5350	3200	1060	378	256	470	476	686
16					4910	3250	1040	372	272	384	557	716
17					4470	3350	1030	367	305	435	580	722
18					4420	3450	966	361	294	441	592	728
19					4420	3500	919	356	262	476	656	716
20					4580	3300	880	333	267	563	734	893
21					4810	3050	843	333	213	597	837	1240
22					5290	2780	861	328	245	656	837	1210
23					6050	2430	861	339	213	740	830	1000
24					7060	2200	830	367	231	656	812	926
25					7250	2040	776	339	200	522	806	806
26					7210	1940	749	328	180	592	656	776
27					6640	1870	716	328	169	662	758	782
28					6790	1830	674	322	184	668	662	893
29					6210	1880	615	316	188	692	592	880
30					5450	1960	603	311	188	710	758	900
31					6290		551	305		668		906
Mean					7049	4207	1160	382	248	454	647	808
Ac. Ft. for Month					433400	250400	71300	23510	14760	27940	38510	49680

NOTE: Station is maintained jointly by Division of Water Resources (Water Supervision) and the Water Resources Branch of the U.S. Geological Survey. Station is located at the "H" Street Bridge and is 6.0 miles above mouth of river. For period not covered by this record refer to station at Fairoaks (Table 22).

TABLE 24

DISCHARGE OF COSUMNES RIVER AT MICHIGAN BAR - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	774	2780	1330	1540	1060	582	134	42	19	20	48	66
2	718	2220	1220	1480	1020	690	131	41	19	20	45	69
3	638	1900	1170	1420	956	450	126	39	20	20	45	61
4	570	1670	1410	1390	912	400	122	37	19	20	44	58
5	522	1560	4020	1870	860	365	115	37	18	20	42	56
6	478	1400	7150	1680	810	332	112	37	18	21	41	60
7	436	1510	4300	1450	770	309	108	37	18	21	41	66
8	408	1940	6580	1570	710	293	101	36	16	22	41	61
9	381	1550	14700	1520	654	277	97	36	16	23	41	55
10	361	1350	18700	1390	618	266	93	35	16	24	41	54
11	341	1280	9900	1290	600	256	91	34	16	24	41	54
12	321	1210	6030	1210	577	249	83	33	17	24	41	52
13	303	1150	4560	1150	547	249	83	30	16	23	41	50
14	294	1110	4560	1150	510	242	81	30	16	23	41	50
15	285	1090	3730	1120	497	229	78	28	16	23	41	49
16	276	1080	3070	1130	470	220	78	27	16	23	39	52
17	260	1040	3500	1120	445	208	76	25	15	23	39	50
18	240	1020	3520	1080	428	199	72	25	14	23	39	52
19	204	989	2740	1060	411	188	72	25	13	25	44	61
20	289	967	2400	1020	406	185	69	24	13	30	64	108
21	7220	967	2400	967	395	180	67	24	13	39	99	211
22	10700	1310	2490	934	385	180	67	23	13	62	108	158
23	11600	1450	2090	901	370	174	64	23	12	76	78	108
24	5930	1470	1880	912	375	166	60	25	12	55	66	89
25	3920	2140	1750	880	370	161	56	25	12	48	60	83
26	3050	1840	1670	840	360	156	55	27	14	45	56	83
27	3430	1750	1600	820	350	151	54	25	19	42	54	81
28	2590	1460	1540	1810	341	146	49	24	20	43	54	74
29	2560		1850	1430	332	138	47	22	20	56	50	71
30	6300		1960	1170	318	136	45	21	20	52	56	79
31	4100		1640		385		44	21		50		106
Mean	2242	1472	4047	1243	556	259	82	30	16	32	51	75.
Ac. Ft. for Month	137800	81720	248800	73990	34200	15430	5020	1820	964	2020	3050	4620

NOTE: This is a permanent station maintained throughout the year under Federal-State cooperation by the Water Resources Branch of the U. S. Geological Survey.

TABLE 25

DISCHARGE OF COSUMNES RIVER AT McCONNELL -1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	880	6000	1420	1700	1000	440	99	28	17	12	21	45
2	770	2910	1280	1580	930	659	95	25	17	12	21	40
3	704	2340	1180	1500	900	510	103	22	17	13	22	44
4	620	1970	1290	1440	840	405	110	17	17	13	24	43
5	573	1740	1690	1480	798	380	107	14	17	13	26	38
6	514	1550	5000	2040	758	342	95	12	16	14	27	35
7	475	1390	11000	1680	720	320	93	11	16	14	26	34
8	439	1780	7400	1500	686	298	87	14	16	14	29	37
9	407	1740	17600	1600	648	284	83	20	16	14	31	40
10	381	1450	24500	1430	615	263	83	20	16	15	32	37
11	356	1280	20400	1320	590	247	81	18	15	15	33	38
12	335	1200	13600	1240	560	243	80	18	15	15	34	38
13	321	1140	8000	1190	530	235	66	17	15	15	35	39
14	302	1090	5200	1130	510	225	66	17	15	16	35	40
15	291	1060	5600	1110	500	203	55	16	15	16	36	40
16	275	1040	3690	1090	475	195	51	16	14	16	36	41
17	262	1030	3200	1090	460	187	54	17	14	16	35	43
18	245	992	4300	1070	445	182	60	17	14	17	36	45
19	218	973	3820	1040	425	174	58	18	14	17	38	49
20	220	947	2950	1010	415	169	62	18	14	17	44	62
21	1180	932	2590	978	395	155	63	18	13	17	61	110
22	14400	1030	2700	918	380	145	58	19	13	18	93	181
23	19200	1640	2590	864	375	140	55	20	13	42	99	180
24	17800	1820	2240	858	370	123	57	20	13	54	82	160
25	10000	2110	2060	847	356	121	51	20	13	43	75	123
26	5000	2260	1910	810	347	125	51	19	12	37	63	94
27	3180	2100	1810	780	341	130	49	19	12	31	54	78
28	2860	1690	1700	1020	325	127	49	19	12	26	52	76
29	2670		1640	1660	320	116	41	18	12	23	48	76
30	3230		2070	1210	315	103	39	18	12	26	46	82
31	12600		1940		329		35	18		22		85
Mean	3249	1686	5366	1239	537	242	69	18	14	20	43	67
Ac. Ft. for Month	199800	93630	330000	73750	33040	14370	4240	1080	863	1260	2570	4110

NOTE: This station is maintained by the U. S. Bureau of Reclamation.
When flow in main channel reaches 4600 c.f.s. water starts to by-pass station. Figures here given include all overflow.

TABLE 26

DISCHARGE OF MOKELUMNE RIVER AT WOODBRIDGE - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	590	1900	1460	2450	3210	2170	407	304	234	324	255	651
2	1080	1900	1460	2450	3220	2970	292	281	220	391	367	693
3	1360	2300	1450	2180	3230	4330	360	268	250	389	466	702
4	1430	1800	1270	2000	3240	3850	392	266	252	211	426	675
5	1440	1450	1260	1990	2930	3150	346	261	269	326	444	606
6	1450	1380	2120	2040	2700	2120	288	273	208	404	498	387
7	1460	1340	3810	1970	2660	1400	273	355	179	360	488	573
8	1460	1310	4120	1950	2590	1340	269	338	180	421	271	658
9	1470	1290	3310	1930	2610	1380	263	326	260	428	347	675
10	1480	1270	4130	1920	2600	1490	269	302	311	360	480	667
11	1390	1260	5100	1920	2550	1820	286	292	346	193	500	671
12	842	1230	4860	1920	2520	1160	280	228	311	278	511	613
13	660	1230	4780	1900	2460	1340	274	261	222	406	540	354
14	620	1210	4750	1880	2000	1220	269	266	247	444	482	596
15	662	912	4630	1880	1720	1060	269	360	326	430	239	680
16	704	832	4670	2130	1650	1040	278	299	344	444	346	686
17	612	810	3770	2340	1630	1050	313	258	358	409	507	689
18	391	1120	2910	2390	1350	1120	349	258	362	197	532	662
19	500	1200	3080	2370	975	1230	329	250	324	237	588	611
20	600	1200	2400	2460	892	1450	319	255	176	415	536	360
21	620	1200	2190	2720	842	1310	281	252	179	472	484	529
22	1500	1090	2390	3160	827	965	288	253	274	470	746	621
23	4000	1070	2540	3170	1010	882	299	136	308	450	706	653
24	4500	1090	2540	3190	1060	723	302	160	295	411	724	678
25	4000	1120	2520	3190	1190	542	288	198	310	226	684	662
26	3500	1440	2510	3210	1430	482	274	208	293	286	649	596
27	3800	1560	2480	3180	1520	521	283	211	193	430	647	451
28	3800	1500	2480	3240	1780	476	278	212	233	478	632	560
29	3500		2480	3240	1970	417	223	217	283	438	423	617
30	2200		2480	3240	1970	424	218	133	276	452	625	636
31	1900		2460		1980		258	172		428		632
Mean	1726	1322	2981	2454	2010	1448	294	253	267	374	505	608
Ac. Ft. for Month	106200	73420	183300	146000	123600	86150	18080	15580	15910	23020	30040	37380

NOTE: This is a permanent station maintained throughout the year under Federal-State cooperation by the Water Resources Branch of the U. S. Geological Survey. It is located just below dam of Woodbridge Irrigation District.

TABLE 27

DISCHARGE OF CALAVERAS RIVER AT JENNY LIND - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	218	2510	762	490	214	86	35	12		0	26	26
2	172	1360	595	430	190	105	34	11		0	26	26
3	144	705	500	385	183	103	33	10		0	23	26
4	118	525	505	356	173	89	33	7		0	22	26
5	99	435	1500	575	171	81	30	4.8		0	22	26
6	85	371	5390	725	160	75	28	3.2		0	23	26
7	75	361	4840	495	155	70	27	2.0		0	23	26
8	70	1350	3860	425	150	68	29	1.9		0	23	26
9	68	1200	3740	485	144	65	30	1.9		0	22	26
10	65	790	4260	430	136	62	27	2.0		0	21	24
11	63	590	4300	361	132	60	25	1.9		0	19	21
12	61	480	3490	324	127	58	24	1.3		0	17	22
13	58	410	2800	292	122	58	23	.9	FLOW	0	16	25
14	56	347	1980	271	120	56	20	.7		0	16	25
15	54	306	1550	254	118	56	18	.1		0	16	25
16	52	275	1100	238	118	55	17	0.0		0	13	25
17	49	246	1150	230	120	53	16	0		0	12	25
18	47	218	2090	214	118	50	17	0	NO	0	14	25
19	47	202	1610	200	115	46	17	0		.5	18	26
20	46	183	1140	196	111	45	19	0		1.0	21	36
21	2310	176	942	190	105	42	21	0		3.2	30	81
22	5850	230	1200	183	97	44	22	0		13	38	92
23	4400	495	996	176	91	45	19	0		29	39	68
24	3500	600	818	171	87	46	17	0		31	37	52
25	2650	2050	710	168	84	45	17	0		30	35	48
26	1370	2220	640	166	81	42	19	0		26	32	50
27	1720	1810	570	163	76	41	17	0		22	29	46
28	1580	1160	515	298	75	40	16	0		20	28	41
29	906		500	460	70	38	15	0		22	26	40
30	2330		730	275	69	36	16	0		24	26	44
31	3190		610		70		17	0		25		52
Mean	1015	772	1787	321	122	59	22	2	0	8	24	36
Ac. Ft. for Month	62390	42850	109900	19090	7500	3490	1380	120	0	489	1410	2240

NOTE: This is a permanent station maintained throughout the year under Federal-State cooperation by the Water Resources Branch of the U. S. Geological Survey.

TABLE 28

DISCHARGE OF SAN JOAQUIN RIVER BELOW FRIANT - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	1270	3070	2280	4220	6500	7320	3240	1900	1360	1010	700	869
2	932	2890	2400	4230	7320	8390	3190	1820	1340	981	588	855
3	960	2650	2500	4420	6350	7580	3100	1740	1320	939	442	816
4	814	2400	2350	4490	6400	6580	3010	1630	1280	772	480	766
5	918	2320	2690	4540	6400	5110	2890	1610	1250	842	582	712
6	1020	2260	4000	4620	6400	4200	2950	1690	1280	939	718	679
7	1120	2200	3970	4360	6910	3920	3220	1710	1300	967	810	676
8	1020	2330	3360	4480	7200	4150	3190	1710	1330	974	790	706
9	984	2580	5380	4930	6460	4570	3040	1710	1320	995	803	730
10	890	2460	7990	4450	6030	4820	2930	1710	1330	967	855	748
11	724	2320	8800	4000	6160	4940	2650	1710	1350	836	876	772
12	939	2350	7630	3680	6180	4940	2670	1710	1360	932	883	748
13	904	2310	6620	3720	6090	4490	2670	1650	1340	987	897	659
14	918	2310	6020	3980	5460	4100	2620	1630	1240	995	869	694
15	932	2240	4790	4800	4830	4070	2520	1610	1180	987	803	730
16	939	2260	4280	5410	4480	4230	2460	1600	1140	967	816	718
17	808	2410	4150	5250	4150	4620	2400	1590	1070	911	869	664
18	612	2350	5890	5820	4020	5340	2220	1580	1090	748	946	626
19	688	2410	5770	5120	3780	5460	2070	1540	1040	816	981	642
20	742	2480	4700	5340	4010	5120	2060	1510	974	918	995	664
21	1660	2700	4260	5170	4260	4820	2070	1510	946	967	967	842
22	10200	2690	3920	5650	4800	4560	2020	1510	946	1000	897	842
23	11000	3260	4000	5970	5740	3940	2050	1510	988	1020	904	778
24	10600	3280	3790	6160	6210	3490	1990	1460	1030	1030	925	742
25	8620	3190	3700	6080	7200	3240	2000	1420	1040	1020	932	670
26	6050	2950	3790	5320	7810	3080	1910	1400	1060	1030	904	550
27	4150	2760	3890	5050	8350	3000	1980	1390	1040	1090	904	485
28	3280	2610	4180	6220	8660	3040	2000	1400	1020	1130	897	540
29	2860		4360	7870	8660	3170	2010	1400	1010	1050	829	588
30	3200		4700	7140	8290	3280	1970	1400	1020	1070	829	610
31	4140		4520		7530		1890	1370		904		593
Mean	2706	2573	4538	5083	6211	4652	2484	1585	1166	961	823	700
Ac. Ft. for Month	166400	142900	279000	302500	381900	276800	152700	97450	69410	59100	48970	43050

NOTE: This is a permanent station maintained throughout the year under Federal-State cooperation by the Water Resources Branch of the U. S. Geological Survey.

TABLE 29

DISCHARGE OF SAN JOAQUIN RIVER AT DELTA BRIDGE* - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	277	1380	835	1170	955	1130	10					0
2	257	1280	745	1180	1000	1180	6					0
3	240	1200	625	1200	1030	1230	5					0
4	212	1090	525	1200	1080	1290	11					0
5	158	985	491	1190	1100	1360	28					0
6	125	910	500	1160	1110	1390	35					0
7	108	835	510	1140	1080	1390	34					0
8	108	765	645	1130	1040	1360	26					0
9	113	710	865	1130	1050	1240	19					0
10	116	665	1010	1130	1060	705	30					0
11	110	665	1090	1110	1070	442	32					0
12	109	710	1210	1100	1090	481	31					0
13	99	735	1380	1090	1100	530	28					0
14	82	710	1480	1050	1080	560	21	FLOW	FLOW	FLOW	FLOW	0
15	89	680	1530	985	1070	555	13					0
16	93	660	1550	910	1050	411	4					0
17	98	645	1580	850	1020	369	2					0
18	100	610	1570	850	950	349	1	NO	NO	NO	NO	0
19	100	565	1550	880	760	351	0					0
20	89	520	1530	920	535	439	0					0
21	65	497	1520	945	393	545	0					0
22	66	545	1510	960	322	595	0					0
23	93	565	1510	960	316	615	0					0
24	328	600	1490	965	341	595	0					0
25	655	655	1470	965	460	478	0					30
26	875	745	1440	965	625	309	0					112
27	1020	805	1400	980	770	191	0					125
28	1170	845	1350	1010	880	104	0					129
29	1380		1280	1000	960	82	0					140
30	1460		1230	970	1030	28	0					157
31	1440		1180		1100		0					171
Mean	362	771	1181	1037	885	677	11	0	0	0	0	28
Ac. Ft. for Month	22280	42800	72600	61680	54400	40270	666	0	0	0	0	1710

* Also called Turner Island Bridge.

NOTE: Station maintained by U. S. Bureau of Reclamation. Station is located at county road bridge eight miles east and six miles north of Los Banos; mile 158.7 above mouth of San Joaquin River. An undetermined amount of water by-passes this station through Pick Anderson Slough and other channels.

TABLE 30

DISCHARGE OF SAN JOAQUIN RIVER AT FREMONT FORD BRIDGE - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	1950	4140	3100	3980	3510	3330	855	196	173	156	132	147
2	1840	4260	3130	3920	3480	3430	745	184	168	155	125	149
3	1780	4300	3010	3890	3490	3560	695	181	159	168	123	153
4	1740	4200	2770	3590	3520	4030	730	169	157	177	123	159
5	1640	4090	2510	3900	3570	3800	800	166	166	182	123	164
6	1500	3960	2400	3910	3620	3860	830	173	168	188	119	180
7	1370	3830	2600	3880	3650	3910	835	177	162	186	116	180
8	1280	3670	3070	3850	3650	3960	825	177	162	188	116	188
9	1240	3480	3450	3830	3620	3990	780	179	188	189	117	191
10	1240	3380	3700	3810	3560	3980	755	184	183	189	120	198
11	1220	3310	4020	3800	3520	3730	820	212	175	188	120	208
12	1170	3210	4290	3790	3510	2980	875	208	181	188	124	222
13	1140	3140	4420	3760	3520	2240	860	194	184	188	123	222
14	1080	3090	4450	3710	3530	2360	780	186	173	186	123	227
15	1010	3030	4450	3670	3520	2380	710	179	171	182	125	241
16	1000	2440	4480	3590	3480	2340	650	175	173	180	129	262
17	980	2830	4530	3450	3430	2150	486	177	184	191	130	268
18	970	2750	4580	3330	3370	1990	388	173	181	202	129	254
19	970	2640	4620	3270	3260	1910	349	175	210	202	130	243
20	970	2510	4640	3260	3020	1910	318	177	231	213	136	254
21	955	2390	4630	3300	2600	2050	286	173	216	264	140	260
22	915	2330	4600	3340	2180	2220	273	171	204	284	147	264
23	1050	2350	4550	3390	1960	2340	265	173	188	272	158	270
24	1420	2410	4520	3410	1890	2390	254	186	192	225	153	302
25	2030	2510	4460	3430	1910	2360	244	192	198	220	140	376
26	2490	2630	4400	3430	2110	2160	241	186	194	210	141	374
27	2790	2820	4330	3440	2390	1840	239	188	183	208	143	401
28	3090	2990	4260	3460	2630	1520	237	184	168	198	146	450
29	3410		4190	3480	2840	1220	227	177	164	171	144	481
30	3690		4110	3520	3030	1070	225	181	160	158	146	505
31	3940		4040		3190		218	183		143		520
Mean	1673	3185	3945	3623	3115	2700	542	182	181	195	131	268
Ac. Ft. for Month	102900	176900	242600	215600	191500	160700	33310	11180	10740	12000	7820	16490

NOTE: This is a recording gage station at the county bridge on the road between Gustine and Stevinson, mile 129.5 above mouth of San Joaquin River and 5.7 miles above the mouth of the Merced River. Recorder operated by U. S. Bureau of Reclamation. Measurements of flow made by Bureau of Reclamation and Division of Water Resources. Additional water during high flow periods passes this station via Mud Slough. See Table 31.

TABLE 31

DISCHARGE OF MUD SLOUGH (BRANCHES COMBINED) AT GUSTINE-STEVINSON HIGHWAY - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	200	4570	1200	3700	1680	1380						0
2	280	5250	1240	3470	1630	1550						9
3	250	5480	1100	3340	1640	1820						18
4	225	4940	870	3280	1710	3170						28
5	190	4290	630	3340	1830	2510						35
6	125	3620	530	3340	1970	2670						45
7	110	3050	710	3230	2050	2820						53
8	106	2400	1170	3070	2050	2960						62
9	102	1820	1750	2970	1970	3050						70
10	97	1610	2500	2870	1800	3020						80
11	93	1490	3890	2850	1710	2290						88
12	89	1350	5410	2750	1680	980						96
13	84	1250	6210	2600	1710	399	FLOW	FLOW	FLOW	FLOW	FLOW	107
14	80	1190	6450	2420	1730	486						114
15	75	1120	6450	2230	1700	505						124
16	71	1030	6610	1970	1620	474						132
17	66	925	6930	1630	1540	338						141
18	62	845	7260	1420	1440	227	NO	NO	NO	NO	NO	150
19	57	745	7470	1310	1290	185						159
20	53	635	7590	1290	1020	180						168
21	48	525	7510	1340	670	261						177
22	44	472	7340	1410	359	382						185
23	40	488	7060	1470	208	471						186
24	35	540	6850	1510	168	510						187
25	246	630	6490	1540	180	486						188
26	615	735	6100	1550	304	345						188
27	885	915	5640	1560	510	140						189
28	1190	1080	5290	1600	695	19						190
29	1670		4910	1630	870	0						190
30	2480		4430	1700	1030	0						190
31	3530		4010		1210							190
Mean	425	1893	4568	2280	1289	1121	0	0	0	0	0	121
Ac. Ft. for Month	26180	105100	280900	135700	79290	66700	0	0	0	0	0	7410

NOTE: Station maintained jointly by Division of Water Resources (Water Supervision) and U. S. Bureau of Reclamation. To determine total flow passing the Gustine-Stevinson highway (Fremont Ford Bridge road) combine the flow in this table with that shown in Table 30.

TABLE 32

DISCHARGE OF SAN JOAQUIN RIVER NEAR NEWMAN - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	2630	11600	6760	11100	9230	8020	1300	466	415	469	338	322
2	2420	13000	6860	10800	9230	7840	1140	478	412	454	322	332
3	2260	13300	6360	10600	9150	8590	1060	445	418	472	345	342
4	2190	12200	5850	10400	9110	9630	1070	432	412	475	360	373
5	2070	12000	5310	10500	9130	9630	1150	412	418	469	368	391
6	1890	9880	5400	10600	9190	8750	1150	435	440	478	362	445
7	1720	9040	7460	10500	9050	8040	1130	455	430	475	365	463
8	1620	8180	8640	10400	9070	7770	1100	450	435	484	350	487
9	1550	7740	9570	10200	9290	7750	1050	460	448	502	345	487
10	1540	8080	10900	9970	9230	7860	1010	438	452	502	322	490
11	1520	7240	12400	9830	8990	7930	1100	448	463	499	310	490
12	1460	6620	14000	9720	8580	6900	1230	448	458	490	312	530
13	1430	6340	15200	9480	8160	5290	1200	412	458	499	320	552
14	1380	6060	15700	8970	7470	4610	1100	420	438	524	315	572
15	1300	5860	15600	8440	6910	4360	1020	442	425	524	310	597
16	1270	5690	15600	8140	6490	4230	958	455	405	514	315	639
17	1250	5460	15900	8120	6290	3940	830	452	430	496	315	642
18	1220	5270	16300	8260	6080	3620	758	438	440	475	312	639
19	1220	5060	16600	8290	5860	3540	718	442	466	475	312	628
20	1220	4830	16700	8220	5470	3610	655	455	505	484	318	636
21	1220	4610	16600	8180	4740	3820	616	463	487	562	330	646
22	1210	4430	16500	8360	3920	3980	571	484	458	614	342	656
23	1320	4380	16200	8500	3370	4050	557	481	428	569	352	660
24	1700	4590	16000	8560	3150	4000	541	484	420	496	345	699
25	2500	4940	15500	8780	3600	3840	541	472	452	466	330	803
26	3280	5450	14600	8910	4840	3570	541	440	490	439	325	823
27	5110	6060	13600	8970	5690	3010	520	430	511	430	322	847
28	6770	6430	13000	9020	6540	2380	514	425	493	424	322	907
29	7730		12400	8910	7110	1810	508	425	502	391	322	944
30	8640		11800	9100	7610	1580	502	440	496	368	322	971
31	9880		11300		7930		490	422		350		1010
Mean	2662	7294	12410	9328	7112	5465	859	447	450	480	331	614
Ac. Ft. for Month	163700	405100	762900	555000	437300	325200	52820	27470	26790	29490	19690	37730

NOTE: This is a permanent station maintained throughout the year under Federal-State cooperation by the Water Resources Branch of the U. S. Geological Survey. It is located at Hills Ferry Bridge, mile 123.7 above mouth of San Joaquin River and just below the mouth of the Merced River.

TABLE 33

DISCHARGE OF SAN JOAQUIN RIVER AT GRAYSON - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	2810	9000	6500	11200	9000	8500	2100	630	610	760	610	480
2	2660	10900	6750	11500	9300	8250	1870	640	600	780	580	480
3	2450	12700	6800	11400	9250	8050	1740	660	580	800	610	460
4	2340	14400	6400	11100	8950	8750	1720	600	600	800	730	470
5	2260	13200	6030	11000	9300	9700	1810	550	620	750	740	500
6	2160	12100	5550	10960	9150	10200	1710	540	660	740	760	510
7	2090	11240	5850	10900	9250	10350	1620	580	650	740	770	540
8	1860	10340	7250	10880	8900	9720	1570	640	620	740	710	570
9	1760	8020	8850	10660	8850	8950	1500	730	600	770	630	590
10	1700	7690	9850	10350	9180	8200	1480	710	600	790	580	600
11	1680	7800	10700	10320	9250	7950	1480	620	630	840	520	600
12	1650	7500	11450	8850	9100	7750	1540	630	670	840	480	610
13	1610	7050	12700	10210	8800	6850	1600	580	670	800	480	630
14	1580	6750	15350	9780	8250	5800	1530	520	660	780	480	650
15	1530	6500	16250	8930	7550	4980	1420	600	580	780	480	670
16	1480	6270	16300	8680	7140	4540	1370	620	550	790	460	700
17	1440	6110	16850	8500	7050	4280	1280	640	540	750	460	730
18	1410	5950	17500	8500	7000	4020	1230	630	580	710	470	780
19	1390	5780	17510	8600	6930	3870	1210	580	680	680	480	820
20	1390	5600	17950	8590	6810	3960	1150	630	770	670	470	820
21	1490	5440	18450	8520	6360	3920	1070	640	760	690	500	820
22	2400	5250	18370	8600	5520	4000	980	680	680	740	500	840
23	2610	5000	17950	8750	4380	4090	890	740	630	760	500	840
24	2480	4940	17650	8830	3540	4030	840	750	620	740	520	860
25	2360	5100	17400	8860	3150	3940	830	710	630	710	510	820
26	3150	5330	16150	9000	3930	3800	840	730	670	660	500	910
27	4200	5680	14900	9300	5100	3560	780	660	790	610	490	920
28	5800	6150	13550	9780	6050	3170	700	580	800	610	480	980
29	6850		13000	9000	7080	2740	680	600	780	620	480	1040
30	7600		12180	8640	7640	2360	680	650	780	610	490	1080
31	8300		11400		8080		670	660		610		1120
Mean	2723	7778	12690	9673	7414	6008	1287	636	654	731	549	724
Ac. Ft. for Month	167400	431980	780290	575580	455860	357500	79120	39130	38900	44960	32670	44510

NOTE: Recording gage station maintained jointly by Division of Water Resources, City of San Francisco, Modesto Irrigation District and Turlock Irrigation District. Station is at Laird Slough Bridge, mile 96.05 above mouth of San Joaquin River.

TABLE 34

DISCHARGE OF SAN JOAQUIN RIVER AT HETCH HETCHY AQUEDUCT CROSSING - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec
1	4960	10400	10200	15250	14500	14840	2920	1295	1315	1750	1730	1825
2	4540	11650	10200	14500	13500	15500	2450	1220	1330	1780	1695	1835
3	3950	13250	10150	14190	13500	13900	2200	1210	1280	1845	1575	1835
4	3850	14450	9850	14050	13510	19000	2180	1185	1265	1890	1700	1855
5	3800	14650	9680	14050	13100	16750	2200	1175	1295	1900	1730	1875
6	3750	13750	10150	14150	12460	14100	2180	1145	1340	1795	1740	1865
7	3580	12550	10460	14400	11740	12100	2120	1150	1315	1785	1750	1825
8	3440	11650	15000	14250	11500	10750	2130	1175	1240	1835	1705	1935
9	3320	11500	14990	14150	11400	10360	2200	1300	1235	1900	1705	2000
10	3220	11300	17200	14120	11100	10830	2040	1330	1260	1920	1650	1990
11	3120	10950	22650	13900	10800	11350	1955	1270	1220	1940	1560	2000
12	3090	10350	25800	13230	10500	11600	1950	1250	1270	1965	1510	1985
13	3170	10050	24550	12870	10320	11550	1950	1240	1315	1930	1495	1915
14	3170	9860	23000	12650	10310	10050	1955	1210	1310	1905	1500	1890
15	3120	9350	22250	12670	10300	8700	1875	1215	1320	1890	1495	2010
16	3000	9180	22100	12680	10000	7550	1830	1280	1350	1940	1485	2125
17	2990	9100	21550	12000	9350	7300	1780	1320	1350	1825	1530	2195
18	2880	8900	21050	11600	8600	7200	1735	1335	1375	1690	1765	2215
19	2910	8700	22150	11600	8100	7100	1715	1275	1435	1620	1815	2290
20	3000	8450	22400	11800	7670	7000	1680	1270	1530	1625	1825	2240
21	3150	8250	21550	11800	7550	7100	1640	1300	1600	1690	1835	2245
22	3670	8050	20750	11500	7350	7550	1580	1365	1555	1765	1820	2355
23	4850	8100	20300	11050	7500	7250	1555	1465	1545	1795	1775	2385
24	4550	8750	20000	10950	8150	6900	1550	1455	1570	1800	1835	2320
25	3650	8850	19250	11350	9200	6550	1535	1405	1620	1760	1865	2320
26	3800	9450	18600	11500	10650	5850	1530	1410	1735	1690	1820	2230
27	4450	9950	17850	11440	12670	5100	1515	1380	1810	1705	1725	2055
28	5400	9980	16850	11250	13880	4250	1395	1285	1875	1720	1815	2195
29	6510		16200	16050	14750	3650	1360	1275	1785	1705	1790	2310
30	7390		16000	15000	15420	3200	1350	1325	1750	1730	1775	2180
31	8350		15900		15250		1310	1360		1730		2075
Mean	4020	10408	17698	13000	11117	9498	1850	1286	1440	1800	1700	2080
Ac. Ft. for Month	247200	578000	1088200	773550	683560	565150	113780	79090	85680	110720	101190	127690

NOTE: Recording gage station maintained by City of San Francisco Public Utilities Commission (Hetch Hetchy Water Supply) and Division of Water Resources. Station is at mile 82.65 above mouth of San Joaquin River.

TABLE 35

DISCHARGE OF SAN JOAQUIN RIVER NEAR VERNALIS - 1943

Day	Daily Discharge in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	6030	14100	13400	20800	21100	18600	3690	1520	1540	2020	2100	2060
2	5820	15900	13200	20000	19700	18900	3210	1480	1540	2040	1980	2170
3	5160	16300	13000	19300	19100	21100	3000	1490	1530	2120	1920	2260
4	4910	16900	12600	19200	19400	24600	2880	1450	1520	2140	1920	2350
5	4810	17100	12200	19300	19100	23100	2950	1420	1560	2140	1950	2390
6	4750	16700	12700	19400	18100	19500	2830	1440	1610	2060	1970	2400
7	4590	15900	16000	19600	17000	15900	2640	1440	1580	2010	2010	2200
8	4420	15000	19800	19500	16500	13300	2620	1480	1510	2060	1960	2420
9	4310	14700	20700	19200	16400	11900	2730	1580	1490	2120	1970	2530
10	4220	14700	21800	19200	16300	11900	2430	1560	1520	2140	1880	2420
11	4120	14000	27800	18900	15500	12400	2330	1500	1510	2180	1780	2380
12	4130	13300	37500	18200	14600	12900	2320	1500	1540	2190	1740	2340
13	4360	12500	36700	17500	14300	13400	2260	1480	1580	2180	1740	2300
14	4420	12000	32100	17200	14200	12200	2200	1440	1580	2160	1740	2180
15	4380	11600	29600	17200	14100	10300	2120	1500	1580	2140	1750	2290
16	4330	11300	28600	17500	13600	8850	2060	1560	1620	2180	1730	2410
17	4270	11200	28100	17500	12700	8360	2000	1570	1610	2130	1720	2460
18	4180	11000	27100	17400	11500	8370	1960	1570	1620	2000	1950	2470
19	3840	10600	27400	17400	10200	8150	1940	1540	1680	1960	2060	2550
20	3420	10300	27900	17400	9380	8430	1850	1530	1810	1980	2090	2490
21	3320	9990	27200	17400	9100	8450	1830	1570	1870	2020	2130	2400
22	4010	9800	26000	17100	8790	8780	1780	1660	1780	2180	2140	2490
23	6140	9830	25300	16200	8640	8690	1750	1730	1780	2200	2010	2500
24	5980	10800	24800	15800	9140	7890	1740	1700	1800	2180	2060	2490
25	7250	11300	24200	16300	11300	7380	1720	1650	1840	2140	2100	2470
26	8030	12200	23400	16800	14100	6640	1700	1650	1950	2100	2100	2430
27	8490	13400	22700	17000	16100	5860	1690	1620	2020	2130	1960	2300
28	9080	13500	21800	16800	17300	5180	1580	1540	2060	2140	2070	2370
29	10200		21200	16900	18300	4510	1560	1510	2040	2120	2050	2580
30	10500		20900	19800	19200	4040	1560	1560	2000	2090	1980	2500
31	11600		21100		19400		1520	1560		2110		2420
Mean	5647	13070	23120	18060	14970	11650	2208	1542	1689	2108	1952	2388
Ac. Ft. for Month	347200	725800	1422000	1075000	920600	693400	135800	94810	100500	129600	116200	146800

NOTE: This is a permanent station maintained throughout the year under Federal-State cooperation by the Water Resources Branch of the U. S. Geological Survey. It is located at Durham Ferry Bridge below the mouth of the Stanislaus River and is at mile 76.7 above mouth of the San Joaquin River.

TABLE 30

DISCHARGE OF MERCED RIVER AT YOSEMITE VALLEY RAILROAD CROSSING - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	7	5270	2440	3050	3800	2480	25	38	23	27	9	6
2	6	3400	1680	3050	3760	4580	25	40	25	27	12	5
3	6	3700	1670	3050	3700	3880	25	38	23	29	16	5
4	5	3300	1680	3050	3660	2760	34	34	23	29	17	4
5	5	1660	2220	3070	3440	1400	34	32	25	29	17	5
6	5	1650	5800	3070	3130	574	29	34	25	27	16	6
7	5	1380	5220	3050	3300	315	29	38	25	27	17	6
8	7	2320	5500	3000	3600	260	29	42	25	27	21	6
9	6	2880	5730	2850	3580	574	31	36	25	31	23	6
10	6	1680	5630	2790	3440	1210	147	34	23	44	29	6
11	6	1670	6390	2730	2850	1410	147	32	23	51	27	6
12	6	1640	6300	2520	2360	1470	100	29	21	51	23	6
13	6	1500	5730	2060	1560	1260	46	29	23	53	23	5
14	7	1500	5340	1830	994	1020	44	29	21	38	23	5
15	6	1500	5340	1920	620	931	46	23	20	31	23	5
16	6	1500	5340	2470	542	889	48	32	21	31	25	5
17	6	1500	5450	3130	506	994	44	32	21	34	21	5
18	6	1500	5430	3420	464	1240	42	32	21	40	27	5
19	6	1460	5270	3280	458	1420	46	32	21	55	29	6
20	7	1400	5220	3300	458	1420	40	32	23	40	40	6
21	11	1400	5340	3560	440	1230	46	32	25	32	34	7
22	17	1420	5340	3480	435	994	51	34	27	15	27	7
23	53	1630	4940	3480	567	651	44	32	27	11	20	7
24	27	1760	4160	3780	1750	395	42	32	27	9	8	7
25	2830	2260	2930	3780	2970	236	38	23	25	6	7	6
26	4340	2520	2560	3780	3440	86	38	23	23	7	7	6
27	4520	2540	2550	3540	3900	59	38	21	21	6	7	6
28	4620	2540	2550	3440	4020	36	42	21	20	7	6	6
29	4700		2560	3800	4000	59	44	20	18	8	6	6
30	5180		2780	3860	3640	25	44	20	23	8	6	6
31	5960		3050		3080		40	21		8		5
Mean	1044	2089	4263	3110	2402	1129	48	30	23	27	18	6
Ac. Ft. for Month	64220	116000	262100	184800	147700	67160	2930	1880	1370	1660	1120	353

NOTE: Station maintained jointly by Division of Water Resources (Water Supervision) and Merced Irrigation District. Station is at mile 43.1 above mouth.

TABLE 37

DISCHARGE OF MERCED RIVER AT CRESSEY BRIDGE - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	86	4940	2660	3130	3710	2830	151	88		Estimate 130 c.f.s.	76	82
2	81	4330	1840	3120	3660	3550	158	82			79	84
3	77	2420	1640	3120	3630	4470	154	90			82	81
4	75	2030	1640	3120	3580	3530	160	84			86	81
5	74	1770	1950	3130	3510	1920	169	72			86	81
6	74	1680	5890	3120	3720	919	160	68			86	82
7	68	1400	4950	3100	3220	504	153	65			88	84
8	70	1710	4890	3090	3510	418	153	75		145	90	86
9	68	3440	6130	2920	3530	458	149	63		154	91	86
10	68	2070	5500	2870	3480	1010	185	62		163	93	86
11	68	1700	5570	2770	3130	1130	249	62		176	95	86
12	67	1670	5540	2700	2630	1500	228	63		174	95	86
13	65	1420	5220	2180	1790	1400	167	68		180	93	88
14	63	1330	4830	1800	1200	1180	136	68		174	93	88
15	63	1320	4850	1800	773	1050	129	77		162	97	88
16	63	1310	4510	2270	876	992	135	72		151	97	90
17	62	1310	4810	3050	572	988	140	74		151	97	90
18	60	1310	5100	3400	539	1190	135	67		156	93	90
19	72	1310	4860	3410	526	1400	122	67		163	97	91
20	63	1310	4780	3510	521	1480	118	68		167	104	97
21	75	1310	4770	3510	554	1360	109	67		154	117	100
22	180	1320	4770	3460	516	1180	113	68		144	117	100
23	373	1630	4740	3410	499	915	109	81		115	106	100
24	690	1720	4140	3190	1090	650	102	82		95	97	99
25	304	2330	3460	3110	2870	1170	106			90	88	99
26	2630	2730	2780	3100	3200	322	100			88	86	97
27	3940	2720	2710	3170	3090	241	100			88	88	97
28	4030	2720	2690	3390	3830	199	100			86	84	99
29	4060		2740	3630	3910	189	93			82	82	99
30	4140		2760	3730	3670	171	100			79	82	100
31	5140		3130		3460		91			77		100
Mean	869	2010	4060	3040	2400	1280	138	(76)	(125)	(133)	92	91
Ac. Ft. for Month	53450	111600	249600	181100	147400	76000	8480	(4690)	(7440)	(8180)	5480	5590

Estimate 90 c.f.s.

Estimate flow as 125 c.f.s. average

NOTE: Station maintained by Division of Water Resources (Water Supervision). Station is at Cressey Bridge - mile 27.6 above mouth.
( ) Indicates figure computed using flows at Yosemite Valley R. R. Crossing and Livingston as a guide. Discharges above 4400 cubic feet per second are from an extended rating curve.

TABLE 38

DISCHARGE OF MERCED RIVER NEAR LIVINGSTON - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	147	5560	2720	3230	4130	3240	268	187	180	228	145	138
2	143	4940	2190	3220	4110	3290	263	187	187	219	144	137
3	140	2990	1750	3210	4080	5060	254	187	185	214	145	135
4	134	2330	1720	3210	3990	4270	268	161	183	203	148	133
5	134	1980	1750	3220	3960	2780	263	187	202	200	150	130
6	133	1770	4950	3240	3610	1510	230	178	204	185	150	133
7	131	1600	6390	3210	3440	928	224	206	206	188	150	134
8	129	1630	5680	3200	3710	699	226	185	178	193	150	135
9	129	3170	6740	3110	3870	629	234	174	185	207	150	137
10	128	2420	7140	3020	3850	988	204	152	208	205	150	137
11	126	1780	6410	2970	3580	1380	290	156	218	219	150	137
12	124	1720	6460	2930	3050	1610	287	129	204	234	150	137
13	124	1560	6210	2620	2400	1620	276	128	197	252	150	137
14	124	1430	5530	2210	1700	1430	232	154	185	262	150	138
15	122	1390	5290	2060	1200	1240	216	180	168	250	150	138
16	122	1370	5240	2320	988	1150	224	212	180	248	150	138
17	122	1430	5190	3020	919	1110	210	189	187	214	150	137
18	121	1390	5530	3540	847	1210	232	200	167	203	150	135
19	124	1360	5470	3690	811	1400	242	206	191	210	150	134
20	124	1350	5240	3580	757	1570	214	202	195	236	153	140
21	131	1350	5180	3700	733	1530	193	214	199	262	160	144
22	147	1360	5170	3780	733	1340	185	216	183	236	150	141
23	285	1440	5160	3690	721	1100	185	200	167	193	150	142
24	594	1660	4630	3810	1020	841	202	193	172	186	153	142
25	473	2000	3920	4020	2430	676	193	178	204	162	145	140
26	1340	2670	3080	4070	3270	539	191	180	230	158	141	138
27	3670	2700	2890	4040	3810	428	180	161	224	154	142	135
28	4070	2740	2850	3810	4130	368	168	159	216	151	141	134
29	4140		2830	3940	4300	315	174	191	216	148	140	134
30	4220		2830	4130	4270	303	168	220	222	147	138	134
31	5360		3130		3990		165	193		147		134
Mean	871	2109	4493	3327	2723	1485	221	183	195	204	148	137
Ac. Ft. for Month	53580	117100	276200	198000	167400	88370	13610	11240	11590	12520	8820	8410

NOTE: This is a permanent station maintained throughout the year under Federal-State cooperation by the Water Resources Branch of the U. S. Geological Survey. The station is at mile 17.1 above mouth.

TABLE 39

DISCHARGE OF MERCED RIVER NEAR MOUTH - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	154	4960	2550	3440	3990	3410	339	241	235	311	177	166
2	149	4990	2310	3430	3990	2980	321	262	235	292	180	164
3	147	4040	1710	3410	3950	4160	321	237	246	304	217	162
4	147	2630	1610	3390	3880	4360	337	232	246	290	223	161
5	145	2280	1600	3400	3830	3290	344	231	249	296	226	159
6	144	1910	2810	3430	3660	1710	326	256	275	284	232	157
7	144	1800	5350	3400	3390	1040	334	273	256	289	246	156
8	142	1560	5340	3380	3500	810	319	264	273	286	223	157
9	141	2310	5440	3320	3730	735	321	273	252	308	218	160
10	141	2980	6240	3180	3800	820	318	229	275	296	193	162
11	140	1880	6230	3140	3640	1120	366	238	292	302	187	162
12	140	1690	6190	3090	3060	1350	405	220	289	290	191	162
13	140	1640	6190	2870	2410	1540	381	207	279	308	200	163
14	137	1430	5920	2370	1630	1490	346	226	259	343	192	163
15	136	1390	5530	2100	1340	1320	330	256	237	343	186	164
16	135	1370	5480	2170	925	1220	314	282	235	329	190	165
17	133	1340	5440	2700	860	1160	325	265	251	277	190	165
18	133	1320	5530	3310	795	1190	357	248	256	243	187	166
19	132	1310	5740	3580	760	1310	355	248	272	236	188	166
20	135	1310	5570	3510	715	1480	316	260	270	241	190	167
21	137	1300	5480	3510	680	1510	307	277	267	262	195	169
22	142	1310	5460	3660	725	1350	287	299	249	256	201	171
23	196	1320	5430	3600	775	1170	272	296	238	213	197	169
24	313	1540	5250	3610	905	965	270	277	232	202	192	168
25	478	1670	4600	3830	1650	810	277	267	267	187	186	167
26	515	2290	3720	3900	2890	700	277	231	304	177	181	165
27	2700	2520	3260	3900	3330	600	259	223	319	172	177	166
28	3600	2550	3140	3820	3770	489	243	220	323	173	175	166
29	3830		3070	3730	3960	392	249	235	335	175	171	167
30	3920		3030	3960	4010	359	240	257	325	176	169	168
31	4300		3200		3870		234	243		177		168
Mean	740	2094	4465	3338	2594	1495	313	251	268	259	196	164
Ac. Ft. for Month	45510	116300	274600	198600	159500	88940	19220	15420	15950	15930	11660	10100

NOTE: Station maintained by U. S. Bureau of Reclamation and is about 4 miles above mouth. Division of Water Resources maintains a recording gage at a point about 1.1 mile above mouth but insufficient current meter measurements were made to accurately compute discharge at that point.

TABLE 40

DISCHARGE OF MERCED RIVER SLOUGH NEAR HILLS FERRY ROAD BRIDGE - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	0	1090	405	810	845	650						
2	0	1160	371	785	840	535						
3	0	1010	229	765	825	865						
4	0	685	181	755	805	980						
5	0	555	158	755	795	715						
6	0	435	405	770	755	380						
7	0	368	1140	760	680	226						
8	0	283	1210	745	705	165						
9	0	378	1250	720	775	147						
10	0	530	1570	680	775	167						
11	0	299	1670	660	730	225						
12	0	232	1760	645	605	203						
13	0	207	1860	595	467	169	FLOW	FLOW	FLOW	FLOW	FLOW	FLOW
14	0	149	1820	471	292	138						
15	0	134	1690	390	175	101						
16	0	125	1670	391	111	83						
17	0	117	1690	494	96	71						
18	0	109	1750	635	82	72	NO	NO	NO	NO	NO	NO
19	0	103	1830	700	70	91						
20	0	97	1800	680	55	119						
21	0	93	1760	680	39	130						
22	0	89	1730	720	26	106						
23	0	90	1710	710	29	79						
24	0	135	1650	715	26	49						
25	0	169	1440	775	168	25						
26	1	315	1140	805	445	13						
27	361	378	955	810	560	3						
28	610	395	870	790	690	1						
29	685		810	765	755	0						
30	745		760	830	785	0						
31	875		765		760							
Mean	106	348	1227	694	476	217	0	0	0	0	0	0
Ac. Ft. for Month	6500	19300	75470	41270	29260	12910	0	0	0	0	0	0

NOTE: This station records the flow which at high stages in the Merced River by-passes the Hills Ferry Road Bridge and reaches the San Joaquin River below the U.S.G.S. station "near Newman". Table 39 records the entire flow of the Merced River and the flow in Table 40 is included in Table 39. Station is maintained by U.S. Bureau of Reclamation.

TABLE 41

DISCHARGE OF DRY CREEK NEAR MODESTO (CLAUSS ROAD BRIDGE) - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	39			64	202	138	75	49	51	47	82	32
2	37			56	194	148	136	51	55	47	44	32
3	36			49	183	133	63	52	46	43	36	32
4	34			45	151	137	58	48	50	43	35	31
5	33	80	56	46	106	152	62	46	49	40	34	33
6	35			157	84	134	52	48	53	39	34	33
7	31			230	66	56	51	45	48	39	34	33
8	30	58		204	74	53	55	44	44	39	33	32
9	30			193	80	103	56	51	44	40	33	33
10	29		(81.35)	162	78	99	59	56	47	41	34	34
11	29			119	84	97	60	58	47	54	34	33
12	29	83	362	115	80	86	55	53	47	61	36	33
13	29	69		98	78	94	51	49	47	66	35	34
14	29	61		57	75	99	49	48	48	61	34	34
15	29	56		62	81	90	45	47	50	44	34	33
16	29	51		55	69	81	47	51	46	42	34	33
17	29	48		51	72	75	39	44	44	41	35	33
18	29	45	(76.95)	50	60	56	53	44	44	41	34	33
19	29	43	(75.90)	54	62	62	53	48	44	42	36	34
20	(1) 29	40		62	66	74	54	52	42	41	36	34
21	(2)142	39		69	82	74	54	57	43	36	36	35
22	(76.20)	38		76	81	73	54	57	41	52	35	34
23	(78.00)	37		95	84	79	52	52	42	68	34	33
24	(77.60)	38		96	81	88	48	49	43	68	34	33
25	(3)350	89		101	84	80	50	48	47	67	34	32
26		(75.52)		96	85	72	51	47	47	68	33	32
27		225	68	81	75	113	53	46	46	68	33	31
28			62	171	62	141	53	43	47	62	32	31
29			53	233	58	140	53	43	43	56	33	32
30			82	223	68	82	53	47	41	54	32	32
31			70		91		50	52		60		35
Mean				106	90	97	56	49	46	51	36	33
Ac. Ft. for Month				6290	5550	5770	3460	3020	2750	3110	2150	2020
M.I.D. Spill Below Station Ac. Ft.			0	670	540	670	400	580	310	900	20	0
Discharge to Tuolumne River Ac. Ft.				6960	6090	6440	3860	3600	3060	4010	2170	2020

Where discharge figure is omitted recorder had been removed on account of high water conditions. Observed gage heights indicated by (). No high water measurements have been made. Gage heights: (1) 69.97; (2) 72.00; (3) 74.28.

NOTE: Station maintained jointly by Division of Water Resources (Water Supervision) and Modesto Irrigation District. Station moved to this location, 5.4 miles above Modesto in 1941 from previous location at mile 2.9.

TABLE 42

DISCHARGE OF TUOLUMNE RIVER AT LA GRANGE BRIDGE - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	1120	3600	3150	3200	3090	9060	27	142	112	586	620	1080
2	1150	3650	2890	3260	3590	14360	26	96	112	586	591	1070
3	1050	3160	2840	3520	3460	8010	26	151	112	574	582	1090
4	1225	2880	3080	3460	3200	4110	25	153	112	544	582	1050
5	1200	2640	4760	3780	2640	2130	22	154	112	549	560	855
6	1180	2550	8700	3650	2290	1160	39	153	125	552	582	1080
7	1210	2420	6020	3200	2340	820	750	154	149	549	574	1060
8	1200	3590	5550	3460	2340	1450	214	153	149	549	574	1090
9	1150	3400	9270	3590	1700	2460	30	125	149	552	574	1100
10	1050	2950	16000	3090	1430	3250	28	95	149	549	560	1120
11	1280	2740	12440	2750	1360	3300	28	95	154	544	574	1090
12	1240	2660	8220	2640	1500	3150	28	98	154	540	578	890
13	1240	2640	6540	2810	2040	2370	28	98	245	544	578	1040
14	1230	3040	6000	3360	2620	2010	28	98	340	544	578	1030
15	1220	2580	6360	3520	2460	1840	99	98	340	544	578	1020
16	1210	2650	5250	3460	1840	1870	109	93	340	400	926	1020
17	1080	2620	4880	3330	1390	2190	109	91	340	403	983	1080
18	1180	2580	5920	3200	1050	2460	109	87	340	403	1020	1030
19	1180	2510	5180	3460	926	2330	109	107	340	403	1010	840
20	1180	2470	4500	3260	1270	2460	109	115	765	403	1050	1250
21	1220	2390	4110	2750	1830	2700	252	115	465	403	815	1120
22	1050	2980	4300	2380	2750	2180	252	115	460	403	1060	1100
23	755	3920	4110	2460	4240	1720	254	115	582	403	1010	1110
24	291	3460	3850	2820	6450	1320	260	115	591	403	536	1090
25	363	4200	3780	2810	8600	502	266	115	591	403	815	785
26	340	3890	3660	2420	9060	51	271	115	591	549	978	790
27	363	3760	3520	1750	8640	30	284	115	586	549	1040	1150
28	330	3340	3590	4370	8850	72	291	115	586	549	865	820
29	363		4110	8010	8220	214	291	115	586	549	800	620
30	380		4500	3400	6720	64	294	114	586	552	1060	610
31	1390		3780		6360		173	113		549		620
Mean	981	3045	5512	3306	3686	2655	156	117	342	504	755	990
Ac. Ft. for Month	60300	169000	339000	197000	227000	158000	9580	7180	20400	31000	44900	60900

NOTE: Station maintained jointly by Division of Water Resources (Water Supervision) and Turlock Irrigation District.

TABLE 43

DISCHARGE OF TUOLUMNE RIVER AT ROBERTS FERRY BRIDGE - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	1380	3730	3390	3570	3330	8720	64	112	169	608	654	1110
2	1070	3920	3180	3560	3740	15300	52	137	169	608	667	1140
3	980	3460	3080	3760	3710	9010	47	166	169	608	647	1160
4	1070	3140	3220	3760	3500	4740	47	169	169	608	641	1080
5	1150	2900	4350	3970	3040	2620	44	169	169	608	634	970
6	1080	2760	9480	4000	2550	1410	47	169	169	615	634	1040
7	1110	2510	6860	3520	2580	926	520	169	169	608	641	1090
8	1140	3580	6200	3700	2620	1460	413	169	169	615	634	1120
9	1150	3740	9660	3930	3170	2630	79	169	169	615	634	1140
10	1110	3290	16200	3470	2690	3470	50	169	169	615	628	1160
11	1160	3000	13600	3110	2660	3590	44	169	169	608	628	1110
12	1180	2910	9200	2940	2760	3380	41	169	169	608	628	1010
13	1170	2850	7170	3090	3320	2640	41	169	169	608	621	1070
14	1160	2720	6290	3540	2810	2160	39	169	375	602	628	1140
15	1140	2700	6900	3950	2750	2000	48	169	375	602	634	1180
16	1160	2850	5910	3710	2100	1950	102	169	375	478	790	1170
17	1090	2800	5310	3600	1490	2440	102	169	375	478	980	1180
18	1150	2750	6350	3580	1190	2500	102	169	375	478	970	1190
19	1190	2640	5690	3710	990	2740	102	169	375	478	970	1060
20	1220	2550	4210	3690	1280	2490	102	169	375	478	1040	1180
21	1290	2520	4410	3170	1900	2930	180	169	472	490	928	1250
22	1160	2970	4600	2770	2980	2500	315	169	472	474	1010	1240
23	970	4060	4470	2720	4390	1810	315	169	595	460	1040	1230
24	550	3700	4170	3100	6500	1490	315	169	602	460	1060	1230
25	490	4340	4060	3120	8800	797	315	169	602	460	896	936
26	550	4190	4000	2780	9560	169	315	169	602	589	936	852
27	550	4000	3800	2020	9180	79	315	169	602	597	990	1140
28	502	3650	3830	3520	9390	63	315	169	608	602	944	1060
29	514		4300	6930	8950	188	315	169	608	608	1030	725
30	615		4840	3930	7330	180	315	169	608	608	1090	706
31	1260		4130		6540		270	169		608		693
Mean	1010	3222	5899	3541	4123	2879	173	166	353	564	808	1076
Ac. Ft. for Month	62100	179000	362700	210700	253500	171300	10650	10210	21010	34670	48050	66170

NOTE: Station maintained jointly by Division of Water Resources (Water Supervision) and Modesto Irrigation District.
Station is at mile 39.9 above mouth.

TABLE 44

DISCHARGE OF TUOLUMNE RIVER AT HICKMAN-WATERFORD BRIDGE

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	1760	3400	3300	4660	3300	7850	231	238	252	604	640	1200
2	1210	3820	3100	3400	3660	14500	230	232	255	611	681	1200
3	1190	3370	3010	3620	3720	10000	230	239	251	611	646	1200
4	1200	3060	3060	3700	3400	4560	227	245	245	611	646	1050
5	1290	2840	3350	3840	3060	2830	227	243	242	611	618	1080
6	1290	2740	8900	3780	2600	1700	225	243	242	618	618	1060
7	1280	2610	7500	3450	2430	1100	395	242	242	618	625	1140
8	1290	3300	5840	3480	2510	1400	590	245	242	625	695	1230
9	1290	3780	8760	3790	2130	2450	259	242	242	625	660	1140
10	1250	4380	14400	3380	1630	3250	244	240	245	632	625	1160
11	1250	2980	14300	3060	1590	3530	231	243	242	632	618	1070
12	1330	2880	9500	2830	1630	3400	232	242	242	632	625	1150
13	1300	2830	8810	2950	2010	2700	227	243	242	632	653	1100
14	1300	2740	6450	3350	2600	2250	226	245	270	632	660	1210
15	1290	2670	7010	3740	2700	2150	226	248	295	646	650	1210
16	1280	2790	6040	3600	2250	2070	239	248	304	590	730	1240
17	1250	2790	5390	3450	1670	2410	231	245	277	475	1100	1210
18	1240	2740	6450	3430	1360	2310	231	245	291	448	1100	1070
19	1330	2630	5780	3500	1100	2750	232	243	296	448	1100	1180
20	1330	2570	5580	3600	1300	2330	230	246	296	448	1300	1180
21	1420	2570	5760	3060	1790	2810	248	252	380	475	1100	1210
22	1340	2880	5840	2720	2750	2610	295	252	375	459	1060	1210
23	1180	3960	5780	2900	4080	1910	291	252	514	448	1180	1210
24	530	3720	5390	2880	6240	1740	284	252	548	448	1250	1210
25	695	4200	5320	2920	8340	1010	286	248	604	448	1180	1060
26	500	4220	4600	2650	9280	310	290	248	611	578	1140	913
27	500	3940	3780	2130	8980	238	290	251	611	604	1120	1140
28	475	3600	3860	2720	9050	228	282	248	611	604	1060	1250
29	330		4200	7150	8990	255	286	248	611	604	1100	448
30	220		4930	4080	7640	288	296	251	618	618	1180	256
31	1060		4140		6660		277	255		618		255
Mean	1103	3218	6133	3461	3885	2898	267	246	357	569	879	1072
Ac. Ft. for Month	67830	178500	377100	205900	238900	172400	16440	15100	21220	35010	52280	65930

NOTE: Station maintained jointly by Division of Water Resources (Water Supervision) and Modesto Irrigation District. Station is at mile 31.7 above mouth.

TABLE 45

DISCHARGE OF TUOLUMNE RIVER AT MODESTO - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	2350	3350	3730	4120	4140	7060	615	494	446	821	881	1280
2	1440	4140	3520	3820	4240	11300	514	463	470	840	858	1270
3	1410	3930	3340	3920	4610	14000	494	463	436	826	803	1280
4	1300	3540	3280	4060	4240	8050	560	463	426	965	803	1290
5	1440	3240	3630	4040	3820	4380	497	463	433	826	821	1270
6	1440	3040	6880	4430	3210	2840	446	497	426	831	808	1090
7	1410	2920	10400	4240	2930	2050	463	511	416	863	775	1260
8	1460	3080	6800	3960	3010	1790	965	514	409	895	831	1270
9	1420	4210	7860	4310	2820	2410	622	528	409	831	904	1320
10	1390	3830	12400	4120	2150	3420	450	514	385	863	798	1340
11	1320	3350	16700	3750	2040	3900	412	494	399	854	752	1360
12	1410	3170	14100	3360	2030	3900	409	514	399	867	757	1340
13	1440	3130	9030	3380	2180	3440	358	487	405	886	762	1130
14	1410	3070	7030	3540	2800	2900	358	477	436	858	771	1340
15	1390	2910	6730	4090	3160	2610	361	497	546	895	757	1350
16	1400	3010	6630	4090	2850	2400	365	504	546	886	762	1430
17	1360	3050	5800	3950	2210	2540	402	504	550	743	1130	1360
18	1250	2990	6290	3960	1890	2740	429	497	521	711	1190	1380
19	1340	2920	6800	3920	1550	3240	412	467	528	702	1230	1380
20	1390	2820	5660	4140	1520	2730	419	470	561	688	1250	1200
21	1470	2790	5030	3760	1940	3110	429	484	564	743	1280	1430
22	1910	2790	4800	3330	2630	3270	561	518	629	757	1050	1410
23	2370	3760	4910	3310	3770	2480	604	504	647	743	1230	1400
24	989	4050	4660	3260	5280	2300	604	484	780	748	1240	1380
25	1110	4080	4450	3600	7220	1770	604	463	803	720	1270	1340
26	965	4970	4500	3420	8690	1130	604	477	803	780	1000	1100
27	965	4430	4240	2980	9110	785	582	443	789	881	1210	1000
28	942	4150	4210	2720	8900	711	579	433	785	886	1230	1350
29	748		4260	6450	9090	693	575	446	780	872	1090	1010
30	729		4910	5830	8390	734	582	450	817	872	1270	817
31	1710		4840		6980		586	450		890		780
Mean	1377	3454	6368	3929	4174	3489	512	483	551	824	984	1257
Ac. Ft. for Month	84650	191800	391600	233800	256700	207600	31460	29700	32810	50660	58540	77270

NOTE: Station maintained jointly by Division of Water Resources (Water Supervision) and Modesto Irrigation District. Located at old U.S. 99 highway bridge and is at mile 15.75 above mouth.

TABLE 46

DISCHARGE OF TUOLUMNE RIVER AT TUOLUMNE CITY - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	2380	2910	3450	4350	4500	7080	740	640	600	940	935	1320
2	1775	3210	3325	4100	4130	9790	670	600	620	975	930	1350
3	1275	3240	3050	4160	4625	15090	630	600	600	970	910	1350
4	1400	3325	3160	4220	4350	8750	650	590	590	1050	905	1330
5	1470	3290	3390	4125	4130	5340	640	590	600	980	910	1320
6	1500	3240	5780	4300	3480	3500	600	630	590	970	915	1140
7	1460	3180	9110	4340	3000	2580	560	590	570	970	900	1230
8	1450	2975	6460	4075	2920	2070	800	620	590	980	900	1320
9	1450	3280	6010	4180	2750	2250	760	630	600	970	950	1320
10	1405	3300	9750	4175	2150	3100	610	620	580	960	905	1380
11	1305	3190	16510	3870	2075	3750	570	620	600	960	875	1400
12	1390	3140	12970	3520	2020	3900	560	630	590	955	870	1330
13	1405	3150	8770	3550	2025	3680	500	600	600	960	875	1140
14	1420	2950	7850	3450	2640	3040	510	610	620	945	875	1230
15	1385	2820	6700	3940	3015	2670	490	630	730	955	875	1320
16	1380	2800	6850	4080	2915	2610	510	620	770	970	875	1380
17	1360	2750	6320	3940	2200	2550	550	620	770	880	1020	1350
18	1255	2800	5950	3850	1750	2680	570	615	750	855	1210	1350
19	1340	2770	5450	3750	1100	2800	580	600	750	860	1250	1370
20	1380	2720	6350	4000	820	2750	540	590	800	850	1260	1180
21	1425	2650	5550	3800	1115	2800	590	610	780	865	1270	1420
22	1620	2675	5150	3250	1780	2960	620	630	780	880	1120	1500
23	2640	3210	5290	2740	3250	2660	680	630	840	890	1180	1480
24	2160	4050	5090	2800	4950	2360	680	630	910	880	1220	1460
25	1380	3710	4880	3270	7250	2020	670	600	930	870	1310	1390
26	1040	4680	4750	3250	8600	1470	690	600	950	855	1110	1080
27	1035	4360	4600	2870	8880	1040	680	580	930	930	1140	1020
28	1235	3950	4590	2530	8750	830	670	570	940	950	1240	1210
29	1680		4490	5370	9000	780	660	580	930	945	1130	1120
30	2035		4640	6480	8690	780	680	590	940	935	1210	955
31	2610		4750		7430		660	600		940		915
Mean	1550	3226	6161	3878	4074	3589	623	609	728	932	1036	1279
Ac. Ft. for Month	95300	179160	378810	230750	250490	213580	38320	37410	43340	57310	61640	78660
Diversions Below Station, Ac. Ft.	0	0	0	80	110	140	70	100	70	40	0	0
M.I.D. Spill Below Station, Ac. Ft.	0	0	0	900	1180	620	990	1180	760	1700	80	0
*Ac. Ft to San Joaquin R.	95300	179200	378800	231700	251800	214300	39380	38690	44170	59050	61720	78660

NOTE: Recording gage station maintained jointly by Division of Water Resources, City of San Francisco, Modesto Irrigation District and Turlock Irrigation District. Station is 3.35 miles above the mouth. *Neglecting seepage return below station

TABLE 47

DISCHARGE OF STANISLAUS RIVER AT ORANGE BLOSSOM BRIDGE - 1943

Day	Daily Discharge in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	916	2960	2390	3870	6750	5450	79	24	25	23	76	472
2	1000	2250	2210	4200	5530	8385	76	24	28	21	76	630
3	1000	1830	2140	4660	3090	5900	82	24	28	21	79	555
4	1000	1560	2210	4750	5070	3920	97	24	25	21	82	599
5	1000	1410	3620	5040	3920	1890	89	23	24	21	89	450
6	1000	1320	9320	4910	3790	353	85	23	24	20	125	212
7	1000	1340	6080	4280	4260	344	79	25	24	20	113	674
8	1000	2300	5340	4600	4330	348	85	28	25	21	42	436
9	980	1960	8570	4640	3860	353	89	21	25	21	40	313
10	968	1530	16000	3780	2810	419	93	23	25	23	121	300
11	1140	1380	13100	3320	2460	718	63	28	25	23	134	291
12	1590	1420	8200	3150	2880	1790	37	28	25	21	125	256
13	1590	1640	6400	3340	2850	1440	31	28	24	21	159	79
14	1580	1850	5980	4100	2640	854	21	28	23	21	168	300
15	1570	1940	5960	4560	2470	520	28	28	23	21	70	348
16	1570	1950	4840	4820	2190	832	28	28	23	20	93	238
17	1570	1960	4760	4820	1400	1120	25	28	23	20	138	256
18	467	1650	5440	4750	476	972	23	28	21	20	138	208
19	57	2050	4460	4750	450	1300	21	28	23	20	185	113
20	26	1710	3860	4640	420	1570	21	28	24	21	192	73
21	1020	2130	3620	3630	320	1270	23	31	23	24	190	93
22	1050	2260	3770	3270	331	1080	23	28	24	25	76	113
23	2660	2820	3460	3980	608	651	25	28	24	21	95	113
24	8720	2680	3220	4870	3860	410	28	25	18	21	194	109
25	5160	4080	3170	5090	4890	387	25	25	24	20	199	109
26	3860	3390	3310	4370	4750	155	24	25	24	20	204	79
27	4840	2970	3560	3700	4390	125	24	24	25	28	204	70
28	3780	2610	3780	6350	4600	121	23	25	28	57	185	234
29	2590		4460	8660	4280	113	24	25	24	57	76	296
30	6450		5060	4280	3270	85	24	28	23	54	282	190
31	5160		4190		3020		21	25		51		168
Mean	2139	2105	5241	4506	3093	1429	46	26	24	26	132	270
Ac. Ft. for Month	131500	116900	322300	268100	190200	85040	2810	1600	1440	1580	7830	16620

NOTE: Station maintained jointly by Division of Water Resources (Water Supervision and Oakdale Irrigation District. Station is at mile 44.7 above mouth or 5.7 miles above Oakdale.

TABLE 48

DISCHARGE OF STANISLAUS RIVER AT RIVERBANK (BURNEYVILLE BRIDGE) - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1040	3340	2470	3740	4230	3830	126	89	84	75	95	304
2	1030	2570	2290	3850	5310	7850	122	89	86	75	97	468
3	1030	2060	2180	4260	5850	6610	131	89	87	75	98	540
4	1030	1730	2170	4480	4940	4360	140	89	87	75	99	486
5	1020	1560	2730	4540	4010	2900	134	85	87	75	100	636
6	1020	1440	7080	4800	3480	844	129	82	87	75	101	152
7	1014	1380	7260	4100	3950	555	124	82	86	75	110	370
8	997	2010	5060	4160	4160	504	120	82	85	75	120	585
9	994	2120	6760	4540	3890	480	121	82	84	75	130	304
10	990	1740	12500	3870	3230	480	122	82	83	75	140	284
11	1170	1490	18200	3330	2400	480	122	82	82	75	154	276
12	1520	1440	9070	3030	2730	1630	95	82	81	75	150	278
13	1580	1570	6710	3090	2790	1540	92	82	80	75	166	135
14	1560	1800	5760	3590	2660	1210	69	82	79	75	164	158
15	1560	1890	5960	4260	2490	600	88	82	79	75	120	286
16	1560	1920	5030	4420	2270	754	88	82	78	75	132	228
17	1560	1920	4430	4520	1870	1160	89	82	78	76	154	239
18	983	1840	5340	4550	820	966	88	82	77	78	164	228
19	213	1810	4590	4500	640	1150	80	82	77	80	183	136
20	132	1880	3950	4470	603	1500	80	82	77	81	193	113
21	182	1870	3630	3920	495	1360	85	82	77	82	184	109
22	2090	2090	3670	3030	438	1200	85	82	77	84	120	113
23	955	2580	3490	3520	448	892	89	82	77	85	116	116
24	7160	2640	3130	4320	2160	561	88	82	77	86	148	116
25	6420	3450	3070	4750	4380	438	89	82	77	88	185	148
26	3980	3610	3130	4490	4480	316	88	82	76	90	189	124
27	4540	3020	3280	3660	4240	192	85	82	76	91	187	120
28	4230	2730	3500	4270	4000	168	85	80	76	92	174	128
29	2800		3860	8800	4280	164	85	82	75	93	120	335
30	4280		4740	5980	3480	147	89	82	75	94	320	225
31	6360		4180		2790		88	82		94		157
Mean	2097	2125	5135	4295	3021	1495	101	83	80	80	147	254
Ac. Ft. for Month	128900	118000	315800	255600	185700	88940	6180	5100	4770	4950	8750	15660

NOTE: Station maintained jointly by Division of Water Resources (Water Supervision), Oakdale and South San Joaquin Irrigation Districts. Station is at mile 32.0 above mouth. Record for period July 12 to November 10 based upon weekly gage heights and relationship to stations at Orange Blossom Bridge.

TABLE 49

DISCHARGE OF STANISLAUS RIVER AT RIPON BRIDGE - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	1080	4880	2530	4280	5600	3260	388	248	210	266	250	392
2	1080	3290	2350	3980	4880	4390	348	244	222	258	238	503
3	1080	2400	2230	4100	5640	7870	326	228	230	254	236	605
4	1080	2030	2160	4370	5740	6140	346	244	226	262	230	621
5	1080	1750	2290	4550	4930	4500	358	244	244	242	238	669
6	1070	1630	3560	4700	4190	2460	314	226	256	236	240	572
7	1070	1540	6550	4720	3930	1310	314	220	226	250	264	446
8	1060	1730	6280	4390	4170	1100	310	250	222	234	282	455
9	1060	2150	5340	4410	4280	1030	318	238	220	232	274	572
10	1050	1940	7540	4520	4000	945	314	222	224	236	234	492
11	1050	1640	17600	4030	3100	890	316	230	218	224	278	482
12	1210	1530	12300	3490	2890	1260	284	234	228	260	308	478
13	1460	1560	8450	3270	3020	1820	250	222	230	250	306	457
14	1490	1710	6400	3420	2930	1620	254	238	220	254	320	344
15	1490	1850	5830	3960	2770	1120	252	250	216	254	322	413
16	1490	1900	5740	4320	2610	962	238	254	220	258	274	474
17	1490	1910	5020	4550	2340	1180	260	224	224	254	260	419
18	1420	1910	4790	4640	1680	1260	268	220	214	256	332	421
19	727	1770	5190	4650	1200	1260	290	224	206	248	328	413
20	485	1970	4640	4630	1070	1500	254	248	200	262	342	344
21	415	1780	4110	4550	993	1590	248	258	212	330	348	308
22	1360	2010	3820	3900	880	1400	270	248	226	320	346	294
23	1240	2230	3790	3530	837	1250	266	272	246	314	292	306
24	2520	2530	3560	3920	1210	972	236	244	232	310	270	304
25	4860	2620	3320	4420	3240	808	228	252	276	288	328	296
26	5160	3460	3250	4720	4010	716	240	262	280	292	346	298
27	4130	3120	3350	4490	4200	546	236	242	270	300	346	278
28	4170	2790	3500	5550	4180	498	226	220	280	284	348	264
29	3210		3700	5040	4260	449	224	240	264	286	338	332
30	2930		4150	8660	4230	436	226	242	250	314	286	442
31	4370		4570		3480		234	228		294		364
Mean	1851	2201	5094	4459	3306	1818	279	239	233	268	293	421
Ac. Ft. for Month	113800	122200	313200	265300	203300	108200	17130	14710	13870	16510	17460	25900

NOTE: Station maintained jointly by Division of Water Resources (Water Supervision), Water Resources Branch of U. S. Geological Survey, City of San Francisco, U. S. Bureau of Reclamation and the South San Joaquin & Modesto Irrigation Districts. Station is at Highway 99 and is 16 miles above mouth of river.

TABLE 50

DISCHARGE OF STANISLAUS RIVER AT BRET HARTE PUMP - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	1010	4350	2450	4100	8020	3170	530	290	230	275	300	345
2	1015	3400	2280	3880	5280	3900	475	300	220	255	260	445
3	1010	2380	2150	3850	5380	5670	485	280	235	280	235	555
4	1000	2020	2050	4050	5880	7800	545	265	220	275	210	605
5	1005	1830	2190	4200	5550	5220	530	255	250	260	220	620
6	1000	1680	3320	4320	4650	3080	475	270	255	255	225	620
7	990	1580	4700	4430	3950	1640	445	250	230	260	250	435
8	995	1570	6250	4270	4230	1420	440	275	215	265	275	595
9	990	2000	5400	4150	4480	1450	405	270	215	260	275	590
10	990	1890	5500	4250	4400	1350	375	245	235	270	250	490
11	985	1650	19250	4040	3630	1200	445	240	205	265	250	445
12	1155	1550	17050	3620	3120	1330	435	245	245	260	270	430
13	2620	1600	8750	3370	3340	2000	320	240	240	270	305	420
14	2660	1780	5800	3450	3290	2000	310	240	215	255	320	315
15	2700	1970	5640	3800	3170	1355	310	260	245	265	335	335
16	2720	2070	5500	4120	3100	1105	295	245	260	260	275	440
17	2740	2100	5180	4550	2880	1190	340	240	235	270	245	415
18	2740	2140	4700	4800	2200	1345	380	245	210	275	260	405
19	895	2020	4820	4860	1800	1285	365	240	265	275	310	405
20	510	2230	4800	4850	1760	1465	240	245	240	285	350	350
21	405	2160	4250	4800	1710	1590	295	260	225	315	350	300
22	700	2350	3830	4350	1580	1450	315	290	230	375	355	265
23	2320	2500	3730	3700	1580	1365	290	290	235	325	310	275
24	2700	2720	3610	3900	1650	1165	325	270	225	325	250	275
25	4700	2700	3430	4430	3650	1005	325	265	235	310	285	275
26	5200	3240	3300	4870	4230	900	295	260	260	320	350	275
27	4820	3080	3320	4920	4300	760	275	255	285	320	355	265
28	4450	2740	3400	4450	4230	675	260	225	285	310	355	250
29	4100		3500	4500	4150	600	275	235	285	305	350	265
30	3160		3700	10500	4230	595	270	240	275	300	265	395
31	3750		4050		3700		260	220		325		355
Mean	2130	2261	5094	4446	3714	1969	365	256	240	286	288	402
Ac. Ft. for Month	130980	125550	313190	264560	228340	117140	22470	15770	14290	17580	17150	24700
Diversions below Station, Ac. Ft.	0	0	0	0	190	70	70	50	170	60	0	0
*Ac. Ft. to San Joaquin R.	130980	125550	313190	264560	228530	117210	22540	15820	14460	17640	17150	24700

NOTE: Recording gage station maintained jointly by Division of Water Resources, U. S. Bureau of Reclamation, City of San Francisco and Modesto Irrigation District. Station is 5.9 miles above mouth of river.

* Neglecting seepage return below station.

CHAPTER III

MEASUREMENTS OF DIVERSIONS

Measurements and records of diversions in 1943 have included those from the Sacramento River and its tributaries on the valley floor, those to the Delta Uplands from Old San Joaquin River, Tom Paine Slough, and San Joaquin River, and those on the Stanislaus, Tuolumne, Merced, (below the major irrigation districts' gravity diversions) and San Joaquin (above Durham Ferry Bridge) rivers as obtained in connection with the return water measurements (See Chapter IV). For 1943 this report records a total of 656 points of diversion, segregated to the various sources as follows: Sacramento River 284, Colusa Trough 16, Back Borrow Pit (carrying drainage water from Colusa Basin along the back levees of Reclamation Districts 108 and 787) 21, Lower Butte Creek and Butte Slough 24, By-pass and Drainage Channels 37, Feather River 37, Yuba River 10, American River 37, from Old San Joaquin River 14, from Tom Paine Slough 8, and from San Joaquin River (below Vernalis gaging station) 47, San Joaquin River (above Vernalis gaging station) 20, Stanislaus River 25, Tuolumne River 20, and Merced River 56.

All of these diversions except eight are accomplished by pumping. These exceptions are gravity diversions, one on the Yuba River, two on the Feather River, one on the Sacramento River, and four minor diversions on the various by-pass and drainage channels, the records for which are obtained by means of canal ratings. In the case of the pumping diversions there are a few instances where the records are obtained by means of canal ratings, but in the main the records are obtained from a relation established between electric power consumption, static head and pump discharge. This is possible due to the fact that nearly all of the pumping plants are electrically

operated. The relation between power input and water pumped is determined from current meter measurements of the discharge and the measured kilowatt input. At the larger pumping plants several measurements are made during each season. At the smaller plants a number of measurements are made initially to determine the rating and thereafter at intervals to show any changes which may occur in the rating. Prior to 1933 a daily diversion record for each plant was compiled. However, since that year, except for the larger diversions, the monthly diversion records only are available.

For 1943 the amount of water diverted by the larger plants was computed, as above, and several discharge measurements were made at each of the larger plants during the season. Due to the intermittent operation of the smaller plants and the large area to be covered by the field engineers, it was not possible to make many discharge measurements at any one of these smaller plants. However, it is felt that possibly the rating as initially determined, remains more or less constant and that over a period of time, enough measurements will be secured to determine any change in the rating. The diversions for 1943 have been computed on a monthly basis only and the breakdown into daily records was not made.

A summary of the 1943 diversions throughout the Sacramento-San Joaquin territory is shown in Table 69. A segregation is made to show the relative diversions from the various river sources. For each segregation the table shows also the acreage irrigated and the computed seasonal gross duty of water. Table 70 shows a comparison of the rice acreage served during the period 1924-1943, from the stream channels in the Sacramento-San Joaquin valley area under water supervision, with the rice acreage in California served from all sources and reported by the Federal-State Crop Reporting

Service. Table 68 summarizes the diversions and irrigated acreages between different points on the Sacramento River. Table 51 shows a comparison of the Sacramento River stream flow irrigation draft and gross duty of water for the years 1924 to 1943, inclusive. Tables 52, 53 and 54 show similar data for the Feather, Yuba and American rivers. In Table 55 is shown the average monthly diversions in per cent of seasonal for the streams in the Sacramento and San Joaquin valleys. A summary of the monthly diversions from the Sacramento valley streams for the period of record prior to 1943 is given in Tables 56 to 59. All data available since 1924 regarding monthly diversions, acreage irrigated, and gross duty of water for the San Joaquin valley streams and Delta upland channels are given in Tables 60 to 66. Table 67 shows, for the Sacramento River only, the seasonal diversions and acreages irrigated for the period 1924-1943, segregated to the different river sections.

TABLE 51

SACRAMENTO RIVER - REDDING TO SACRAMENTO
STREAM FLOW - IRRIGATION DRAFT - GROSS DUTY OF WATER 1924 - 1943

Year	Seasonal Runoff at Red Bluff in Per cent of normal *	Discharge of Sacramento River at Kennett Cubic feet per Sec. Average July-Sep. Inclusive	Discharge of Sacramento River at Kennett Cubic feet per Sec. Average July	Irrigation Draft July	Irrigation Draft Aver. cfs July-Sep. Inclusive	Irrigation Draft Acre-feet Mar.-Oct. Inclusive	Acreage Irrigated General	Acreage Irrigated Rice	Acreage Irrigated Total	Gross Duty of Water Acre-feet per Acre Jul.-Sep. Inclusive	Gross Duty of Water Acre-feet per Acre July	Gross Duty of Water Acre-feet per Acre Mar.-Oct. Inclusive	Gross Duty of Water Acres per sec.foot Mar.-Oct. Inclusive	Gross Duty of Water Acres per sec.foot July-Sep. Inclusive
1924	38	2920**	2890**	3075	2470**	953000	104300	59700	164000	2.75	1.15	5.81	84	66
1925	92	3630**	3640**	3444	2960**	843000/	76200	58000	134200	4.03	1.57	6.28	77	45
1926	65	2780	2880	4225	3210	1108000/	76600	87500	164100	3.57	1.58	6.75	73	51
1927	125	3550	3950	4229	3510	1159000/	77900	79800	157700	4.07	1.60	7.35	66	45
1928	87	3320	3580	3693	2920	1055000/	88200	63500	151700	3.52	1.49	6.95	70	52
1929	50	2920	3060	3579	2770	1066000/	136900	43900	180800	2.80	1.15	5.90	83	65
1930	70	2970	3070	3541	2880	1056000/	96600	56200	152800	3.44	1.42	6.91	70	53
1931	38	2570	2600	3937	3030	1335000	141500	73900	215400	2.57	1.13	6.20	78	71
1932	58	2730	2940	3218	2570	1020000	130700	53800	184500	2.54	1.07	5.53	88	72
1933	52	2770	3010	3211	2680	1042000	101100	53000	154100	3.17	1.28	6.76	72	57
1934	51	2540	2650	3299	2750	1057000	93800	56500	150300	3.34	1.35	7.03	69	54
1935	86	3010	3330	3364	2820	926000	98500	51100	149600	3.44	1.38	6.19	78	53
1936	81	2910	3280	3516	2890	1055000	93100	62700	155800	3.38	1.39	6.77	72	54
1937	68	2950	3380	3827	3210	1070000	101000	66500	167500	3.50	1.41	6.39	76	52
1938	168	4220	4870	3555	2990	932000	85600	62600	148200	3.68	1.47	6.29	77	49
1939	50	3000	3100	3746	2910	1301000	158800	63900	222700	2.38	1.03	5.84	83	77
1940	120	3425	3625	4050	3275	1063000	119700	64400	184100	3.25	1.35	5.77	84	56
1941	164	4500	5180	4314	3850	1150000	118600	85200	203800	3.44	1.31	5.64	86	53
1942	129	4340	4905	4662	4100	1279000	111200	107600	218800	3.42	1.31	5.84	83	53
1943	97	3950	4305	4699	4205	1417000	126300	115600	241900	3.17	1.19	5.86	83	58
Average 1924-1943		3250	3512	3749	3100	1094000	106800	68300	175100	3.23	1.32	6.25	78	56

* 50 year mean (1889-1939) of natural run-off. See Tables 1, 3 and 5 for comparison of 40 and 50 year means.
** Flow near Red Bluff. Station at Kennett established in 1926.
/ Diversions for March estimated.

TABLE 52

FEATHER RIVER - OROVILLE TO MOUTH

STREAM FLOW - IRRIGATION DRAFT - GROSS DUTY OF WATER 1924 - 1943

Year	Seasonal Runoff at Oroville in Per Cent of Normal *	Discharge of Feather River at Oroville Cubic Feet per Sec.		Irrigation Draft			Acreage Irrigated			Gross Duty of Water				
										Acre-feet per Acre			Acres per Sec. Ft.	
		Average July-Sep. Inclusive	Average July	July	Aver. cfs July-Sep. Inclusive	Acre-feet Mar.-Oct. Inclusive	General	Rice	Total	July-Sep. Inclusive	July	Mar.-Oct. Inclusive	Mar.-Oct. Inclusive	July-Sep. Inclusive
1924(1)	27	933	852	950	917	355346	22402	22541	44943	3.72	1.30	7.92	61	49
1925	65	1719	1770	1464	1287	417150	25560	26734	52294	4.49	1.72	7.98	61	41
1926	65	1839	1840	1712	1432	474025	23545	34694	58239	4.49	1.81	8.14	60	41
1927	121	1920	2110	1857	1578	533615	24944	38513	63457	4.54	1.80	8.41	58	40
1928	88	1689	1980	1697	1363	497201	23383	33145	56528	4.40	1.85	8.80	55	41
1929	38	2089	1920	1416	1134	453464	29011	23917	52928	3.91	1.64	8.57	57	47
1930	80	1986	1890	1517	1225	450020	25604	24258	49862	4.48	1.87	9.03	54	41
1931	30	1177	1230	1333	1059	464138	24683	27079	51762	3.73	1.58	8.97	54	49
1932	68	1570	1990	1621	1327	496713	24115	28108	52223	4.64	1.91	9.51	51	39
1933	39	1389	1590	1533	1286	478326	21897	26541	48438	4.84	1.95	9.88	49	38
1934	42	1445	1530	1325	1085	428008	23984	24918	48902	4.05	1.67	8.75	56	45
1935	88	1937	2067	1502	1258	390873	25162	20849	46011	4.99	2.01	8.50	57	37
1936	88	2171	2242	1612	1349	479093	23990	26546	50536	4.87	1.96	9.48	51	37
1937	65	1760	2138	1787	1529	507765	26705	30203	56908	4.90	1.93	8.92	54	37
1938	175	2674	3334	1757	1594	512600	26938	27144	54082	5.38	2.00	9.48	51	34
1939	39	1516	1460	1497	1168	501357	29234	26303	55537	3.84	1.66	9.03	54	48
1940	116	1966	1913	1713	1414	473974	30117	23526	53643	4.81	1.96	8.84	55	34
1941	133	2229	2754	1681	1547	475240	27658	26640	54298	5.20	1.90	8.75	56	35
1942	136	2558	3169	2042	1833	539693	25177	38477	63654	5.25	1.97	8.48	57	35
1943	115	1957	2236	2134	1906	623641	24089	46566	70235	4.95	1.87	8.88	55	37
Average 1924 -1943		1830	2000	1610	1360	477600	25410	28830	54220	4.58	1.83	8.81	55	40

* 50 year mean (1889 - 1939) of natural runoff. See tables 1, 3 and 5 for comparison of 40 and 50 year means.

(1) Some of the smaller plants were omitted in 1924.

TABLE 53

YUBA RIVER - SMARTVILLE TO MOUTH

STREAM FLOW - IRRIGATION DRAFT - GROSS DUTY OF WATER 1925 - 1943

Year	Seasonal Runoff at Smartville in Per cent of Normal *	Discharge of Yuba River at Smartville Cubic feet per Sec.		Irrigation Draft			Acreage Irrigated			Gross Duty of Water				
										Acre-feet per Acre			Acres per Sec. Ft.	
		Average July-Sep. Inclusive	Average July	July	Aver. cfs July-Sep. Inclusive	Acre-feet Mar.-Oct. Inclusive	General	Rice	Total	July-Sep. Inclusive	July	Mar.-Oct. Inclusive	Mar.-Oct. Inclusive	July-Sep. Inclusive
1925(1)	85	417	637	16	10	4045	1796	0	1796	1.01	0.55	2.25	217	180
1926	65	226	280	145	133	35908	3234	3279	6513	3.73	1.37	5.51	88	49
1927	142	495	868	160	125	39750	4003	1930	5933	3.84	1.66	6.71	73	47
1928	98	374	546	157	114	36800	4935	1875	6810	3.04	1.42	5.40	90	60
1929	41	252	340	152	139	53254	5180	2450	7630	3.33	1.23	6.99	69	55
1930	73	296	347	191	163	58521	4680	2875	7555	3.93	1.59	7.74	63	46
1931	26	146	152	146	134	63320	4823	2950	7773	3.14	1.16	8.14	60	58
1932	85	359	603	155	137	58201	4950	2615	7565	3.32	1.26	7.70	63	55
1933	43	293	420	178	162	63369	5935	2645	8580	3.46	1.27	7.38	66	53
1934	40	185	222	183	127	52651	6305	1667	7972	2.91	1.40	6.51	74	63
1935	90	383	602	184	153	48850	6535	1552	8887	3.46	1.40	6.05	80	53
1936	104	394	584	168	155	64058	5202	2665	7867	3.58	1.31	8.14	60	51
1937	75	360	541	159	156	59163	6699	2598	9297	3.06	1.05	6.37	76	60
1938	162	748	1410	162	152	43257	5772	1605	7377	3.75	1.35	5.88	83	49
1939	36	213	238	210	186	73113	6642	1898	8540	3.97	1.51	8.56	57	46
1940	115	342	390	247	207	69968	7220	1270	8490	4.45	1.79	8.24	59	41
1941	129	787	1565	221	206	73530	7472	1345	8817	4.27	1.54	8.34	58	43
1942	137	792	1386	243	235	74706	6661	1125	7786	5.50	1.92	9.59	51	33
1943	126	576	743	280	278	93799	6280	2310	8590	5.91	2.00	10.92	45	31
Average 1925-1943		402	625	177	156	56120	5490	2030	7520	3.79	1.45	7.46	65	48

* 50 year mean (1889 - 1939) of natural run-off. See Tables 1, 3 and 5 for comparison of 40 and 50 year means.

(1) Record obtained for Lower Yuba River only.

TABLE 54

AMERICAN RIVER - FAIROAKS TO MOUTH

STREAM FLOW - IRRIGATION DRAFT - GROSS DUTY OF WATER 1925 - 1943

Year	Seasonal Runoff at Fairoaks in per cent of Normal *	Discharge of American River at Fairoaks Cubic feet per Sec.		Irrigation Draft			Acreage Irrigated			Gross Duty of Water				
										Acre-feet per Acre			Acres per Sec. Ft.	
		Average July-Sep. Inclusive	Average July	July	Aver. cfs July-Sep. Inclusive	Acre-feet Mar.-Oct. Inclusive	General	Rice	Total	July-Sep. Inclusive	July	Mar.-Oct. Inclusive	Mar.-Oct. Inclusive	July-Sep. Inclusive
1925	94	565	1080	20	16	4353	3510		3510	0.82	0.35	1.24	392	219
1926	48	207	247	25	16	4606	3073		3073	0.94	0.50	1.50	324	192
1927	127	653	1240	29	21	5636	3343		3343	1.16	0.52	1.68	288	159
1928	88	286	414	21	17	5635	3071		3071	1.00	0.41	1.83	264	181
1929	40	262	482	25	20	6324	3077		3077	1.20	0.50	2.04	239	154
1930	57	276	414	21	15	4955	2639		2639	1.06	0.49	1.87	262	176
1931	25	98	136	20	15	5620	2694		2694	1.03	0.46	2.09	232	179
1932	90	679	1500	21	17	5481	3165		3165	0.96	0.42	1.73	281	187
1933	44	344	633	21	15	4651	2848		2848	0.94	0.46	1.62	300	190
1934	39	179	192	21	15	5505	2770		2770	0.98	0.46	1.99	245	185
1935	90	504	1009	21	15	4815	2808		2808	0.97	0.46	1.71	284	187
1936	118	753	1364	20	16	4727	2492		2492	1.16	0.49	1.90	256	156
1937	81	497	873	25	20	5381	3353		3353	1.07	0.45	1.61	302	168
1938	157	1060	2101	20	16	4287	2923		(1) 2923	1.03	0.43	1.47	331	182
1939	36	127	165	28	19	6654	3064		(1) 3064	1.11	0.55	2.17	224	161
1940	118	511	734	29	19	6052	3061		(1) 3061	1.15	0.58	1.98	245	159
1941	109	715	1319	25	19	5309	3046		(1) 3046	1.12	0.50	1.74	279	160
1942	136	1115	2402	23	18	4167	3132		(1) 3132	1.08	0.44	1.33	364	174
1943	135	628	1273	25	19	4581	3112		3112	1.12	0.49	1.47	346	164
Average 1925-1943		498	925	23	17	5200	3010	0	3010	1.03	0.47	1.73	281	177

* 50 year mean (1889-1939) of natural run-off. See Tables 1, 3 and 5 for comparison of 40 and 50 year means.
(1) An estimated 2200 acres have been added for Carmichael Irrigation District.

TABLE 55

AVERAGE MONTHLY DIVERSIONS IN PER CENT OF SEASONAL FOR SACRAMENTO AND SAN JOAQUIN VALLEY STREAMS

	Period of Record	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.
SACRAMENTO VALLEY	Per Cent of Seasonal Diversion								
Sacramento River - Redding to Sacramento	1924 to 1943	0.7	6.7	17.4	19.7	21.1	19.6	11.1	3.7
Feather River - Oroville to mouth	1924 to 1943	0.3	5.0	17.9	19.7	20.7	19.4	12.1	4.9
Yuba River - Smartville to mouth	1925 to 1943	.0	7.2	15.8	18.7	19.3	18.3	13.2	7.5
American River - Fairoaks to mouth	1925 to 1943	0.6	4.3	9.5	20.1	27.3	21.1	12.1	5.0
DELTA UPLANDS									
Old San Joaquin River	1924 to 1943	2.4	8.7	17.1	18.1	20.6	17.3	11.3	4.5
Tom Paine Slough	1924 to 1943	1.4	7.4	15.3	17.4	18.9	18.2	14.2	7.2
San Joaquin River below Vernalis	1924 to 1943	2.6	11.8	16.2	13.9	24.1	18.8	8.9	3.7
SAN JOAQUIN VALLEY									
San Joaquin River - Delta Bridge to Vernalis	1931 to 1943	2.7	9.0	14.8	15.8	23.0	19.3	11.6	3.8
Merced River-Yosemite Valley Railroad Crossing to mouth	1931 to 1943	1.5	6.8	14.6	18.6	22.6	19.1	12.6	4.2
Tuolumne River - La Grange to mouth	1931 to 1943	2.0	7.0	16.6	17.9	20.5	19.1	11.7	5.2
Stanislaus River - Orange Blossom Bridge to mouth	1931 to 1943	0.9	7.1	14.0	19.4	21.3	19.1	12.5	5.7

TABLE 56

SACRAMENTO RIVER - MONTHLY DIVERSIONS IN ACRE-FEET - SACRAMENTO TO REDDING 1924 - 1943

Year	March	April	May	June	July	August	September	October	Seasonal Diversions
1924	7324	102511	184043	186073	189081	163677	97976	22088	952773
1925	1200*	11177	87709	184151	211788	194888	134442	18108	843463
1926	4000*	34326	195052	258889	259777	226874	98632	30220	1107770
1927	600*	31327	206864	234116	260018	241876	139469	44993	1159263
1928	1900*	52335	207747	229261	227058	214549	92114	29574	1054538
1929	5600*	138283	204360	167378	207785	191346	107103	43954	1065809
1930	3100*	74236	198836	221852	217698	199875	107577	32681	1055855
1931	30199	222932	257156	227158	242076	209351	101822	44572	1335266
1932	4661	123973	176667	194500	197849	171122	99657	51571	1020000
1933	4452	118677	188004	189852	197452	185945	105071	52267	1041720
1934	2599	109638	204710	193469	202843	191488	107885	44331	1056963
1935	1524	18598	157817	203562	206813	195215	112498	30137	926164
1936	7320	76534	203802	194110	216217	206858	104203	45925	1054969
1937	3459	32727	210339	210927	235304	217924	133271	26510	1070461
1938	5285	29942	121847	199745	218572	208414	118177	30248	932230
1939	63636	202428	227491	233319	230319	209735	90708	43412	1301048
1940	1802	18073	182534	218505	249012	228765	119951	43988	1062630
1941	1883	5274	157567	228387	265229	259557	177189	55029	1150115
1942	1991	11727	187657	268091	286655	278848	186708	61298	1278975
1943	1769	61409	257673	276759	288930	288024	190456	51915	1416935
Average Acre-feet	7720	73810	190900	216000	230500	214000	121200	40140	1094000
Average c.f.s.	126	1240	3105	3630	3749	3480	2037	653	2251
Monthly diversion in per cent of seasonal	0.7	6.7	17.4	19.7	21.1	19.6	11.1	3.7	

* Estimated.

TABLE 57

FEATHER RIVER -- MONTHLY DIVERSIONS IN ACRE-FEET - OROVILLE TO MOUTH 1924 - 1943

Year	March	April	May	June	July	August	September	October	Seasonal Diversions
1924	2652	36440	75741	60132	58418	67365	41618	12980	355346
1925	0*	9506	70947	88956	90047	81340	63395	8829	413020
1926	0*	16528	83297	104100	105255	101623	54446	4083	469332
1927	0*	17522	96458	107706	114211	102251	71514	18669	528331
1928	0*	19912	101655	109875	104359	97452	46986	12040	492279
1929	1500*	48450	97295	83570	87061	82177	37711	12711	450475
1930	0*	31719	78154	91418	93250	89300	40912	20811	445564
1931	5887	67203	98054	85024	81941	71953	39288	14788	464138
1932	2158	50002	85950	94140	99640	93180	49359	22284	496713
1933	5388	31219	91529	91635	94231	85891	54515	23918	478326
1934	2245	34217	92225	82379	81467	72334	44121	19020	428008
1935	214	1538	51974	89713	92372	85835	51342	17885	390873
1936	768	14136	92675	92002	99147	90575	56374	33416	479093
1937	620	5647	92614	99882	109850	103248	65946	29958	507765
1938	0	3512	76975	98534	108039	104846	77969	42725	512600
1939	3583	71539	99567	90960	92044	83292	37752	22620	501357
1940	188	2207	84408	95502	105337	93454	59182	33695	473973
1941	0	2448	70513	72971	103334	100433	78451	47090	475240
1942	0	0	61352	113416	125530	122146	86814	30435	539693
1943	0	13290	101599	125318	131210	123282	93309	35495	623641
Average Acre-feet	1260	23850	85150	93860	98840	92600	57550	23170	476300
Average c.f.s.	20	400	1380	1580	1610	1510	967	377	980
Monthly Diversion in Per Cent of Seasonal	0.3	5.0	17.9	19.7	20.7	19.4	12.1	4.9	

*Estimated

TABLE 58

YUBA RIVER - MONTHLY DIVERSIONS IN ACRE-FEET - SMARTVILLE TO MOUTH 1925 - 1943

Year	March	April	May	June	July	August	September	October	Seasonal Diversions
1925	-	-	617	1594	985	586	249	14	4045
1926	0	0	4681	6825	8893	10785	4604	120	35908
1927	-	304	6492	9761	9808	8733	4220	432	39750
1928	0	0	7329	8759	9651	8816	2245	0	36800
1929	0	3972	10808	8843	9376	8710	7308	4237	53254
1930	0	4803	9234	10293	11752	10825	7137	4477	58521
1931	0	10471	12111	10427	8991	8986	6468	5866	63320
1932	0	8778	10151	9973	9525	9188	6371	4215	58201
1933	0	7617	11048	10516	10917	10920	7724	4627	63369
1934	0	7112	11137	10985	11235	8454	3496	232	52651
1935	0	525	9034	11008	11313	10013	6674	283	48850
1936	0	9709	11579	10513	10330	10009	7908	4010	64058
1937	0	8093	9913	10055	9749	9815	8835	2703	59163
1938	0	360	4807	9371	9982	9433	8284	1020	43257
1939	176	8986	13174	12890	12889	12739	8304	3955	73113
1940	0	1326	9377	14114	15190	11798	10780	7383	69968
1941	0	2624	10589	13076	13574	13419	10672	9576	73530
1942	0	36	5703	14736	14955	14841	13086	11349	74706
1943	0	1903	10622	15237	17203	16972	16610	15252	93799
Average Acre-feet	9	4030	8860	10470	10860	10270	7420	4200	56120
Average c.f.s.	0.2	68	144	176	177	167	125	68	115
Monthly Diversion in per cent of seasonal	0	7.2	15.8	18.7	19.3	18.3	13.2	7.5	

TABLE 59

AMERICAN RIVER - MONTHLY DIVERSIONS IN ACRE-FEET - FAIROAKS TO MOUTH 1925 - 1943

Year	March	April	May	June	July	August	September	October	Seasonal Diversions
1925	10*	66	261	985	1233	1198	458	142	4353
1926	0*	5	390	1162	1519	894	480	156	4606
1927	5*	16	317	1028	1754	1577	529	410	5636
1928	10*	121	580	1406	1263	965	832	458	5635
1929	50*	482	812	936	1539	1280	864	361	6324
1930	30*	317	436	1250	1302	976	504	140	4955
1931	46	469	1127	916	1237	1027	510	288	5620
1932	39	390	598	1116	1317	1164	556	301	5481
1933	0	106	471	1070	1317	924	424	303	4615
1934	63	431	896	1078	1281	806	624	326	5505
1935	5	338	663	893	1289	824	603	200	4815
1936	44	312	355	786	1208	1005	667	350	4727
1937	3	119	329	1082	1518	1252	797	281	5381
1938	0	100	267	824	1256	1117	635	88	4287
1939	73	380	932	1616	1699	1151	557	246	6654
1940	44	339	488	1216	1785	1038	686	456	6052
1941	150	253	379	836	1531	1202	673	285	5309
1942	0	0	13	678	1395	1187	789	104	4167
1943	0	0	54	941	1513	1226	753	94	4581
Average Acre-feet	30	223	493	1040	1420	1100	628	263	5190
Average c.f.s.	0.5	4	8	17	23	18	11	4	11
Monthly Diversion in per cent of seasonal	0.6	4.3	9.5	20.1	27.3	21.1	12.1	5.0	

* Estimated.

TABLE 60

OLD SAN JOAQUIN RIVER - DELTA UPLANDS, MONTHLY DIVERSIONS IN ACRE-FEET AND GROSS SEASONAL DUTY OF WATER 1924 - 1943

Year	March	April	May	June	July	August	September	October	Seasonal Diversion	Acreage Irrigated		Gross Seasonal Duty, Acre-Ft.per Acre
										General	Rice	
1924	10320	10311	12600	12434	12460	10845	8277	3633	80880	29190	0	2.8
1925	100*	1737	7330	13233	16264	13962	9404	2347	64377	34677	0	1.9
1926	500*	4440	15526	17420	16690	15283	12376	2151	84386	37480	0	2.3
1927	80	1815	16312	14758	14252	12651	9398	2504	71770	35351	0	2.0
1928	500*	3430	16895	15037	14526	13701	9185	2679	75953	39924	0	1.9
1929	2000*	12977	13170	8894	14735	13143	9465	3389	77773	37359	0	2.1
1930	400*	5624	15152	14488	15289	12958	8535	3019	75465	36480	0	2.1
1931	5735	17099	10400	9245	14125	10854	3522	389	71369	34232	0	2.1
1932	296	5460	9318	9343	9803	8379	5718	2636	50953	27942	0	1.8
1933	488	10114	10351	10092	10938	10414	6082	3463	61942	27851	0	2.2
1934	3204	14687	10321	8708	12827	9946	5817	3019	68529	29792	0	2.3
1935	10	30	11027	13473	12973	10171	6933	2082	56699	28307	0	2.0
1936	420	5310	12235	8621	14492	9994	6958	5239	63269	30232	0	2.1
1937	3	2621	13418	11093	13590	11934	7100	4853	64612	31913	0	2.0
1938	0	1313	8628	11989	9806	8841	6250	3566	50393	29658	0	1.7
1939	7728	12880	8746	12055	13453	9855	4977	1669	71363	34956	0	2.0
1940	0	1015	9527	10943	14091	10217	6148	3306	55247	29009	0	1.9
1941	0	447	5492	11541	13087	10009	7382	2909	50867	28842	0	1.8
1942	0	516	7175	11077	13143	11425	6740	2878	52954	28749	0	1.8
1943	0	2048	11293	12463	13745	11945	7568	3104	62166	40607	0	1.5
Average	1590	5690	11250	11850	13510	11330	7390	2940	65550	32630	0	2.0
Average c.f.s.	26	96	183	199	220	184	124	48	135			
Monthly Diversion in per cent of seasonal	2.4	8.7	17.1	18.1	20.6	17.3	11.3	4.5				

* Estimated

TABLE 61

TOM PAINE SLOUGH - DELTA UPLANDS, MONTHLY DIVERSIONS IN ACRE-FEET AND GROSS SEASONAL DUTY OF WATER 1924 - 1943

Year	March	April	May	June	July	August	September	October	Seasonal Diversion	Acreage Irrigated		Gross Seasonal Duty, Acre-ft. per ac.
										General	Rice	
1924	1126	1926	2529	2696	2238	2419	1474	1242	15650	2810	0	5.6
1925	0*	500*	1672	3491	3027	3058	2205	933	14886	7441	0	2.0
1926	100*	926	3676	3095	3238	2903	2507	693	17138	4973	0	3.4
1927	0*	94	3700	2911	3099	3166	2630	1655	17255	6157	0	2.8
1928	200*	785	2111	2589	2456	2353	2497	1649	14640	4906	0	3.0
1929	500*	1554	2376	1642	3028	2814	2100	1154	15168	5195	0	2.9
1930	100*	764	2081	2132	2326	2124	1752	960	12239	4987	0	2.5
1931	530	2109	1324	1602	2325	2286	1981	523	12680	5322	0	2.4
1932	67	1809	926	1883	1952	2068	1894	775	11374	5040	0	2.3
1933	0	1306	1608	1775	1715	1898	1543	1351	11196	4450	0	2.5
1934	70	2069	1272	1433	1936	1616	1578	972	10946	4549	0	2.4
1935	0	0	1593	1917	1797	1826	1241	556	8930	3226	0	2.8
1936	38	990	1680	1670	2469	2373	1709	1308	12237	4450	0	2.7
1937	0	112	1545	1864	2173	2041	1426	503	9664	3302	0	2.9
1938	0	432	1219	1364	1296	1497	1062	427	7297	2887	0	2.5
1939	763	1620	1218	1703	1414	1789	1015	645	10167	3911	0	2.6
1940	0	159	1509	1974	2129	1612	1133	873	9389	4007	0	2.3
1941	0	0	1406	1972	2163	1788	1704	529	9562	3963	0	2.4
1942	0	0	1292	1852	2434	1930	1158	278	8944	4357	0	2.0
1943	0	891	2526	2728	2629	2578	2041	589	13982	5058	150	2.7
Average	175	902	1860	2120	2290	2210	1730	881	12170	4550	8	2.7
Average c.f.s.	3	15	30	36	37	36	29	14	25			
Monthly Diversion in per cent of Seasonal	1.4	7.4	15.3	17.4	18.9	18.2	14.2	7.2				

*Estimated

TABLE 62

SAN JOAQUIN RIVER - DELTA UPLANDS, MONTHLY DIVERSIONS IN ACRE-FEET AND GROSS SEASONAL DUTY OF WATER 1924 - 1943

Year	March	April	May	June	July	August	September	October	Seasonal Diversion	Acreage Irrigated		Gross Seasonal Duty, Acre-ft.per acre
										General	Rice	
1924	614	1126	1760	1889	2175	1819	1385	206	10974	4335	0	2.5
1925	0*	6	276	1149	1530	1694	1040	39	5734	3224	0	1.8
1926	2000*	5657	8800	7696	8251	7693	6308	1577	47982	11196	0	4.3
1927	0*	713	8530	8224	8927	9378	4317	746	40835	12870	0	3.2
1928	1000*	3075	7915	7523	9141	8159	4604	1849	43266	17579	0	2.5
1929	2000*	6747	9600	5497	10594	7624	4498	2586	49146	16941	0	2.9
1930	2000*	6823	11848	7555	12899	11800	4227	1357	58409	18486	0	3.2
1931	3009	9378	8007	5475	12617	11759	4141	2126	56512	17021	0	3.3
1932	1452	8519	5767	5133	9972	7349	4365	1704	44261	19088	0	2.3
1933	767	9174	6089	5799	10703	7581	3165	2099	45377	18025	0	2.5
1934	3744	10633	7861	5411	12805	8682	4068	1965	55169	19372	0	2.8
1935	12	1691	6790	8950	10353	7785	3637	1714	40932	16571	0	2.5
1936	1483	7467	6838	4166	11651	8629	3575	1865	45674	18993	0	2.4
1937	3	5355	6512	4285	12542	7737	2824	1970	41228	19648	0	2.1
1938	1	3062	6753	4154	9943	6622	3004	991	34530	17582	0	2.0
1939	4012	9394	5398	6901	11721	8744	3862	1178	51210	18672	0	2.7
1940	4	4638	6974	7011	12805	7978	3300	1932	44642	18457	0	2.4
1941	4	1086	6162	5944	12007	8735	4384	1762	40084	19298	0	2.1
1942	188	2232	5210	6602	12203	9651	4014	2085	42185	17932	0	2.4
1943	0	3169	10172	8940	11617	10886	5142	1793	51719	19685	0	2.6
Average	1120	5000	6860	5920	10220	8010	3790	1570	42490	16250	0	2.6
Average c.f.s.	18	84	112	99	166	130	64	26	87			
Monthly Diversion in per cent of seasonal	2.6	11.8	16.2	13.9	24.1	18.8	8.9	3.7				

* Estimated.

TABLE 63

SAN JOAQUIN RIVER - FREMONT FORD BRIDGE TO VERNALIS, MONTHLY DIVERSIONS IN ACRE-FEET AND GROSS SEASONAL DUTY OF WATER 1928-1943

Year	March	April	May	June	July	August	September	October	Seasonal Diversion	Acreage Irrigated		Gross Seasonal Duty, Acre-ft. per acre
										General	Rice	
1928	*	*	*	*	11854	10574	8925	*	*	*	*	*
1929	*	*	*	*	12814	11021	10790	*	*	*	*	*
1930	*	12970	15632	15951	16472	16921	10860	1654	90460	*	*	*
1931	8084	18145	14765	14752	19847	15593	9607	5203	105996	34894	500	3.0
1932	3510	16745	11018	11802	15571	14886	11562	5010	90104	39813	80	2.3
1933	5496	14431	11244	11762	19043	18373	11437	3795	95581	35036	0	2.7
1934	5935	21809	17152	12615	24787	22392	12880	3123	120693	41696	290	2.9
1935	595	1228	14156	18502	23647	22541	13284	5211	99164	37320	155	2.6
1936	4511	12744	15608	21854	23594	15879	10614	3729	108533	41862	160	2.6
1937	212	3100	17198	16112	25933	21963	12183	3295	99996	41542	230	2.4
1938	69	4378	17054	15089	21991	17576	10842	2767	89766	42226	200	2.1
1939	7044	17485	17212	18955	25161	21288	10366	2505	120016	42379	420	2.8
1940	555	4547	15524	18950	26396	17707	10769	3365	97813	39373	470	2.5
1941	0	302	13633	15486	26484	20840	12725	3947	93417	39866	484	2.3
1942	573	2044	14158	17059	28352	25384	12575	4235	104380	41934	580	2.5
1943	0	4417	20849	20115	29913	25046	16595	4789	121724	41143	342	2.9
Average **	2810	9340	15350	16390	23900	19960	11960	3920	103630	39930	301	2.6
Average ** c.f.s.	46	157	250	275	389	325	201	64	213			
Monthly** Diversion in per cent of seasonal	2.7	9.0	14.8	15.8	23.0	19.3	11.6	3.8				

* No Record
** 1931 to 1943
NOTE: No records prior to 1928.

TABLE 64

MERCED RIVER - YOSEMITE VALLEY RAILROAD CROSSING TO MOUTH, MONTHLY DIVERSIONS IN ACRE-FEET AND GROSS SEASONAL DUTY OF WATER - 1928-1943

Year	March	April	May	June	July	August	September	October	Seasonal Diversion	Acreage Irrigated		Gross Seasonal Duty, Acre-ft. per acre
										General	Rice	
1928	*	*	*	*	3451	3027	2343	*	*	*	*	*
1929	*	*	*	*	3420	2965	1942	*	*	*	*	*
1930	*	1062	2319	2750	2716	2253	1242	474	12816	*	*	*
1931	778	2836	3298	2902	3553	3232	2128	765	19492	3623	0	5.4
1932	524	1334	1808	2261	2539	2292	1787	711	13256	3299	0	4.0
1933	320	1406	1757	1990	2372	1900	1600	645	11990	3229	0	3.7
1934	627	2627	2989	2637	3202	2673	2018	826	17599	5091	0	3.5
1935	0	70	1612	2684	2764	2472	1607	632	11841	3305	0	3.6
1936	26	486	2192	2149	2426	2705	1623	411	12018	3662	0	3.3
1937	0	108	1341	2514	3114	2876	1671	387	12011	4155	0	2.9
1938	0	123	858	1523	2213	1933	1018	458	8126	3072	0	2.6
1939	38	951	1791	2162	2520	1803	808	236	10309	3478	0	3.0
1940	2	220	1541	2275	2206	1597	949	317	9107	3123	0	2.9
1941	0	0	870	1644	1995	1537	1306	236	7588	3570	0	2.1
1942	0	14	475	1619	2716	2005	1207	363	8399	3302	0	2.5
1943	0	198	1782	2249	3077	2258	1680	474	11718	3680	0	3.2
Average **	178	798	1720	2200	2670	2250	1490	497	11800	3580	0	3.2
Average c.f.s. **	3	13	28	37	43	37	25	8	24			
Monthly** Diversion in per cent of seasonal	1.5	6.8	14.6	18.6	22.6	19.1	12.6	4.2	*			

* No record
** 1931 to 1943.
NOTE: No records prior to 1928.

TABLE 65

TUOLUMNE RIVER - LA GRANGE BRIDGE TO MOUTH, MONTHLY DIVERSIONS IN ACRE-FEET AND GROSS SEASONAL DUTY OF WATER 1928-1943

Year	March	April	May	June	July	August	September	October	Seasonal Diversion	Acreage Irrigated		Gross Seasonal Duty, Acre-ft. per acre
										General	Rice	
1928	*	*	*	*	327	277	79	*	*	*	*	*
1929	*	*	*	*	477	338	189	*	*	*	*	*
1930	*	173	388	480	523	473	224	59	2320	*	*	*
1931	128	585	560	585	673	585	363	88	3567	894	0	4.0
1932	37	234	260	281	438	331	181	95	1857	653	0	2.8
1933	72	222	213	300	451	411	266	205	2220	855	0	2.6
1934	108	334	396	368	325	349	219	150	2249	845	0	2.7
1935	7	47	326	422	438	375	257	120	1992	770	0	2.6
1936	41	125	387	345	422	442	295	121	2178	736	0	3.0
1937	41	120	540	339	451	409	255	57	2212	752	0	2.9
1938	0	12	135	222	245	201	127	38	980	594	0	1.7
1939	160	149	414	501	455	558	193	104	2534	864	0	2.9
1940	3	19	577	415	642	436	335	151	2578	1072	0	2.4
1941	0	122	519	685	603	607	438	173	3147	1295	0	2.4
1942	7	75	443	462	645	683	343	112	2770	1619	0	1.7
1943	0	116	354	541	542	520	360	183	2616	1826	0	1.4
Average**	46	166	394	427	487	454	279	123	2380	983	0	2.5
Average** c.f.s.	1	3	6	7	8	7	5	2	5			
Monthly ** Diversion in per cent of seasonal	2.0	7.0	16.6	17.9	20.5	19.1	11.7	5.2				

* No records
** 1931 to 1943
NOTE: No records prior to 1928.

TABLE 66

STANISLAUS RIVER - ORANGE BLOSSOM BRIDGE TO MOUTH, MONTHLY DIVERSIONS IN ACRE-FEET AND GROSS SEASONAL DUTY OF WATER 1928 - 1943

Year	March	April	May	June	July	August	September	October	Seasonal Diversion	Acreage Irrigated		Gross Seasonal Duty, Acre-ft. per acre
										General	Rice	
1928	*	*	*	*	1248	1277	1089	*	*	*	*	*
1929	*	*	*	*	1059	807	605	*	*	*	*	*
1930	*	625	1057	1495	1336	1167	730	115	6525	*	*	*
1931	108	2023	1692	2773	2855	2449	1308	706	13914	2261	0	6.2
1932	431	1142	1529	1994	1780	1678	1216	471	10241	2522	0	4.1
1933	103	1046	1158	1355	1350	1176	684	316	7188	2021	0	3.6
1934	240	1620	1274	1687	1697	1683	780	402	9383	2122	0	4.4
1935	0	250	1177	1702	1855	1745	759	304	7792	2076	0	3.8
1936	0	727	838	1256	1952	1407	943	429	7552	2313	0	3.3
1937	0	508	1816	2248	2530	2429	1756	650	11937	3849	75	3.0
1938	0	327	735	1239	1690	1748	997	309	7045	3198	0	2.2
1939	198	1848	2201	2873	3222	3310	1752	827	16231	6331	0	2.6
1940	217	682	2143	3330	3858	2924	1741	851	15746	6902	0	2.3
1941	12	392	2696	3173	3413	3228	2466	1280	16660	6940	110	2.4
1942	240	356	2533	4242	4590	3972	2721	1360	20014	7095	130	2.8
1943	3	873	3439	4241	4458	3935	3518	1598	22065	7360	0	3.0
Average **	119	907	1790	2470	2710	2440	1590	731	12750	4230	24	3.0
Average** c.f.s.	2	15	29	42	44	40	27	12	26			
Monthly ** Diversion in per cent of seasonal	0.9	7.1	14.0	19.4	21.3	19.1	12.5	5.7				

* No record.
** 1931 to 1943.
NOTE: No records prior to 1928.

TABLE 67

SACRAMENTO RIVER - SEASONAL DIVERSIONS AND ACREAGES IRRIGATED 1924 - 1943
(SEGREGATED TO RIVER SECTIONS)

Year		River Sections							Redding to Sacramento
		Redding to Red Bluff	Red Bluff to Butte City	Butte City to Colusa	Colusa to Wilkins Slu	Wilkins Slu to Knights Ldg	Knights Ldg to Verona	Verona to Sacramento	
1924	Seasonal diversion acre-feet	99835	407427	67152	167217	99573	18422	93147	952773
	Average cubic feet per second	205	838	138	344	205	38	192	1960
	Acreage irrigated - rice	0	25875	6950	10130	11000	770	4963	59688
	Acreage irrigated - general	20020	32488	12991	19401	6093	854	12422	104269
1925	Seasonal diversion acre-feet	105593	369570	69511	179953	33822	6731	78283	843463
	Average cubic feet per second	217	761	143	370	70	14	161	1736
	Acreage irrigated - rice	0	30467	8761	9156	3054	0	6587	58025
	Acreage irrigated - general	15714	12979	7065	25408	3472	922	10662	76222
1926	Seasonal diversion acre-feet	107160	525287	134027	189515	41796	19700	90285	1107770
	Average cubic feet per second	220	1081	276	390	86	41	186	2280
	Acreage irrigated - rice	0	47827	14117	13214	1781	1537	9025	87501
	Acreage irrigated - general	19890	13580	7534	18778	4440	1803	10600	76625
1927	Seasonal diversion acre-feet	103240	502946	95815	233466	113750	24786	85252	1159263
	Average cubic feet per second	212	1036	197	481	234	51	175	2386
	Acreage irrigated - rice	0	37718	9110	16864	7574	2569	5926	79761
	Acreage irrigated - general	17823	17565	6445	18609	5371	1597	10451	77861
1928	Seasonal diversion acre-feet	113321	446674	68244	224477	77851	22153	101818	1054538
	Average cubic feet per second	234	919	140	461	160	46	210	2170
	Acreage irrigated - rice	0	29911	5751	14024	4865	1642	7353	63546
	Acreage irrigated - general	20789	19996	7452	21875	5889	513	11704	88218
1929	Seasonal diversion acre-feet	120150	478947	70608	205659	76003	18246	96196	1065809
	Average cubic feet per second	247	986	146	423	156	37	198	2193
	Acreage irrigated - rice	0	21680	4557	7979	4404	0	5274	43894
	Acreage irrigated - general	19105	39985	9168	45826	10859	464	11507	136914
1930	Seasonal diversion acre-feet	126760	440617	72341	229715	68169	21528	96725	1055855
	Average cubic feet per second	261	907	149	473	140	44	199	2173
	Acreage irrigated - rice	0	29199	4963	11717	3155	1130	6020	56184
	Acreage irrigated - general	14571	24068	9461	30003	7659	491	10324	96577
1931	Seasonal diversion acre-feet	143543	553663	93184	313237	70966	21506	139167	1335266
	Average cubic feet per second	295	1139	192	645	146	44	286	2747
	Acreage irrigated - rice	0	39532	5462	19067	780	200	8853	73894
	Acreage irrigated - general	14538	33254	10216	54487	9706	2417	16887	141505

TABLE 47 (CONTINUED)

SACRAMENTO RIVER - SEASONAL DIVERSIONS AND ACREAGES IRRIGATED 1924 - 1943
(SEGREGATED TO RIVER SECTIONS)

Year		River Sections							Redding to Sacramento
		Redding to Red Bluff	Red Bluff to Butte City	Butte City to Colusa	Colusa to Wilkins Slu	Wilkins Slu to Knights Ldg	Knights Ldg to Verona	Verona to Sacramento	
1932	Seasonal diversion acre-feet	132035	460462	31846	249723	37791	18573	89570	1020000
	Average cubic feet per second	272	947	66	514	78	38	184	2099
	Acreage irrigated - rice	0	29673	3086	15529	0	567	4968	53823
	Acreage irrigated - general	12745	52084	7387	34883	9159	4707	9782	130747
1933	Seasonal diversion acre-feet	135323	474372	33281	250149	59381	17837	71377	1041720
	Average cubic feet per second	278	975	69	515	122	37	147	2143
	Acreage irrigated - rice	0	31663	1640	15578	2126	270	2017	53294
	Acreage irrigated - general	12809	30479	4436	34925	6468	1847	10057	101021
1934	Seasonal diversion acre-feet	133625	448806	23531	243463	90826	20877	95835	1056963
	Average cubic feet per second	275	924	48	501	187	43	197	2175
	Acreage irrigated - rice	0	29153	587	15853	4497	892	5534	56516
	Acreage irrigated - general	13620	27858	4591	28934	7035	1461	10284	93783
1935	Seasonal diversion acre-feet	121974	385508	19703	225702	74382	20989	77906	926164
	Average cubic feet per second	251	794	41	464	153	43	160	1906
	Acreage irrigated - rice	0	26884	380	14462	4168	650	4546	51090
	Acreage irrigated - general	13405	28589	5142	30663	6804	1313	12577	98493
1936	Seasonal diversion acre-feet	149313	455981	36371	215313	80901	17072	100018	1054969
	Average cubic feet per second	307	937	75	443	167	36	206	2171
	Acreage irrigated - rice	0	30087	2028	14409	7042	400	8696	62662
	Acreage irrigated - general	13254	27579	5423	27832	5884	1542	11579	93093
1937	Seasonal diversion acre-feet	114609	482048	42570	247130	72526	12949	98629	1070461
	Average cubic feet per second	236	992	88	508	149	27	203	2203
	Acreage irrigated - rice	0	34214	2040	19235	3739	0	7318	66546
	Acreage irrigated - general	13324	30634	5843	29888	6710	2631	11806	100836
1938	Seasonal diversion acre-feet	120301	351901	31684	267085	66219	12447	82593	932230
	Average cubic feet per second	248	723	65	550	136	26	170	1918
	Acreage irrigated - rice	0	29522	1790	19616	4264	0	7396	62588
	Acreage irrigated - general	9309	27193	5137	27788	6476	1757	7935	85595
1939	Seasonal diversion acre-feet	141403	587358	29668	292226	89153	21496	139744	1301048
	Average cubic feet per second	291	1209	61	601	183	44	288	2677
	Acreage irrigated - rice	0	32917	750	17360	3667	0	9159	63853
	Acreage irrigated - general	13423	58185	6802	51711	13120	2727	12800	158768

TABLE 67 (CONTINUED)

SACRAMENTO RIVER - SEASONAL DIVERSIONS AND ACREAGES IRRIGATED 1924 - 1943
(SEGREGATED TO RIVER SECTIONS)

Year		River Sections							Redding to Sacramento
		Redding to Red Bluff	Red Bluff to Butte City	Butte City to Colusa	Colusa to Wilkins Slu	Wilkins Slu to Knights Ldg	Knights Ldg to Verona	Verona to Sacramento	
1940	Seasonal diversion acre-feet	116052	479028	15683	249532	70974	34057	97304	1062630
	Average cubic feet per second	239	986	32	513	146	70	200	2187
	Acreage irrigated - rice	0	31754	463	19475	4024	1541	7134	64392
	Acreage irrigated - general	9696	43885	6354	41548	7318	1318	9611	119730
1941	Seasonal diversion acre-feet	135305	493667	16903	305187	95969	25970	77114	1150115
	Average cubic feet per second	278	1016	35	628	197	53	159	2367
	Acreage irrigated - rice	0	40183	530	30716	6786	1013	5968	85196
	Acreage irrigated - general	12205	45217	6772	37039	7923	980	8445	118581
1942	Seasonal diversion acre-feet	119216	553834	37714	335431	116200	26820	89760	1278975
	Average cubic feet per second	245	1140	78	690	239	55	185	2632
	Acreage irrigated - rice	0	49299	2668	39415	8957	660	6664	107663
	Acreage irrigated - general	13513	47696	5123	30095	5425	1476	7898	111226
1943	Seasonal diversion acre-feet	139086	594046	60963	333715	136688	35934	116503	1416935
	Average cubic feet per second	286	1222	125	687	281	74	240	2916
	Acreage irrigated - rice	0	55316	4275	35777	9299	1115	9817	115599
	Acreage irrigated - general	14362	62663	4765	29580	4594	1250	9052	126266
	Average 1924 - 1943								
	Seasonal diversion acre-feet	123900	474600	52540	247900	78650	20910	95860	1094000
	Average cubic feet per second	256	978	109	511	163	44	198	2251
	Per cent of seasonal draft	11.3	43.4	4.8	22.6	7.2	1.9	8.8	
	Acreage irrigated - rice	0	34140	3995	17980	4759	748	6661	74950
	Acreage irrigated - general	14710	33800	6905	31960	7020	1604	10820	106800

TABLE 68

SUMMARY OF SACRAMENTO RIVER DIVERSIONS, DIVERSION PERCENTAGES AND ACREAGES IRRIGATED - 1943

River Section	Acre-feet diverted and monthly use in per cent of seasonal									Per cent of seasonal Draft	Acreage Irrigated		Acre-feet per Acre
	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Seasonal Draft		General	Rice	
Redding to Red Bluff (Ac. Ft.)	75	90	18460	23139	25984	25893	24702	20752	139086	9.8	14362	0	9.7
Per cent of seasonal	.1	.1	13.3	16.6	18.7	18.6	17.7	14.9					
Red Bluff to Butte City	0	20368	104910	115364	118918	119009	87784	27693	594046	41.9	62663	55316	5.0
Per cent of seasonal	0	3.4	17.7	19.4	20.0	20.0	14.8	4.7					
Butte City to Colusa	0	2640	12551	16169	11353	12336	5751	163	60963	4.3	4765	4275	6.7
Per cent of seasonal	0	4.3	20.6	26.5	18.6	20.3	9.4	0.3					
Colusa to Wilkins Slough	0	24118	72132	64403	68480	68837	35620	125	333715	23.6	29580	35777	5.1
Per cent of seasonal	0	7.2	21.6	19.3	20.6	20.6	10.7	0					
Wilkins Slough to Knights Ldg.	0	6860	26314	27548	29666	29149	16943	208	136688	9.7	4594	9299	9.8
Per cent of seasonal	0	5.0	19.3	20.1	21.7	21.3	12.4	0.2					
Knights Landing to Verona	0	115	6978	7716	7791	7588	5536	219	35934	2.5	1250	1115	(1) 15.2
Per cent of seasonal	0	0.3	19.4	21.5	21.7	21.1	15.4	0.6					
Verona to Sacramento	1694	7218	16328	22429	26738	25212	14120	2764	116503	8.2	9052	9817	6.2
Per cent of seasonal	1.4	6.2	14.0	19.3	23.0	21.6	12.1	2.4					
Total	1769	61409	257673	276759	288930	288024	190456	51915	1416935		126266	115599	5.9
Average cubic feet per second	29	1032	4191	4651	4699	4684	3201	844	2916				
Monthly diversion in per cent of seasonal	0.1	4.3	18.2	19.5	20.4	20.3	13.5	3.7					

(1) The principal diversion on this section of river is the Portuguese Bend plant of Sutter Mutual Water Company. Area irrigated is included in section between Colusa and Wilkins Slough.

TABLE 69

DIVERSIONS, ACREAGE IRRIGATED, AND GROSS SEASONAL (MARCH TO OCTOBER, INCLUSIVE) DUTY OF WATER IN THE SACRAMENTO-SAN JOAQUIN AREA - 1943

Source	Table Number	Seasonal diversions Acre-feet	Acreage Irrigated			Gross Seasonal Duty of Water Acre-feet per acre
			General	Rice	Total	
Sacramento River - Redding to Sacramento	71	1416935	126266	115599	241865	5.9
Feather River below Oroville	57	623641	24089	46566	70655	8.8
Yuba River on Valley floor	58	93799	6280	2310	8590	10.9
American River below Fairoaks	59	5200	3010	0	3010	1.7
By-Pass and Drainage Channels	75	51829	7044	4446	11490	(1) 4.4
Lower Butte Creek and Slough	74	35894	1994	2024	4018	(2) 3.3
Colusa Trough and Back Borrow Pit	72 & 73	(3)115313	3411	14450	(3)17861	6.5
Total above Sacramento		2342611	172094	185395	357489	(1&2) 6.4
Delta Uplands from:						
Old San Joaquin River	60	62166	40607	0	40607	1.5
Tom Paine Slough	61	13982	5058	150	5208	2.7
San Joaquin River (below Durham Ferry Bridge)	62	51719	19685	0	19685	2.6
San Joaquin River from Fremont Bridge to Durham Ferry Bridge	63	121724	41143	342	41485	2.9
Merced River below Snelling	64	11718	3680	0	3680	3.2
Tuolumne River below Roberts Ferry Bridge	65	2616	1826	0	1826	1.4
Stanislaus River below Orange Blossom Bridge	66	22065	7360	0	7360	3.0
Total Delta Uplands and pumping diversions of San Joaquin River and Tributaries*		285990	119359	492	119851	2.4
Sacramento-San Joaquin Delta**		(See Table 135)				

* Note that major gravity diversions by canals of Oakdale, South San Joaquin, Modesto, Turlock, Waterford and Merced Irrigation Districts and Miller & Lux are not included within the scope of these measurements.

** Delta crop census not taken in 1943. See 1938 and reports prior to 1933 for detailed data.

(1) Duty figured after taking into account 200 acres of gun clubs not shown in totals.

(2) Duty figured after taking into account 6735 acres of gun clubs not shown in totals. Diversions after Nov. 1 not included.

(3) A large portion of this diversion was used to supply acreages reported under Sacramento River Diversions (Provident Irrigation District). See footnote Table 71, Provident Irrigation District diversions at Mile 154.8R.

TABLE 70

RICE ACREAGE IN CALIFORNIA

A comparison of rice acreage served from stream channels in Sacramento-San Joaquin Valleys with rice acreages in California from all sources.

Year	Rice Acreage		Rice acreage in Sacramento-San Joaquin Valley in per cent of total rice acreage
	Served from all sources*	Served from stream channels in Sacramento-San Joaquin Valleys**	
1924	90000	89000	99
25	103000	95000	92
26	149000	129000	87
27	160000	123000	77
28	132000	101000	76
29	95000	74000	78
30	110000	88000	80
31	125000	126000	100
32	110000	91000	83
33	108000	87000	80
34	108000	92000	85
35	100000	78000	78
36	138000	104000	75
37	132000	109000	82
38	125000	95000	76
39	120000	104000	87
40	118000	94000	80
41	153000	120000	78
42	(1) 207000	159000	77
43	230000	186000	81
Average 1924-1943	130600	107200	82

* As reported by Federal-State crop reporting service.

** From reports of Sacramento-San Joaquin Water Supervision.

(1) During 1942 there was a large increase in acreages served from sources other than Sacramento, San Joaquin rivers and tributaries.

TABLE 71

SACRAMENTO RIVER DIVERSIONS - 1943

Water User	*Mile and Bank	Number and size of pump	Monthly Diversions in Acre-feet								Total Diversion March to October Acre-feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.		General	Rice
—"M" STREET BRIDGE - SACRAMENTO - MILE 0.0—													
City of Sacramento	0.8L	1-18"	1694	2015	3185	3473	4180	3920	3269	2415	24151	Municipal	
		3-20"											
—AMERICAN RIVER - MILE 1.1L													
—BACK BORROW PIT RECLAMATION DISTRICT 1000 - MILE 1.3L													
E. Fourness	1.45R	1-8"				37	54	60			151	120	
M. Zubiri	2.05L	1-8"				NO DIVERSION							
—RECLAMATION DISTRICT 1000 DRAIN - MILE 2.1L													
Elmer F. Christophel	2.15L	1-8"			9	33	13	13	11		79	38	
Elmer F. Christophel	2.4L	1-5"				NO DIVERSION							
H. M. Swalley	2.45L	1-5"				11	15	7			33	42	
D. D. Parr (1)	2.9L	1-6"				26	14				40	23	
A. I., Lidia, and B. K. Diepenbrock and Marian Shoor (2)	3.55R	1-16"				315	107	170			592	166	
W. E. M. Beardslee Estate	3.75R	1-5"		8	17	22	22	22	21	14	126	66	
M. C. C. Van Loben Sels	4.0R	1-10"				NO DIVERSION					64	108	
Reese & Greer	4.65R	1-7"				20	30	14			284	106	
A. M. Harbinson	5.05R	1-14"			12	70	147	47	4	4	109	43	
R. S. Seydel	5.25R	1-8"		3	14	22	25	27	12	6	52	54	
A. R. Merkley	5.3R	1-8"				39	13				21	37	
Lucy Casselman	5.5R	1-6"				8	12	1			29	40	
A. A. Casselman	5.55R	1-6"				9	20						
K. L. Lovdal	5.7R	1-10"				NO DIVERSION							
J. E. Bandy	6.0R	1-6"				NO DIVERSION							
Riverside Mutual Water Company	6.1L	2-18"			61	960	1566	1796	469		4852	1658	60
O. A. and F. L. White	6.6R	1-6"				NO DIVERSION							
E. S. Fisk	7.0R	1-4"				NO DIVERSION							
Fred C. Jones	7.5L	1-8"				11	19	34			64	75	
M. R. Williamson	7.8L	1-10"				102		26	25		153	35	
A. Marty	7.9R	1-8"				15	23	17	5		60	(3) 376	
Willey & Winter (4)	7.9L	1-10"			54	31	79	83	48		295	100	
M. Marty	8.3R	1-10"				11	136	158			305	(5)	

*Mileage along river above Sacramento.

(1) Previously listed as N. J. Parr.

(2) Formerly DiGiorgio Fruit Corporation.

(3) This is the total acreage served by this plant and the one at Mile 8.3R. Some additional water was received from wells for supplemental use on about 50 acres.

(4) Formerly Bennett Bros.

(5) See plant at Mile 7.9R.

TABLE 71 (CONTINUED)

SACRAMENTO RIVER DIVERSIONS - 1943

Water User	*Mile and Bank	Number and size of pump	Monthly Diversions in Acre-feet								Total Diversion March to October Acre-feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.		General	Rice
Blauth Estate	8.5R	1-7"				27	31				58	83	
H. Waldeck	8.7R	1-6"			6	6	6	27	27	7	79	41	
Mullin & Plato	8.95R	1-6"				33	38	25	22	2	120	40	
Capital Company	9.35R	1-14"			100	190	137	165			592	(1) 299	
R. G. Pearson & P. S. Driver	9.8L	1-14"				371	390	166			927	(2) 538	
Carl Casselman	9.9R	1-12"				19	59	104	85		267	124	
Lloyd M. Robbins	10.25L	1-14"			8	196	125	117	23		469	398	
Reese Estate	10.75R	1-12"					85	84	45		214	207	
Fiddymint & John Sing, Jr. (3)	10.75L	1-12"				85		74	51		210	55	
McKeehan and Harris	11.1R	1-10"				37	214	206	103	16	576	125	
		1-12"											
—ELKHORN FERRY - MILE 11.9—													
Conaway Ranch	12.0R	4-36"			4194	4951	7060	6168	2546		24919	450	4600
Thomas O'Conner	12.5R	1-12"					83	51	28	11	173	102	
Gertrude Brown	12.7R	1-6"				NO DIVERSION							
Julius Hauser	13.1R	1-12"			37	86	129	110	77		439	138	
J. Corey	13.2R	1-8"				15	34	18	38		105	45	
J. De Nigeras (4)	13.25R	1-8"				24	129	129	37	12	331	87	
		1-20"											
Elkhorn Mutual Water Co.	14.1L	1-24"			14	1415	2025	2452	1481		7387	1787	89
Joseph Veress	14.25R	1-10"				17	57	20	6		100	91	
M. E. Dole	14.4R	1-6"				NO DIVERSION							
Capital Company	15.15R	1-10"				28	87	37	9		161	40	
Central Mutual Water Company	16.0L	2-38"		1238	2651	2771	3429	3205	1856		(5) 15150	(6)	(6)
Henry Rich (Hershey Plant) (7)	16.27R	1-20"			493	759	614	527	347		2740	28	400
H. T. Silvius	16.4R	1-6"				NO DIVERSION							
Henry Rich (8)	16.62R	1-10"					40				40	50	
California Trust & Savings Bank	16.7R	1-12"				NO DIVERSION							
Henry Rich (7)	17.4R	1-18"			343	558	496	357	337		2091	120	220
Calif. Western States Life Ins. Co.	17.75R	1-20"					286				286	80	
M. & J. Scheiber	18.45L	1-12"				49	77	61	63	1	251	100	

* Mileage along river above Sacramento.

(1) Acreage divided as follows: Utterback 136 and Souza 163.

(2) Acreage divided as follows: Pearson 128, Driver 310 and total figure includes 100 acres on adjoining Fong Yen lands.

(3) Formerly Fiddymint and Natomas Company.

(4) Formerly Socal and Bonnetto.

(5) This plant pumps to the irrigation canal both from a drain canal of R.D. 1000 and from the Sacramento River. The diversions listed are those from the river only. The water obtained from the drain canal was as follows: (Acre-feet) April 35, May 330, June 473, July 429, August 155, September 598—Total 2020.

(6) See acreage notefor plants at Mile 19.6L (1.0S) and (2.0S).

(7) Formerly Fisher & Rich.

(8) Formerly California Trust & Savings Bank.

TABLE 71 (CONTINUED)

SACRAMENTO RIVER DIVERSIONS - 1943

Water User	*Mile and Bank	Number and size of pump	Monthly Diversions in Acre-feet								Total Diversion March to October Acre-feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.		General	Rice
G. H. Lyall	18.7L	1-8"					68	18			86	19	
Natomas Central Mutual Water Co. (Bennett Subd. Plant) (1)	(2) (1.0S)	1-20"		770	874	1052	986	1320	842		5844	(3) 918	(3)4448
Natomas Central M.W.Co.(Central)(1)	(2) (2.0S)	2-24"		3184	4256	4525	3578	3376	2233	276	21428	(3)	(3)
Natomas Ben May Plant	(2) (3.35N)	1-10"	NO DIVERSION										
—VERONA GAGING STATION - MILE 19.6—													
SACRAMENTO TO VERONA Totals			1694	7218	16328	22429	26738	25212	14120	2764	116503	9052	9817
Average cubic feet per second			28	121	266	377	435	410	237	45	240		
Monthly use in per cent of seasonal			1.4	6.2	14.0	19.3	23.0	21.6	12.1	2.4			
—FEATHER RIVER - MILE 20.9L													
—SACRAMENTO SLOUGH - MILE 21.2L—													
West Coast Life Insurance Co.	21.7R	1-15"					90	150	67	5	312	60	
Henry Rich (Keller Plant) (4)	22.5R	1-22"			1400	1515	1235	920	830		5900		550
A. F. Johnston	26.8L	1-8"	NO DIVERSION										
Frank B. Edson	28.2L	1-4"	NO DIVERSION										
Gustaf Inglin (5)	28.2R	1-6"			16	7	20	10	10	1	64	30	
Russell Bros.	29.2R	1-12"				37	7	57	27		128	77	
M. R. Richardson	29.7R	1-8"					28	30			58	66	
Kate Russell and P. L. Traganza	29.75R	1-8"	NO DIVERSION										
Sebastine Ytwurraldi	29.9L	1-12"					143		58		201	110	
Leo Giovanetti	30.2L	1-5"				9		7	1		17	20	
M. R. Richardson	30.6R	1-12"				33	23	4	10		70	40	
Floyd Anderson	30.7R	1-6"	NO DIVERSION										
George Senf	30.9L	1-8"	NO DIVERSION										
A. C. Huston	31.5R	1-12"				11	57	69			137	135	
M. Alonzo	31.8L	1-6"					5	3			8	33	
M. R. Richardson	32.0R	1-12"				99	27	107	36		269	200	
Sutter Mut. W. Co. (Portuguese Bend)	32.0L	2-24"		115	4919	4755	4770	4960	3179		22698	(6)	(6)

*: Mileage along river above Sacramento.

(1): Formerly Northern Mutual Water Company.

(2): Cross canal, the main drain between R. D. 1000 and 1001 joins the Sacramento River at Mile 19.6L. Distance of plant from Sacramento River and bank are shown in ().

(3) This is the total acreage served by this plant and the ones at Mile 16.0L and 19.6L (2.0S). Includes 519 acres of rice and 445 acres of general crops irrigated from drains within District.

(4) Formerly Fisher & Rich.

(5) Formerly Morse Inglin.

(6) See plant at Mile 63.75L.

TABLE 74 (CONTINUED)

SACRAMENTO RIVER DIVERSIONS - 1943

Water User	*Mile and Bank	Number and size of pump	Monthly Diversions in Acre-feet								Total Diversion March to October Acre-feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.		General	Rice
Collier Bros.	32.5R	1-10"			25	60	17	40	13	1	156	99	
Walter H. Ziegler (H. T. Carlson)	33.2L	2-10"			329	614	653	599	589	118	2902	280	245
J. G. Knox	33.35L	1-8"					123		15		138	40	
Sidney Epperson (1)	33.5R	1-12"	NO DIVERSION										
Leiser Bros.	33.75L	1-12"			289	576	593	632	701	85	2876	60	320
		1-14"											
Sidney Epperson (2)	33.85R	1-6"	NO DIVERSION										
—KNIGHTS LANDING GAGING STATION - MILE 34.0—													
VERONA TO KNIGHTS LANDING Totals			0	115	6978	7716	7791	7588	5536	210	35934	1250	1115
Average cubic feet per second			0	2	113	130	127	123	93	3	74		
Monthly use in per cent of seasonal			0	0.3	19.4	21.5	21.7	21.1	15.4	0.6			
—COLUSA BASIN DRAINAGE - MILE 34.15—													
Earl Wallace (3)	34.2R	1-10"	NO DIVERSION (4)								(4)	(4)	(4)
		2-16"											
River Farms Co.(Townsite Plant)	34.25R	1-20"	NO DIVERSION (5)								(5)	(5)	(5)
		1-24"											
		1-26"											
Commercial Investment Co.	34.85L	1-12"	NO DIVERSION										
Walter Raymond	35.2L	1-12"			80	278	314	361	360	65	1458	36	115
Walter Raymond	35.62L	1-7"	NO DIVERSION										
J. H. Donnelly Ranch (Bundock Bros.)	35.8L	1-10"			15	9	29				53	55	
F. L. Burrell (J. L. Sills)	36.2L	1-14"					25	164	25		214	140	
R. H. Bailey (J. L. Sills)	36.45L	1-8"						24			24	35	
Amedeo Moroni	36.7L	1-5"	NO DIVERSION										
Robert Bottimore	37.2L	1-14"	NO DIVERSION										
Bundock Bros.	37.75L	1-8"						18			18	24	
Addie Reel	38.4L	1-10"						41			41	90	
Capital Company (H. A. Kramer)	38.8L	1-10"						47			47	80	
F. O. Eastman	39.4L	1-12"					29				29	70	
Commercial Investment Co.(C.L. Reel)	39.8L	1-10"						37			37	70	

* Mileage along river above Sacramento.

(1) Formerly J. W. Snowball Estate.

(2) Formerly J. W. Snowbell.

(3) Formerly Meek Estate.

(4) Point of diversion changed to Knights Landing Ridge Cut, Mile 0.8R. (By-pass and drainage channel diversions.)

(5) Point of diversion changed to Back Borrow Pit, Mile 0.03L; see also diversion from Sacramento River at Mile 43.1R.

TABLE 71 (CONTINUED)

SACRAMENTO RIVER DIVERSIONS - 1943

Water User	*Mile and Bank	Number and size of pump	Monthly Diversions in Acre-feet								Total Diversion March to October Acre-feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.		General	Rice
Wm. Duffy Jr.	39.9L					NO DIVERSION							
Sutter Mut. W. Co. (State Ranch Bend)	40.6L	2-24"		3067	5461	5787	6031	6112	3206	6	29670	(1)	(1)
		1-36"											
Buell Ranch (M. K. Dean)	41.8L	1-4"				NO DIVERSION							
Buell Ranch (M. K. Dean)	42.2L	1-6"				NO DIVERSION							
Matteolli & Fratchia	42.3L	1-8"					23	23			46	45	
Kramer Ranch	43.1L	1-12"				1	12	52	6	14	85	(2) 260	
El Dorado Ranch	43.1R	1-18"				214	6				220	287	
River Farms Co.(R.D.#2047 Plant)	43.1R	2-50"		1820	12100	10570	11340	10540	5480		(3) 51850	44	(3)5303
—RECLAMATION DISTRICT 108 DRAINAGE PLANT - MILE 44.0R—													
John Clauss	44.2L	1-14"						260	80		340	400	
John Clauss	47.3L	1-14"				NO DIVERSION							
P. J. Hiatt	48.7L	2-20"		51	805	831	908	918	792		4305	500	155
G. J. Hiatt	49.7L	1-14"				NO DIVERSION							
R. D. 108 (Tyndall Mound)	51.1R	2-24"			2943	4095	4447	4529	3624	89	19727	187	1530
Holmes & Noble (G. J. Hiatt)	51.2L	2-16"		341	774	970	1224	1121	716		5146	250	300
J. F. White	51.5L	1-8"				NO DIVERSION							
T. J. Cummins Ranch Co.	52.0L	1-16"				287	47				334	300	
Geo. Van Ruiten	52.9L	1-10"				200		117			317	150	
Geo. Van Ruiten	53.9L	1-12"					350		79		429	200	
Broomieside Farm	55.1L	1-20"				199		54	123	5	381	150	
R. D. 108 (Boyer Bend Plant)	56.4R	1-18"		604	1364	1479	1415	1356	400		6618	171	600
C. M. Miller	56.42R	1-6"					3				3	5	
C. M. Miller (Asa Morris)	56.65R	1-12"				NO DIVERSION							
Broomieside Farm (Spencer & Crawford)	56.95L	1-20"		549	735	1121	1268	1072	656		5401		(4) 571
L. M. Miller	57.0R	1-10"			13	6	9		9		37	15	
Lamb Bros.	57.5L	1-16"				NO DIVERSION							
James A. Neilson	58.2L	1-15"				10	155	37	38	22	262	128	
Alex Grant	58.9L	1-16"					135	20	29		184	65	
I. G. Zumwalt	59.1R	1-12"					48	63	18		129	85	
Lamb Bros.	59.8L	1-8"		219	1696	1222	1248	1250	760		6395	545	525
		1-12"											
		1-14"											
R. D. 108 (Steiner Bend)	59.85R	1-16"				NO DIVERSION							

* Mileage along river above Sacramento.

(1) See plant at Mile 63.75L.

(2) Includes 150 acres on adjoining Brown property.

(3) Plant serves River Farms Company and R. D. 108 lands. Acreage divided as follows: Rice, River Farms Co. 682 acres; R. D. 108, 4621 acres; General, River Farms Co. 44. Water divided approximately as follows: River Farms Co. 16,000 acre-feet; R. D. 108, 36,000 acre-feet.

(4) Includes 221 acres on adjoining R. D. 1500 lands.

TABLE 71 (CONTINUED)

SACRAMENTO RIVER DIVERSIONS - 1943

Water User	*Mile and Bank	Number and size of pump	Monthly Diversions in Acre-feet							Total Diversion March to October Acre-feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.		General	Rice
F. L. Burrell	60.4L	1-10"					66	476	257		(1) 799		(1)
Blanche Coulter Brown (A. Earl Lane)	60.5L	1-12"		209	328	225	397	336	249		1744		(2) 200
Sutter Basin Corporation	61.3L	1-12"				NO DIVERSION							
I. G. Zumwalt	61.5R	1-12"					36	26	29		91	50	
Hines Ranch	62.3R	1-10"					52	42			94	77	
Blanche Coulter Brown	62.3L	1-10"				NO DIVERSION							
Jake Locovitch	62.6R	1-8"				NO DIVERSION							
R. L. Young	62.8L	1-8"				44	49	53	7	7	160	80	
—WILKINS SLOUGH GAGING STATION - MILE 62.9—													
KNIGHTS LANDING TO WILKINS SLOUGH Totals			0	6860	26314	27548	29666	29149	16943	208	136688	4594	9299
Average cubic feet per second			0	115	428	463	482	474	285	3	281		
Monthly use in per cent of seasonal			0	5.1	19.0	20.6	21.4	21.1	12.7	0.1			
R. D. 108 (Wilkins Slough)	63.2R	5-42"		11633	23517	14703	18551	21080	7589		97073	85	(3)11350
B. W. Meister	63.65L	1-8"			18	78	43	23	14		176	70	
Sutter Mut. W. Co. (Tisdale Plant)	63.75L	6-42"		11868	44905	44615	43302	43099	26997		214786	(4)18754	(4)20321
		2-48"											
Crnbaum, Nobles Land & Livestock Co.	64.3R	1-12"					25				25	20	
Tisdale Irrig. & Drainage Co.	64.4L	1-12"			35	412	418	319	132		1316	(5) 872	(5) 148
Van Horn Ranch	64.9R	1-14"				91	99	34			224	125	
Robert S. Unsueta (6)	65.1R	1-8"				NO DIVERSION							
Capital Company	65.7L	1-10"				NO DIVERSION							
M. P. Schohr	65.8R	1-16"				NO DIVERSION							
J. L. Browning	66.4R	1-18"				NO DIVERSION							
Tisdale Irr. & Dr. Co.	67.1L	1-12"		268	581	1149	1166	1252	652	30	5098	(7)	(7)
		1-20"											
Desmond A. Winship	67.2L	1-10"				NO DIVERSION					(7)	(7) 24	(7)46

* Mileage along river above Sacramento.

(1) See plant at Mile 60.5L.

(2) This is the total acreage served by this plant and the one at Mile 60.4L.

(3) See plant at Mile 43.1R for additional R. D. 108 acreage.

(4) This is the total acreage served by this plant and the ones at Mile 32.0L and 40.6L and includes 2594 acres of beans in R.D. 1660. Water delivered (acre-feet): May 632, June 1626, July 1883, Aug. 2231, Sept. 632—Total 7004.

(5) This is the total acreage served by this plant and the one at Mile 67.1L. An additional 46 acres of rice and 24 acres of general crops served for plant at Mile 67.2L.

(6) Formerly M. Bettencourt.

(7) See plant at Mile 64.4L.

TABLE 71 (CONTINUED)

SACRAMENTO RIVER DIVERSIONS - 1943

Water User	*Mile and Bank	Number and size of pump	Monthly diversions in Acre-feet								Total Diversion March to October Acre-feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.		General	Rice
Newhall Land & Farming Co. (1)	67.5L	2-24"		1089	2445	3264	3364	3110	1201		14473	(1)2380	(1)410
—RECLAMATION DISTRICT 70 DRAIN - MILE 68.80L—													
Meridian Farms Water Co. #5 (2)	68.81L	1-24"									(2)	(3)	(3)
J. L. Browning	69.0R	1-24"				NO DIVERSION							
Faxon & Norton (4)	69.2R	1-18"				72	436		22	30	560	244	
—EDDYS FERRY (GRIMES) - MILE 69.45—													
Wilber Jensen and Mary Cecil, et al.	70.35R	1-24"				NO DIVERSION							
H. F. Daly	70.4L	1-10"						6	22		28	44	
Houchins, Hoffman, Beckley & Ritchie	70.4R	1-6"				NO DIVERSION							
		1-24"											
Meridian Farms Water Co. #4	71.1L	1-24"		113	1113	1557	1637	1558	1190		7168	(3)	(3)
A. B. Armstrong	71.9R	1-12"					109	108			217	165	
Antone Steidlmayer	71.9R	1-12"				NO DIVERSION							
H. & A. Andreotti (5)	72.3L	1-7"			6	18	30	5			59	50	
E. B. Vann (Froh)	73.6R	1-10"				25	205	148			378	(6) 77	
Meridian Farms Water Co. #3	74.8L	1-18"		477	658	730	788	1150	90		3893	(3)	(3)
L. B. Westfall	75.3R	1-10"					77	1	5		83	138	
J. H. Yates	76.1L	1-12"				28		17			45	65	
Joseph Miller (Sanborn)	76.2L	1-8"				31		17			48	50	
Steidlmayer Bros.	76.5R	1-16"					73				73	160	
E. V. Jacobs	77.9L	1-12"				NO DIVERSION							
Sebia Davis Estate	78.2R	1-16"				NO DIVERSION							
Sebia Davis Estate	78.8R	1-14"		347	2912	1966	1770	1895			8890		1172
		1-24"											
C. E. Reische	79.0L	1-10"			8	56	50	45	25		184	142	
Steidlmayer Bros.	79.0R	1-12"			45	55	50	90	43		283	120	
Henry Schmidt	79.3R	1-10"				NO DIVERSION							
E. V. Jacobs	79.5L	1-8"				NO DIVERSION							
G. W. Wood	79.7L	1-10"				11	17	27			55	34	
—MERIDIAN BRIDGE - MILE 79.85—													
Meridian Farms Water Co. # 1 & 2	80.0L	1-20"		1497	3045	3968	4107	4070	2400		19007	(7)3537	(7)2330
		1-24"											
Roger C. Wilbur	80.3R	1-8"		2	11	20	52	20			105	45	

* Mileage along river above Sacramento.

(1) Acreage divided and located as follows: On R. D. 70 - Rice 410, General crops 280 on Newhall lands. In R. D. 1660—General crops 2100 on Ennis Brown lands.

(2) This is a combination irrigation and drainage plant. No diversion from Sacramento River during 1943, all from drains. Drainage pumped to river shown in Table 105.

(3) See plant at Mile 80.0L.

(4) Formerly Faxon Ranch.

(5) Formerly California Western States Life Insurance Company.

(6) Includes 50 acres on adjoining Cecil lands.

(7) This is the total acreage served by this plant and the ones at Miles 68.8L, 71.1L, 74.8L.

TABLE 71 (CONTINUED)

SACRAMENTO RIVER DIVERSIONS - 1943

Water User	*Mile and Bank	Number and size of pump	Monthly Diversions in Acre-feet								Total Diversion March to October Acre-feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.		General	Rice
Wonderly and Lilienthal	81.5L	1-16"					58:	3:	10:	2:	73:	83:	
Steidlmayer Bros.	81.9R	1-20"				41:	340:	216:			597:	(1) 860:	
F. T. Reische and L. F. Wood	82.5L	1-12"				45:	100:	60:	7:		212:	83:	
J. T. Pinkard	83.05L	1-7"				NO DIVERSION							
Geo. W. Kirkpatrick Estate	83.3L	1-14"				NO DIVERSION							
J. E. Clark	83.5L	1-8"				NO DIVERSION							
—BUTTE SLOUGH OUTFALL GATES - MILE 84.0L—													
Clifford Reichel	85.8L	1-8"				26:	46:				72:	45:	
Ewing and Halsey	86.1R	1-12"			14:	49:	110:	21:		30:	224:	70:	
Lydell Peck	86.1L	1-8"				NO DIVERSION							
Lydell Peck	86.6L	1-18"				NO DIVERSION							
Lloyd Scoggins	86.8L	1-8"				22:	14:				36:	45:	
Capital Company (Wilbur)	86.9R	1-10"			40:	120:	105:	57:	15:	10:	347:	80:	
Capital Company (Wilbur)	87.4R	1-10"				91:	30:		69:		190:	35:	
Jacobsen & O'Rourke	87.6L	1-10"				NO DIVERSION							
Swinford Tract Irrig. Co.	87.7R	1-12"			40:	144:	75:			11:	260:	136:	
Edward K. Lange	88.0R	1-6"				8:	8:				16:	20:	
Nagle & Locovitch	88.2L	1-10"					27:				27:	60:	
W. D. DeJarnett Estate	88.7L	1-14"				86:	156:			22:	264:	80:	
Colusa Irrigation Co.	89.2R	1-20"				441:	882:	294:	18:		1635:	722:	
Phil B. Arnold	89.25L	1-8"					56:				56:	60:	
G. A. Berkey	89.26L	1-12"				NO DIVERSION							
—COLUSA BRIDGE & GAGING STATION - MILE 89.4—													
WILKINS SLOUGH TO COLUSA Totals			0:	24118:	72132:	64403:	68480:	68837:	35620:	125:	333715:	29580:	35777:
Average cubic feet per second			0:	405:	1174:	1081:	1114:	1120:	599:	2:	686:		
Monthly use in per cent of seasonal			0:	7.2:	21.6:	19.3:	20.6:	20.6:	10.7:	0:			
Lillian & Hattie Boggs	89.7L	1-6"				NO DIVERSION							
Roberts Ditch Company	90.7R	2-20"		60:	215:	550:	580:	420:	200:	129:	2154:	1423:	
Paul B. Westfall	91.1L	1-8"				NO DIVERSION							

* Mileage along river above Sacramento.

(1) Includes 90 acres on adjoining A. H. Tubbs lands.

TABLE 71 (CONTINUED)

SACRAMENTO RIVER DIVERSIONS - 1943

Water User	*Mile and Bank	Number and size of pump	Monthly Diversions in Acre-feet								Total Diversion March to October Acre-feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.		General	Rice
I. G. Zumwalt	91.6R	1-12"				NO DIVERSION							
George P. Ahlf	92.5L	1-8"				15	7	14			36	47	
Paul R. Westfall	93.0L	1-8"				NO DIVERSION							
Brown Ranch	93.0R	1-12"				NO DIVERSION							
Paul R. Westfall	93.4L	1-8"				NO DIVERSION							
		1-10"											
Tuttle Land Company	94.3R	1-15"				146	255	26			427	185	
		1-20"											
W. D. DeJarnett Estate	94.6R	1-8"				NO DIVERSION							
Capital Company	94.8R	1-12"				NO DIVERSION							
A. N. Lewis	95.6L	1-16"			427	1500	1530	1708	960		6125		400
		1-20"											
Bridget Graham Estate	95.8L	1-16"			40	130	120	180	82		552	350	
I. G. Zumwalt	96.8R	1-15"					160				160	100	
H. Heitman	97.7R	1-12"					33				33	20	
Frank N. Beckley	98.0L	1-10"					4				4	7	
J. L. Erisey	98.3R	1-10"				NO DIVERSION							
R. A. Sperry & Colusa Dev. Co.	98.6L	1-15"				NO DIVERSION							
D. Boggs	98.8L	1-18"				18	210	134			362	280	
Cheney Slough Irr. Co.	99.0R	2-26"				NO DIVERSION							
		1-36"											
J. P. Boggs	99.1L	1-10"			285	411	414	436	71		1617	20	(1) 90
Terrill & Sartain	99.2L	1-20"			372	160	181	50			(2) 763	15	
Dave George	99.8L	1-16"				NO DIVERSION							
R. C. Wolfrom (Gillenwater)	101.1R	1-20"				60	65	40			165	140	
Clara C. Packer	102.8R	2-18"				14		300	165		479	679	
		2-30"											
		1-36											
Charles W. Welch	103.7R	1-16"		203	656	762	786	726	605	34	(3) 3772	(3) 150	(3) 350
Compton-Delevan Irr. Dist.	103.8R	2-24"											
		1-36"											
C. W. Tuttle	103.9R	1-16"		77	502	604	618	595	268		2664		320
		1-20"											
I. G. Zumwalt	104.8L	1-12"					147				147	150	
Thousand Acre Ranch (H. W. Keller)	106.0R	1-14"			14	134	113	86			347	150	
Capital Company	110.0R	1-12"				91	67				158	145	
—PRINCETON FERRY - MILE 112.0—													

* Mileage along river above Sacramento.

(1) A portion of this acreage was served from plant at Mile 99.2L.

(2) A portion of this diversion used on lands under plant at Mile 99.1L.

(3) See plant at Mile 154.8R.

TABLE 71 (CONTINUED)

SACRAMENTO RIVER DIVERSIONS - 1943

Water User	*Mile and Bank	Number and size of pump	Monthly Diversions in Acre-feet								Total Diversion March to October Acre-feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.		General	Rice
Reclamation District #1004	112.1L	2-30" 1-50"		2300	10040	11560	6000	7607	3400		40907	748	3115
Princeton-Codora-Glenn Irr. Dist.	112.4R	3-24"	NO DIVERSION (1)								(1)	(1)	(1)
I. G. Zumwalt	112.6L	1-10"					51				51	130	
Edward L. Steele Estate	115.5L	1-12"				14	12	14			40	26	
--BUTTE CITY GAGING STATION - MILE 115.8--													
COLUSA TO BUTTE CITY Totals			0	2640	12551	16169	11353	12336	5751	163	60963	4765	4275
Average cubic feet per second			0	44	204	272	185	201	97	3	125		
Monthly use in per cent of seasonal			0	4.3	20.6	26.5	18.6	20.3	9.4	0.3			
R. H. Gebicke	115.85L	1-14"	NO DIVERSION										
--BUTTE CITY FERRY - MILE 115.9--													
Butte City Ranch (Linville) (2)	115.9R	1-10"	PLANT REMOVED (2)								(2)	(2)	
Butte City Ranch	116.7R	1-10"	NO DIVERSION										
R. H. Gebicke	116.9L	1-12"	NO DIVERSION										
C. T. White	123.7R	1-6"	NO DIVERSION										
S. Taylor	123.8R	1-3"				1	2	2	2	1	8	5	
		(3) 1-5"											
Princeton-Codora-Glenn Irr. Dist.	123.9R	3-24"									(1)	(1)	(1)
Provident Irrigation District	124.2R	1-36" 4-42"					4005	4005			(5) 8010	(4)	(4)
Capital Company (Shelloe Ranch)	124.4R	1-16"	NO DIVERSION (1)								(1)	(1)	
Capital Company (Leonard Ranch)	126.3R	1-12"	NO DIVERSION (1)								(1)	(1)	
F. S. Reager	130.75R	1-6"	NO DIVERSION										
--ORD FERRY - MILE 130.8--													
M. & T. Inc. & Parrott Investment Co.	141.5L	5-24"			854	116	1328	1595	1512	113	(6) 5518	(7) 3137	(7)1890
--OLD CHICO LANDING RAILROAD BRIDGE SITE - MILE 142.1--													
Alameda Putney	(8)143.8L	1-6"					4	4	2		10	20	

* Mileage along river above Sacramento.

(1) See plant at 154.8R.

(2) Due to changes in river channel, plant is no longer on river but on dead slough. 40 acres of general crops served.

(3) 5" unit added in 1943.

(4) See plant at 154.8 for total District acreage served from both sources.

(5) Diversion during July for Princeton-Codora-Glenn Irrigation District.

(6) Additional water from Butte Creek as follows: (Acre-feet) May 3875, June 3750, July 2528, August 2134, September 1804, October 253.

(7) Acreage divided as follows: M. & T. Inc.--rice 1150, general crops 175. Parrott Investment Company--rice 740, general crops 2962.

(8) Mileage correction.

TABLE 71 CONTINUED

SACRAMENTO RIVER DIVERSIONS - 1943

Water User	*Mile and Bank	Number and size of pump	Monthly Diversions in Acre-feet								Total Diversion March to October Acre-feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.		General	Rice
Edward Fiero	(1)146.9L	1-6"	NO DIVERSION										
C. C. Dunning	148.9R	1-10"			15	31	101	51			198	70	
—GIANELLA BRIDGE - 149.5—													
Capital Company	150.0L	1-10"	NO DIVERSION										
Holly Sugar Corporation	150.8R	1-12"			102	520	553	650	406	139	2370	775	
		1-16"											
A. Holecek	152.2R	1-6"				26	16	31	16	12	101	30	
Maas Bros.	154.6R	1-5"			4	4	7	4	4	3	26	12	
Glenn-Colusa Irrigation District(4)	154.8R	2-30"		15963	73835	82225	84325	81495	61757	24354	(2)423954	(3)49345	37251
		1-42"											
		2-50"											
		2-66"											
		4-72"											
		1-100"											
Jacinto Irrigation District	154.8R	(5)		704	3868	4106	3689	3699	3193	863	20122	6345	
Compton-Delevan Irrigation District	154.8R	(5)		1051	3164	4671	7071	7686	4046		27689		3098
Provident Irrigation District	154.8R	(5)		1063	7981	6994	5440	2209	4774	321	(6) 28782	(7) 619	(7)7635
Princeton-Codora-Glenn Irr. Dist.	154.8R	(5)		1587	13202	14368	9998	04269	10792	1884	(8) 66100	1981	3942
Maxwell Irrigation District	154.8R	(5)			1785	1488	1537	2460	1082		8352		1100
Capital Company (Shelloe Ranch)	154.8R	(5)									(9)	162	
Capital Company (Leonard Ranch)	154.8R	(5)									(9)	60	
Mills Orchard	154.8R	(5)									(10)	(10)	(10)
I. G. Zumwalt	154.8R	(5)			30	714	738	738	131		2351		400
Johnathon Garst	161.7L	2-16"	NO DIVERSION										
—CORNING-VINA BRIDGE - MILE 166.5—													
A. F. Landis	166.7R	1-3"				4	5	10	7	2	28	13	
Mrs. Guy Whitnack	166.8R	1-2"			1	1	2	2	2	1	9	4	
—TEHAMA BRIDGE - MILE 177.5—													
E. B. Noble	184.5R	1-14"	NO DIVERSION										

* Mileage along river above Sacramento.

(1) Mileage correction.

(2) Additional water from Stony Creek by gravity (acre-feet): April 11,300, May 2260, and includes water to the following: Capital Company (124.4R)—154.8R; Capital Company (126.3R)—154.8R.

(3) Includes 960 acres duck lakes. Acreage figures include 345 acres of rice and 398 acres of general crops.

(4) This is common point of diversion for Glenn-Colusa, Jacinto, Compton-Delevan, Provident, Princeton-Codora-Glenn, Maxwell Irrigation District and Capital Company.

(5) Same plant as that of Glenn-Colusa Irrigation District.

(6) District operates plants on Colusa Trough (Table 72) and Sacramento River (Mile 124.2R) to supplement this diversion. An additional 4005 acre-feet received from Sacramento River plant during August.

(7) Figures include 1809 acres of rice and 42 acres of general crops outside of District.

(8) An additional 4005 acre-feet received from plant at Mile 124.2R during July.

(9) Diversion included in figures reported for Glenn-Colusa Irrigation District, Mile 154.8R.

(10) Diversion and acreage figures for Glenn-Colusa Irrigation District includes water to Mills Orchard for use on 345 acres of rice and 398 acres of general crops.

TABLE 71 (CONTINUED)

SACRAMENTO RIVER DIVERSIONS - 1943

Water User	*Mile and Bank	Number and size of pump	Monthly Diversions in Acre-feet								Total Diversion March to October Acre-feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.		General	Rice
Coneland Water Company	187.6L	1-12"				NO DIVERSION							
L. C. Brooks (1)	188.6L	1-8"				NO DIVERSION							
—RED BLUFF BRIDGE - MILE 193.45—													
J. Keithdriber	196.5L	1-2½"				1	1	1			3	1	
S. & E. Ericksen	196.6L	1-5"			8	26	27	8	20		89	36	
C. Droz	197.0L	1-8"			61	68	69	90	38		326	48	
C. Droz (2)	197.65L	1-3"				NO DIVERSION							
—RED BLUFF GAGING STATION (IRON CANYON) - MILE 198.6—													
BUTTE CITY TO RED BLUFF Totals			0	20368	104910	115364	118918	119009	87784	27693	594046	62663	55316
Average cubic feet per second			0	342	1706	1939	1934	1936	1475	450	1222		
Monthly use in per cent of seasonal			0	3.5	17.4	19.8	19.8	19.8	15.1	4.6			
C. C. Budd	206.75L	1-10"				NO DIVERSION							
—BEND FERRY BRIDGE - MILE 207.0—													
James Drennon (3)	209.0L	1-2½"				NO DIVERSION							
J. F. Nunes	213.0R	1-7"					53	34	12		99	30	
F. L. Jelly	213.5L	1-3"				NO DIVERSION							
J. F. Nunes	216.0R	1-3"							12	15	27	12	
W. A. Hunaeus	216.4L	1-3"				NO DIVERSION							
Haakonson Bros. (4)	217.5L	1-3½"				32	44	1			77	54	
J. L. Haskins (Lawrence)	218.0L	1-5"					66				66	50	
Rio Alto Rancho	221.0R	1-10"					218	190	207		615	258	
—BALLS FERRY BRIDGE - MILE 224.5—													
—ANDERSON BRIDGE - MILE 232.9—													
L. C. Smith	233.0L	1-6"				6	4				10	2	
Menzel Estate	240.2L	1-12"				247	287	289	194		1017	130	

* Mileage along river above Sacramento.

(1) Formerly Wallace Bosworth.

(2) Formerly W. H. Freemeyer.

(3) Formerly Mrs. A. A. Keene.

(4) Formerly T. A. Haakonson.

TABLE 71 (CONTINUED)

SACRAMENTO RIVER DIVERSIONS - 1943

Water User	*Mile and Bank	Number and size of pump	Monthly Diversions in Acre-feet								Total Diversion March to October Acre-feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.		General	Rice
Anderson-Cottonwood Irrigation Dist.	(2)239.0L	(1)1-16"			813	2287	2581	2699	2393	1435	12208	(3)	
		1-24"											
Jack Graf	241.5L	1-8"				NO DIVERSION							
—REDDING-ALTURAS FREE BRIDGE - MILE 242.0—													
—REDDING-YREKA BRIDGE - MILE 245.9—													
Anderson-Cottonwood Irrigation Dist.	246.0R	gravity			17494	20279	22370	22360	21608	19164	123275	(4)13809	
—SOUTHERN PACIFIC RAILROAD CROSSING - MILE 246.25—													
John Diestelhorst	246.3R	1-10"					24	28	17		69	17	
—OLD REDDING-YREKA BRIDGE - MILE 246.4—													
City of Redding	246.7R	2-6"	75	90	153	279	337	292	259	138	1623	Municipal	
RED BLUFF TO REDDING													
Totals			75	90	18460	23130	25984	25893	24702	20752	139086	14362	
Average cubic feet per second			1.2	1.5	300	389	423	421	415	337	286		
Monthly use in per cent of seasonal			0.1	0.1	13.3	16.6	18.7	18.6	17.7	14.9			
TOTAL DIVERSIONS - SACRAMENTO TO REDDING													
Totals			1769	61409	257673	276759	288930	288024	190456	51915	1416935	126266	115599
Average cubic feet per second			29	1032	4191	4651	4699	4684	3201	844	2916		
Monthly use in per cent of seasonal			0.1	4.3	18.2	19.5	20.4	20.3	13.5	3.7			

* Mileage along river above Sacramento.
(1) 16" unit added in 1943.
(2) Mileage correction from 240.5L.
(3) See diversion at Mile 246.0R.
(4) This is the total acreage served by this diversion and the one at Mile 239.0L.

TABLE 72

*COLUSA TROUGH DIVERSIONS - 1943

Water User	**Mile and Bank	Number and size of pump	Monthly Diversions in Acre-feet								Total Diversion March to October Acre-feet	Acreage Irrigated		
			Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.		Gen-eral	Rice	Gun Club
—COLUSA TROUGH GAGING STATION - MILE 0—														
I. G. Zumwalt	2.2L	1-12"				973	1644	1262	468		(1) 4347		1300	
		1-15"												
		1-20"												
J. C. Cave (Phil Gaffney) (2)	2.95R	2-12"			39	394	510	500	223		1666		200	
Buffem and Seaver	3.0L	2-14"			434	765	790	790	446		3225		376	
Wierdsma Bros.	4.5L	1-12"				NO DIVERSION								
Maxwell Irr. Dist. (Plant 2A)	7.0R	1-15"									(3)	(3)	(3)	
		1-26"												
Maxwell Irr. Dist. (Plant 3A)	Opp.7.0R(3)	1-20"									(4)	(4)	(4)	
S. Ashe	7.65R	1-10"				NO DIVERSION								
S. Ashe	8.0L	1-20"			332	607	550	741	182		2412		450	
Chas. W. Welch (2)	8.0R	1-15"			379	380	539	539	521		2358		440	
El Dorado Sportsman's Club	9.5R	1-15"				NO DIVERSION								
M. A. Rourke Estate	10.5L	1-20"			130	180	225	180	80		795	300		
Provident Irr. Dist.	Opp.13.5R(5)	1-20"									(6)	(6)	(6)	
—LATERAL HIGHWAY - BUTTE CITY TO WEST SIDE - MILE 20.5—														
Provident Irr. Dist. (Willow Creek Plant)	Opp.20.5R(7)	1-24"			1319	1537	1647	1752	1622		(6)7877	(6)	(6)	
		1-36"												
Henry Jameson Estate	22.0R	1-18"			586	717	715	734	561		3313	300		
Provident I.D. (Drain 55)	Opp.24.2R(8)	Gravity		420	1060	1470	2010	2320	2380		(6) 9660	(6)	(6)	
Provident I.D. (Drain 13)	Opp.27.0R(9)	1-15"			760	1120	1200	1200	800		(6) 5080	(6)	(6)	
Total Acre-feet			0	420	5039	8143	9830	10018	7283	0	40733	600	2766	
Average cubic feet per second			0	7	82	137	160	163	122	0	84			
Monthly use in per cent of seasonal			0	1.1	12.2	20.4	23.8	24.3	18.2					

* Main drain of Reclamation District 2047.
** Mileage along Colusa Trough above Colusa-Williams Highway.
(1) Some additional water received from drainage from the west.
(2) New installation 1943.
(3) See Maxwell Irr. Dist. diversion at Mile 154.8R on the Sacramento River.
(4) Plant is on Lateral E (Stone Corral Creek) and is 3/4 mile west of Plant #2A (Mile 7.0R).
(5) Plant is on Hunter Creek at SW corner Section 36, T. 18 N., R. 3 W.
(6) See Provident Irrigation District diversion at Mile 154.8R. on the Sacramento River.
(7) Plant is on Willow Creek at SW corner NE¼ Section 33, T. 19 N., R. 2 W.
(8) Works are on Drain #55 and are in SW¼ NW¼ Section 86, Glenn Ranch survey.
(9) Works on Drain #13 and are in SW¼ SW¼ Section 51, Glenn Ranch survey.

TABLE 73

*BACK BORROW PIT DIVERSIONS - 1943

Water User	**Mile and Bank	Number and size of pump	Monthly Diversions in Acre-feet								Total Diversion March to October Acre-feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.		General	Rice
River Farms Company (1)	.03L	1-16"			1590	2624	1448	1388	969		8019	2093	987
—KNIGHTS LANDING RIDGE CUT JUNCTION - MILE 0.4R—													
River Farms Company	1.45R	1-16"		150	501	428	511	506	235		2331		464
W. Crawford (2)	4.35R	(3)1-20"			1074	1016	1180	1414	46		4730		700
George E. Youngmark (4)	8.8R	1-14"			467	670	683	637	284		2741		518
Hershey Estate (Johnson & Peterson)	11.15R	1-12"			1181	1301	1074	971	460		4987		988
		1-14"											
Hershey Estate	13.75R				PLANT DISMANTLED								
C. M. Mumma	14.75R	1-10"			127	178	165	146	82		698	20	120
—COUNTY LINE BRIDGE - MILE 15.25—													
M. T. Emmert (Hughes & McCullough)	15.75R	1-15"			443	518	463	498	98		2020		389
Kate West (Hughes & McCullough)	18.1R	2-15"			421	633	595	593	321		2563		600
C. R. Suggett (H.B. & D. L. West)	20.0R	1-15"			362	868	497	470	493		2690		430
—RECLAMATION DISTRICT 108 GRAVITY DRAIN - MILE 20.2L—													
Gregory Estate (G. W. Knox, Jr.)	21.35R	1-16"			192	993	938	1279	736		4138		400
Bean & Brandenburg	22.15R	1-14"			432	700	714	690	446		2982		404
A. B. Armstrong (L. Kaelin) (5)	22.65L	1-24"	294	421	938	1234	1308	1283	374		5852		600
—HANNUM BRIDGE - MILE 22.8—													
—SOUTHERN PACIFIC RAILROAD CROSSING - MILE 23.0—													
H. H. Balsdon	24.6L	1-20"		466	876	774	884	905	89		3994	528	420
A. M. Dobrowsky (Moore)	24.7L	1-8"						29	8		37	100	

* Carries return water from Colusa Basin along West border of Reclamation Districts 108 and 787 and thence to discharge to Sacramento River at Knights Landing or partial diversion via Knights Landing Ridge Cut.

** Mileage along Borrow Pit from outfall gate just above junction of Borrow Pit with Sacramento River at Knights Landing.

(1) This plant serves some of the land formerly served by Sacramento River plant (Mile 34.25R).

(2) Formerly E. L. Wallace and W. Crawford.

(3) New unit replaces 16" and 20" units.

(4) Formerly Reclamation District 108.

(5) Formerly J. W. Browning.

TABLE 73 (CONTINUED)

*BACK BORROW PIT DIVERSIONS - 1943

Water User	**Mile and Bank	Number and size of pump	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Total Diversion March to October Acre-feet	Acreage Irrigated General	Acreage Irrigated Rice
—GRIMES-COLLEGE CITY CAUSEWAY - (SOUTH LINE OF RECLAMATION DISTRICT 2047) - MILE 25.5—													
Fred Schutz (Tuttle)	25.9L	1-16"			1365	1880	1834	1730	772		7581		1435
		1-20"											
C. W. and M. F. Struckmeyer	27.25L	1-16"			508	1549	1780	1618	459		5914	70	(1) 1245
(Scarlett)		1-20"											
Wallace Ranch (Wilkins)	28.0R	(2) 2-12"			306	470	552	574	424		2326		(3) 350
—WALLACE CROSSING - (OLD MERIDIAN-WILLIAMS BRIDGE) - MILE 29.2—													
A. Davis Estate (Wilkins & Hornell)	(4) 33.0R	1-20"			360	550	660	690	500		2760		(5) 460
J. C. Hornall	33.5R					PLANT REMOVED							
Mrs. Belle Moore (Olvey) (6)	(4) 33.9L	1-12"			314	348	360	360	208		1590		199
W. H. O'Hair	36.65R	1-20"	393	760	322	760	785	437			3457		600
W. H. O'Hair (6)	37.0L	1-15"			449	749	736	771	462		3170		375
—COLUSA-WILLIAMS HIGHWAY - GAGING STATION - MILE 37.0—													
Totals			687	1797	12228	18243	17167	16992	7466	0	74580	2811	11684
Average cubic feet per second			11	30	199	307	279	276	125	0	153		
Monthly use in per cent of seasonal			0.9	2.5	16.2	25.0	22.7	22.5	10.2	0			

* Carries return water from Colusa Basin along West Border of Reclamation Districts 108 and 787 and thence to discharge to Sacramento River at Knights Landing or partial diversion via Knights Landing Ridge Cut.

** Mileage along Borrow Pit from outfall gate just above junction of Borrow Pit with Sacramento River at Knights Landing.

(1) Includes acreages on adjacent lands as follows: Marin 120, Wallace 160, Brown 320, Sackriter 245.

(2) 15" unit has been removed.

(3) All on adjacent lands as follows: Struckmeyer 150, Davis 200.

(4) Mileage correction. (3.8 miles above Wallace Crossing.)

(5) Includes 100 acres on adjoining Jacobsen lands.

(6) New installation 1943.

TABLE 74

LOWER BUTTE CREEK AND BUTTE SLOUGH DIVERSIONS - 1943

Water User	*Mile and Bank	Number and size of pump	Monthly Diversions in Acre-feet								Total Diversion March to October Acre-feet	Acreage Irrigated		
			Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.		General	Rice	**Gun Club
Lower Butte Creek														
—SACRAMENTO RIVER JUNCTION - MILE 0—														
Reclamation District 833	1.5L					PLANT REMOVED								
Reclamation District 833 (Ingram)	2.9L	1-36" box				336	380	377	286	58	1437	585		
West Butte Farms Co.	3.85L					PLANT REMOVED								
Reclamation District 1004 (2)	3.9R	(1)1-24"				NO DIVERSION					(2)	(2)	(2)	
Butte Lodge Outing Club	4.0L	1-22"				NO DIVERSION (3)					(3)			985
El Anzar Duck Club	5.35L	1-12"				NO DIVERSION								
Reclamation District 1004	9.3R	Gravity			727	1100	825	2047	945		(4) 5644	567	882	(4)
Butte Basin Gun Clubs (5)	10.0L	Gravity							6000	9000	15000			5000
White Mallard Duck Club	10.2R	1-36" box								250	250			750
Murdock Land Company	14.4R					NO DIVERSION								
—GRIDLEY ROAD - MILE 15.4—														
Murdock Land Company	19.3R	1-14"			126	115	110	102	93	40	586	115		
—BIGGS-AFTON ROAD - MILE 19.4—														
Glenn Rice Farms	20.4L	1-24"		180	265	490	563	606	409		2513		220	
Elefante & McGowan (Hennigan) (6)	20.9R	1-16"			200	260	430	361	239		1490		130	
Elefante & McGowan (Oakleaf Is.)(6)	21.0R	1-20"			490	650	820	760	500		3220		250	
Glenn Harris (6)	Opp.21.4R	1-16"					140	90	180		(7) 410		135	
—RICHVALE - BUTTE CITY ROAD - MILE 22.5—														
Elefante & McGowan	23.0R	1-20"			431	916	1058	918	890	145	4358		407	

* Approximate mileage from junction with Sacramento River.

** Only diversions which occurred prior to November 1st are given for gun club acreages. In most instances diversions for this purpose extended into November and December.

(1) 15" unit has been removed.

(2) Reclamation District 1004 diversion points are: Sacramento River Mile 112.1 L., and Butte Creek Mile 3.9R, and 9.3R.

(3) Served through R.D. 1004 diversion at Mile 9.3R.

(4) An additional 985 acres of gun club served for plant at Mile 4.0L.

(5) In addition to gun clubs under other diversions listed, this comprises the group of clubs diverting Butte Creek water by gravity from the main or interconnecting channels (Sanborn Slough, etc.) in the vicinity of Mile 10. Through R.D. 833 canals, most of the clubs in this group receive also drainage and Feather River water diverted from the clubs by Western Canal. These diversions are principally in the fall months. For diversions via Western Canal see table of Feather River Diversions, Mile 59.7R. The area flooded by this group is estimated to be approximately 5000 acres. The clubs included are Wild Goose, Last Chance, Berry and Keller, Tule, Goose, Bettens, Greenhead, Field and Tule, North Butte, Henshaw, Sacramento Outing, Anderson, West Butte, and Colusa Shooting.

(6) New installation 1943.

(7) An additional 680 acre-feet received from a well pump.

TABLE 74 (CONTINUED)

LOWER BUTTE CREEK AND BUTTE SLOUGH DIVERSIONS - 1943

Water User	*Mile and Bank	Number and size of pump	Monthly Diversions in Acre-feet								Total Diversion March to October Acre-feet	Acreage Irrigated		
			Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.		General	Rice	**Gun Club
Butte Slough														
Butte Slough Irrigation Co. Ltd.														
(Diversion to Sutter By-pass)	0.3W	Gravity									(1)	(2)		
M. Marty	0.3W	1-12"				23	23	23	8		77	72		
G. S. and D. C. Smith	1.4E	1-8"					48	42			90	(3)204		
—MAWSON BRIDGE - MILE 2.1—														
J. E. Smith	3.0W	1-10"					22	22	29		73	(4) 83		
I. E. Nall	3.5W	1-10"					26	26	35		87	60		
P. A. Reische (Ross Place)	3.7W	1-10"					24	9	7		40	50		
P. A. Reische	4.1W	1-10"				15	228	97	126		466	(5)148		
E. V. Jacobs (H. Reische)	4.8W	1-10"					25	15			40	60		
Armstrong, Hensen, Locovitch	5.1W	1-12"				40	29	16	16	12	113	(6) 50		
T. J. Hageman	6.8W	3-8"				NO DIVERSION								
—OLD LONG BRIDGE - MILE 7.5 WEST—														
Totals (Lower Butte Creek and Butte Slough)			0	180	2239	3945	4751	5511	9763	9505	35894	1994	2024	6735
Average cubic feet per second			0	3	36	66	77	90	164	155	74			
Monthly return in per cent of seasonal			0	.5	6.1	11.2	13.0	15.2	27.8	26.2				

* Approximate mileage from junction with Sacramento River.

** Only diversions which occurred prior to November 1st are given for gun club acreage. In most instances diversions for this purpose extended into November and December.

(1) Butte Slough Irrigation Company maintains a dam on Butte Slough just above its junction with Sacramento River and thereby diverts water via Butte Slough to East and West Borrow Pits of Sutter By-pass near "Long Bridge". The total water so diverted is shown in Table 100. Rediversions from West Borrow Pit of Sutter By-pass are made. See Sutter By-pass Diversions, Table 75.

(2) See acreages under rediversions - West Borrow Pit Sutter By-pass. A considerable additional but indefinite acreage was served by sub-irrigation and direct diversions from flow diverted to East Borrow Pit of Sutter By-pass which is joined by Feather River return flow entering via Wadsworth Canal, Table 103. See East Borrow Pit Sutter By-pass Diversions, Table 75.

(3) Includes acreages on adjoining lands as follows: O'Banion 20, Carrol 40.

(4) Includes 60 acres on adjoining Straub and Miller lands.

(5) Includes 72 acres on adjoining C. P. Reische lands.

(6) All on P. B. Hensen lands.

TABLE 75

BY-PASS AND DRAINAGE CHANNEL DIVERSIONS - 1943

Water User	Mile and Bank	Number and size of pump	Monthly Diversions in Acre-feet								Total Diversion March to October Acre-feet	Acreage Irrigated		
			Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.		General	Rice	Gun Club
West Borrow Pit of Sutter By-pass														
	(1)													
—SOUTHERN PACIFIC RAILROAD CROSSING - MILE 2.5—														
—KNIGHTS LANDING-MARYSVILLE CAUSEWAY - MILE 12.7—														
—SOUTH LEVEE TISDALE BY-PASS - MILE 18.9—														
—RECLAMATION DISTRICT 1660 GRAVITY RETURN - MILE 19.3—														
Sutter Basin Improv. Co. (Guisti)	(2)23.7R	16"				NO DIVERSION								
Butte Slough Irrig. Co. Ltd.	25.0R	Gravity					516	832	234		1582	(3)	130	
Butte Slough Irrig. Co. Ltd.	28.4R	Gravity		530	1174	1235	1464	1520	654		6577	(4)3830		
—NEW COLUSA-MARYSVILLE HIGHWAY - MILE 29.1—														
—NORTHERN ELECTRIC RAILROAD CROSSING - MILE 29.15—														
East Borrow Pit of Sutter By-pass														
	(5)													
R. E. Hughes	0.4S *	1-14"				NO DIVERSION								
R. E. Hughes	0.1S *	1-16"				PLANT REMOVED								
—GAGING STATION "WILLOW SLOUGH AT CHANDLER"- MILE 0—														
R. E. Hughes	0.5N *	1-16"				NO DIVERSION								
—RECLAMATION BOARD DRAINAGE PLANT #1 - MILE 1.4N—														
G. Guisti and Sons(9)	(7)1.4N (0.3)	1-14"			424	408	389	306	200		1727		(8)507	
G. Guisti and Sons(6)	(7)1.4N (1.3)	1-10"			242	740	638	771	359		2750		(8)	
E. H. Christenson (Hale Ranch)	(7)1.4N (1.75)	1-15"			128	393	408	430	432		1791		400	
E. H. Christenson	(7)1.4N (3.29)					PLANT REMOVED								
A. W. Kimerer	(7)1.4N (3.3)	1-14"				NO DIVERSION								
E. H. Christenson	(7)1.4N (3.3)	(9)1-15"			50	358	432	661	555		2056	395		

(1) Mileage is given northerly from drainage plant of Reclamation District 1500. Mile 9.15 West Borrow Pit is opposite Chandler. Asterisk indicates area irrigated is within By-pass area.
(2) Mileage correction.
(3) See diversion at Mile 28.4R.
(4) This is the total acreage served by diversions at Mile 25.0R and 28.4R.
(5) Mileage is given northerly or southerly from Chandler. Chandler is opposite Mile 9.15 West Borrow Pit. Asterisk indicates area irrigated is within By-pass area.
(6) Formerly Earl Lane.
(7) Plant is on drain canal which enters By-pass at this point. Figure in () indicates distance along drain from By-pass.
(8) Acreage served by plants at miles 1.4N (0.3) and 1.4N (1.3).
(9) 16" unit has been removed.

TABLE 75 (CONTINUED)

BY-PASS AND DRAINAGE CHANNEL DIVERSIONS - 1943

Water User	Mile and Bank (1)	Number and size of pump	Monthly Diversions in Acre-feet Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Total Diversion March to October Acre-feet	Acreage Irrigated General	Rice	Gun Club
East Borrow Pit of Sutter By-pass (Continued)														
Nelson Bros. (2)	1.4N (3.3)		PLANT REMOVED											
E. H. Christenson (3) (2)	1.4N (4.05)	1-24"			805	659	1028	1049	428		3969		320	
R. E. Hughes #6	1.5N*	1-14"				10	74	35			119	(4) 370	(4) 1000	
R. E. Hughes	2.9N*	1-14"			13	163	405	285	490		1356	(4)	(4)	
R. E. Hughes	4.0N*	1-14"			109	474	562	437	272	237	2091	(4)	(4)	
—KNIGHTS LANDING-MARYSVILLE CAUSEWAY - MILE 4.4N—														
R. E. Hughes	4.5N*	1-14"				600	540	453	468	41	2102	(4)	(4)	
Ira Mulligan	5.7N	1-16"			222	316	376	347	152		1413		(5) 680	
R. E. Hughes	5.9N*	1-14"				474	390	458	281	126	1729	(4)	(4)	
Ira Mulligan	7.1N	1-16"			464	553	527	629	474		2647		(5)	
E. H. Christenson	7.5N		PLANT REMOVED											
—RECLAMATION BOARD DRAINAGE PLANT #2 - MILE 10.0N—														
Spurgeon Gun Club	10.0N*	1-12"							160	100	260			200
—EAST LEVEE OF WADSWORTH CANAL - MILE 16.5N—														
—RECLAMATION BOARD DRAINAGE PLANT #3 - MILE 16.5N—														
Meyer, Platter, Moorehead, DeWitt Bros., Epperson and Middleton	19.1N	(6) 1-14"					434	363			797	389		
—NEW COLUSA-MARYSVILLE HIGHWAY - MILE 19.98N—														
—NORTHERN ELECTRIC RAILROAD CROSSING - MILE 20.0N—														
Sacramento Slough														
C. Fred Holmes	(7) 1.4R	(8) 1-12"					23	147			170	200		

(1) Mileage is given northerly or southerly from Chandler. Chandler is opposite Mile 9.15 West Borrow Pit. Asterisk indicates area irrigated is within By-pass area.
(2) Plant is on drain canal which enters By-pass at this point. Figure in () indicates distance along drain from By-pass.
(3) New installation 1943.
(4) Acreage served by plants at Mile 1.5N*, 2.9N*, 4.0N*, 4.5N*, 5.9N*.
(5) Acreage served jointly by plants at Mile 5.7N and 7.1N.
(6) 8" unit has been removed.
(7) Mileage is given easterly from drainage plant of Reclamation District 1500 which is at head of slough.
(8) Replaces 24" unit.

TABLE 75 (CONTINUED)

BY-PASS AND DRAINAGE CHANNEL DIVERSIONS - 1943

Water User	Mile and Bank	Number and size of pump	Monthly Diversions in Acre-feet								Total Diversion March to October Acre-feet	Acreage Irrigated		
			Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.		General	Rice	Gun Club
Knights Landing Ridge Cut (1)														
	(1)													
Lawrence Raymond (2)	0.1R	1-5"				90	15				105	(3)65		
Meek Estate (E. L. Wallace)	0.8R	1-20"		562	1200	2017	1936	1249	261		7225		710	
M. R. Richardson (Dettling Bros.)	0.82L	1-14"			540	810	800	760	800		3710		295	
—RECLAMATION DISTRICT 730 DRAIN PLANT #2 - MILE 3.8—														
Ralph W. Pollock	4.55L	1-12"			100	100	80	114			394	75		
Hershey Estate (Darneille)	4.7L	1-15"				215					215	260		
Sieber Bros.	4.7R	1-6"				NO DIVERSION								
—WEST LEVEE YOLO BY-PASS - MILE 6.3—														
Frank Fisher, Henry Rich and E. L. Wallace	(4) 6.3	Gravity										(4)	(4)	
Yolo By-pass (East Borrow Pit or Tule Canal) (5)														
	(5)													
Robert Swanston	1.8S	(6)1-16"					588	280			868	200		
Robert Swanston	1.1S					PLANT REMOVED								
—NORTH LEVEE SACRAMENTO BY-PASS - MILE 0.0— RECORDING GAGE														
Robert Swanston	1.8N*	1-20"			168	505	1044	863	456		3036		204	
California Packing Corporation	2.4N	1-20"							15	166	181	610		
California Packing Corporation	3.4N	1-8"				NO DIVERSION								
Smith and Roberts	5.9N	1-14"				NO DIVERSION								
—SACRAMENTO-WOODLAND HIGHWAY - MILE 6.18—														
—SACRAMENTO-WOODLAND RAILROAD CROSSING - MILE 6.2—														
Julius Hauser (Newman)	7.0N*	1-14"				242	709	702	706		2359	(7)50	200	
—RECLAMATION DISTRICT 1600 DRAINAGE PLANT - MILE 10.0—														

(1) Mileage is given from head at Colusa Trough. Flow is principally Colusa Basin drainage diverted to the Ridge Cut by checking at the Knights Landing outfall gates on the Back Borrow Pit of Reclamation District 787. See Table 116.
(2) New installation 1943. Removed during summer.
(3) Crop not matured on account of irrigation difficulties.
(4) See Yolo By-pass diversions at Mile 10.0 and 10.1R.
(5) Mileage is given northerly or southerly from north levee of Sacramento By-pass. Asterisk indicates land irrigated is in By-pass area. Diversions from East Borrow Pit or Yolo By-pass are primarily from water diverted through Knights Landing Ridge Cut (Table 116).
(6) This unit replaces 10" pump and was moved from Mile 1.1S.
(7) On adjacent City of Woodland lands.

TABLE 75 (CONTINUED)

BY-PASS AND DRAINAGE CHANNEL DIVERSIONS - 1943

Water User	Mile and Bank	Number and size of pump	Monthly Diversions in Acre-feet								Total Diversion March to October Acre-feet	Acreage Irrigated		
			Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.		General	Rice	Gun Club
Yolo By-pass (East Borrow Pit or Tule Canal) (Continued) (1)														
Frank Fisher and Henry Rich	(1) 10.0N*	1-18" Gravity				NO DIVERSION								
Frank Fisher and Henry Rich	10.1N*	Gravity				600					600	600		
E. L. Wallace (C. A. Hershey)	10.1N*	Gravity				NO DIVERSION								
—FREMONT WEIR (EAST END) - MILE 12.3—														
Back Borrow Pit Reclamation District 1000														
						NO DIVERSION								
Totals- By-pass and Drainage Channel Diversions														
West Borrow Pit of Sutter By-pass			0	530	1174	1235	1980	2352	888	0	8159	3830	130	0
East Borrow Pit of Sutter By-pass			0	0	2457	5148	6203	6224	4271	504	24807	1154	2907	200
Sacramento Slough			0	0	0	0	23	147	0	0	170	200	0	0
Knights Landing Ridge Cut			0	562	1840	3232	2831	2123	1061	0	11649	400	1005	0
Yolo By-pass (East Borrow Pit or Tule Canal)			0	0	168	1347	2341	1845	1177	166	7044	1460	404	0
Back Borrow Pit Reclamation District 1000			0	0	0	0	0	0	0	0	0	0	0	0
Totals			0	1092	5639	10962	13378	12691	7397	670	51829	7044	4446	200
Average cubic feet per second			0	18	92	184	218	206	124	11				
Monthly use in per cent of seasonal			0	2.1	10.8	21.6	25.6	24.1	14.5	1.3	107			

(1) Mileage is given northerly or southerly from north levee of Sacramento By-pass. Asterisk indicates land irrigated is in By-pass area. Diversions from East Borrow Pit of Yolo By-pass are primarily from water diverted through Knights Landing Ridge Cut (Table 116).

TABLE 76

FEATHER RIVER DIVERSIONS - 1943

Water User	*Mile and Bank	Number and size of pump	Monthly Diversions in Acre-feet								Total Diversion March to October Acre-feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.		General	Rice
Henry Rutz	1.55L	1-8"				15	10	25			50	85	
Sutter Basin Corporation	2.60R	1-20"				NO DIVERSION							
		1-26"											
Frank Guastalli	5.6L	1-10"			10	71	87	194			362	120	
Capital Company	6.44L	1-10"				NO DIVERSION							
M. Scheiber	7.7L	1-10"				131	165	141	140		577	271	
—NICOLAUS GAGING STATION - MILE 9.3—													
—NICOLAUS BRIDGE - MILE 9.4—													
Bercut Richards Co.	9.75R	1-20"			173	573	661	500	485		2392	310	
Garden Highway Mutual Water Co.	13.1R	1-20"		641	1814	2404	2079	1780	1321		10039	775	610
		1-24"											
Feather River Water Co.	13.35R	1-14"				166	184	93	23		466	180	
Plumas Mutual Water Co.	17.5L	1-22"			752	1750	2065	1635	1110	130	7442	795	270
G. C. Shannon	18.75R	1-6"				50	50	11	13		124	74	
Oswald Water District	21.4R	1-16"			85	663	829	392	216	494	2679	(1) 668	
Reclamation District No. 784 (2)	24.0L	1-20"			166	625	749	726	642		2908		650
Nevada California Lands, Inc.	25.2R	1-10"				NO DIVERSION							
—MOUTH OF YUBA RIVER - MILE 27.3R—													
—YUBA CITY - MARYSVILLE BRIDGE - MILE 28.0—													
J. L. Sullivan, Jr.	33.9R	1-10"				144	227	62			433	180	
Sutter Butte Canal Co. (Sunset Plant)	38.1R	1-26"			2946	3289	4728	5364	1440		(3)17767	(3)	(3)
		2-42"											
J.L. Sullivan Jr. and C.J.Matthew	(4)43.7L (0.4L)	1-18"			98	164	137	184	113		696	355	
Thomas Mathew	(4)43.7L (0.7L)	1-5"				NO DIVERSION							
Moznett and Wetmore Sub. No. 1	(4)43.7L (1.2L)	1-10"				60	236	163	42	33	534	(5) 208	
Manuel A. Barba (Borges)	(4)43.7L (1.25L)	1-8"			41	106	71	56	53		327	78	

* Mileage along river above mouth.

(1) Includes 145 acres outside of district.

(2) Formerly listed as Alicia Mutual Water Company.

(3) See diversion at Mile 58.1R.

(4) Plant diverts Feather River water backed into Honcut Slough. Slough is tributary to Feather River at Mile 43.7L. Mileage of plant above mouth of Honcut Slough is indicated ( ). All plants on left bank of slough.

(5) Some additional water from well pump.

TABLE 76 (CONTINUED)

FEATHER RIVER DIVERSIONS - 1943

Water User		*Mile and Bank	Number and size of pump	Monthly Diversions in Acre-feet								Total Diversion March to October Acre-feet	Acreage Irrigated	
				Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.		General	Rice
A. P. Barba		47.9L	1-12"			30	77	52	41	39		239	60	
E. F. Biggs		48.3L	1-10"				90	21	11			122	290	
Edward Dunning		49.0L	1-8"				111	83				(1) 194	(1) 55	
Clyne Ranch		51.0R	1-6"					43	23			66	(2) 31	
C. E. Porter		51.1L	1-7"			21	72	49	38	44		224	55	
Edward Steadman		51.4R	1-10"				8	79	23			110	(3)120	
J. F. Fratus		52.1L	1-10"				13	46	39			98	72	
Capital Company		52.5L	1-6"						23	11		34	55	
F. L. Morris		52.7L	1-8"			9	34	50	9	10	4	116	62	9
Frank Dutra		52.9R	1-6"				NO DIVERSION							
Ruby Chambers		53.1R	1-6"				20	15	7			42	38	
Budh Singh Banes		54.7R	1-8"				NO DIVERSION FROM RIVER							
Hearst Estate		55.1L	1-14"			17	101	119	61	26		324	200	
Mrs. Alvin Kister		57.0L	1-8"					15	7			22	30	
Henry Hazelbusch		57.9R	1-9"			9	53	30	17	4	33	146	70	
Sutter Butte Canal Co.	(4)	58.1R	Gravity		5593	36233	41949	42314	39822	33362	13514	(4)212787	14204	11071
Richvale Irrigation District	(4)	58.1R	Gravity		3286	21292	24652	24866	23401	19605	7942	125044	430	12579
Biggs-West Gridley Water Dist.(5)	(4)	58.1R	Gravity		3453	22370	25900	26126	24586	20598	8344	131377	4043	7027
Western Canal Company		59.7R	Gravity		317	15473	21989	25097	23969	14021	(6)5034	105900	170	14230
—OROVILLE BRIDGE - MILE 65—														
—U.S.G.S. GAGING STATION - MILE 71—														
Totals				0	13290	101599	125318	131210	123282	93309	35495	623641	24089	46566
Average cubic feet per second				0	223	1652	2106	2134	2005	1568	577			
Monthly use in per cent of seasonal				0	2.1	16.3	20.1	21.0	19.8	15.0	5.7			

*Mileage along river above mouth.

(1) Some additional water from well pump.

(2) An additional 15 acres served for plant at Mile 51.4R.

(3) Includes 15 acres served from plant at Mile 51.0R.

(4) This is a common point of diversion for the Sutter Butte Canal Company, Richvale Irrigation District and Biggs-West Gridley Water Districts. Diversions are reported separately. The Sutter-Butte Canal Company also operated a pumping plant at Mile 38.1R.

(5) District newly organized and commenced receiving water through Sutter-Butte Canal Company system in 1943.

(6) Includes 4687 acre-feet diverted for gun clubs.

TABLE 77

YUBA RIVER DIVERSIONS - 1943

Water User	*Mile and Bank	Number and size of pump	Monthly Diversion in Acre-Feet								Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.		General	Rice
—GAGING STATION "YUBA RIVER AT MARYSVILLE" (SEVENTH STREET BRIDGE) - MILE 0.9—													
Davis Bros.	1.6L	1-12"				16	24	20	18		78	40	
Charles Shinkle	1.8R	1-5"				6	8	8	5		27	8	
Marysville River Farms Company	3.0L	1-10"					73	306			379	(1)165	
Marysville River Farms Company (2)	3.0R	1-6"				NO DIVERSION							
Capital Company (3)	4.1L	1-8"				146	119	216	142		623	(4)165	
Di Giorgio Fruit Corporation	4.75L	1-10"				247	33	50			330	153	
Di Giorgio Fruit Corporation	5.3L	1-8"			4	32	20	20			76	60	
Marysville River Farms Co. (5)	5.9L	1-10"					44		42		86	65	
Hallwood Irrigation Company	11.0R	Gravity		1265	7159	9842	11529	11522	11510	10687	63514	3892	1010
Cordua Irrigation District	11.0R	Gravity		638	3459	4948	4956	4830	4516	4565	27912	1762	(6)1300
—DAGUERRE POINT DAM - MILE 11.0—													
Yuba Consolidated Gold Field Co.	14.5L	Gravity	NO AGRICULTURAL USE										
—GAGING STATION "YUBA RIVER BELOW NARROWS DAM" - MILE 20—													
Totals			0	1903	10622	15237	17203	16972	16610	15252	93799	6280	2310
Average cubic feet per second			0	32	173	256	280	276	279	248	193		
Monthly use in per cent of seasonal			0	2.0	11.3	16.3	18.3	18.1	17.7	16.3			

* Approximate mileage along river above highway crossing at Marysville
(1) Includes 100 acres on adjoining Rashen Estate.
(2) Previously listed as Yuba River Farms Co.
(3) Formerly E. O. Rubke.
(4) Includes 100 acres on adjoining Hendricks lands.
(5) New installation 1943.

TABLE 78

AMERICAN RIVER DIVERSIONS - 1943

Water User	*Mile and Bank	Number and size of pump	Monthly Diversion in Acre-Feet								Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.		General	Rice
—GARDEN HIGHWAY BRIDGE - MILE 0.2—													
—AUBURN BOULEVARD BRIDGE (16TH STREET) - MILE 1.9—													
—SACRAMENTO-NORTHERN RAILROAD BRIDGE - MILE 2.0—													
—WESTERN PACIFIC RAILROAD BRIDGE - MILE 2.1—													
North Sacramento Lands Co.	2.4R	1-6"				NO DIVERSION							
North Sacramento Lands Co.	2.55R	1-5"				NO DIVERSION							
North Sacramento Lands Co.	2.65R	1-7"						22			22	40	
G. A. Meister	3.1L	1-10"				NO DIVERSION							
—SOUTHERN PACIFIC RAILROAD BRIDGE - MILE 3.5—													
G. A. Meister	3.7L	1-4"				NO DIVERSION							
		1-6"											
G. A. Meister	4.1L	1-10"				NO DIVERSION							
C. Swanston and Sons	4.2R	1-10"						53			53	(1)80	
C. Swanston and Sons	5.3R	1-10"						26	62		88	(1)	
C. Swanston and Sons	5.5R	1-6"				NO DIVERSION							
L. D. Carlson and J. Sanburg (2)	5.7L	1-10"			35	206	158	18			417	176	
—GAGING STATION - AMERICAN RIVER AT SACRAMENTO - MILE 6.1—													
E. Clemens Horst Co.	6.5R	1-6"				29	50				79	(3)50	
S. H. Cowell	7.1L	1-7"				NO DIVERSION							
E. Clemens Horst Co.	7.5R	1-8"				41	72				113	(3)100	
Haggin Hop Farm	7.8R	1-5"				21	19				40	44	
Hagginbottom Land Co.	8.05R	1-10"				NO DIVERSION							
J. H. Kerby	9.0L	1-6"				64	54	76	2		196	40	
Hagginbottom Land Co.	9.2R	1-12"				NO DIVERSION							
Collins Ranch	9.2L	1-8"			1	2	1				4	15	
Ruth Coleman	9.35L	1-5"				7	29	15			51	(4)50	
Ruth Coleman	9.5L	1-5"				NO DIVERSION							
Ruth Coleman	9.55L	1-5"				5	4	4			13	(4)	
Henry Cowell	9.6L	1-6"				NO DIVERSION							

* Mileage along river above mouth.

(1) Combined acreage that is served by the plants at miles 4.2R and 5.3R.

(2) Formerly W. S. Kendall Estate.

(3) Some additional water from wells.

(4) Combined acreage that is served by the plants at Miles 9.35L and 9.55L.

TABLE 78 (CONTINUED)

AMERICAN RIVER DIVERSIONS - 1943

Water User	*Mile and Bank	Number and size of pump	Monthly Diversions in Acre-Feet								Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.		Gen-eral	Rice
Dr. J. Karnarse	10.2R	1-5"				NO DIVERSION							
Guy H. Roddan	10.3L	1-10"					28	21	18	2	69	7	
Gold Nugget Orchard Co.	10.4R	1-5"				33					33	17	
Mucke Sand and Gravel Co.	11.2L	1-6"				NO DIVERSION							
J. T. Gore Estate	11.5L	1-8"			18	63	34	28	69	12	224	55	
William A. Meyer	11.7L	1-4"				13	26	8		2	49	27	
A. Teichert & Sons (1)	11.7L	1-5"				10	23	2		18	53	32	
A. Teichert & Sons (2)	12.0L	1-4"						9			9	22	
H. T. Danielson	13.1R	1-5"				2	4	3	2		11	8	
P. Osterli	13.2R	1-4"					21	23			44	46	
		1-6"											
Chas. Deterding Jr., J.R.Deterding and M. McDonald	13.9R	1-6"				45	50	18			113	70	
Chas. Deterding Jr., J.R.Deterding and M. McDonald	14.7R	1-4"				NO DIVERSION							
Chas. Deterding Jr., J.R.Deterding and M. McDonald	15.1R	1-6"					40				40	33	
Carmichael Irrigation District	16.0R	1-6"				400	900	900	600	60	(3)2860	(4)2200	
		2-12"											
William H. Devlin	17.1R	1-6"				NO DIVERSION							
—GAGING STATION "AMERICAN RIVER AT FAIROAKS" - MILE 19.2—													
Totals			0	0	54	941	1513	1226	753	94	4581	3112	0
Average cubic feet per second			0	0	0.9	16.0	25.0	20.0	13.0	1.5	9.6		
Monthly use in per cent of seasonal			0	0	1.2	20.5	33.0	26.8	16.4	2.1			

* Mileage along river above mouth.
(1) Formerly Capital Building and Loan Association.
(2) New Installation 1943.
(3) Diversion estimated as no record of operation kept by District.
(4) Classed as suburban lands. No details of irrigation available.

TABLE 79

DELTA UPLANDS DIVERSIONS FROM OLD SAN JOAQUIN RIVER - 1943

Water User	*Mile and Bank	Number and size of pump	Monthly Diversions in Acre-Feet							Total Diversion March to October Acre-feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.		General	Rice
East Contra Costa Irr. District	(1)36.5L	2-18"		632	4225	4112	5190	3446	2047	481	20133	(2)13219	
		2-24"											
		2-30"											
Byron-Bethany Irrigation District	(3)40.9L	1-26"		220	1924	3313	3106	3356	2166	1025	15110	5598	
		1-30"											
Federal Land Bank	(4)44.6L	1-7"				NO DIVERSION							
E. H. Stevenson Estate	45.3L	1-12"				NO DIVERSION							
H. Lindeman	47.2L	1-12"			118	90	120	155	58	43	(5)584	110	
Gus Lindeman	47.2L	1-10"									(6)	(6)	
West Side Irrigation District	(7)47.65L	7-15"		1196	3478	3551	3799	3457	1993	854	(8)18328	8203	
Vance Brown	48.8L	1-8"			6	9	7	12	6		40	32	
Naglee Burke Irrigation District	50.4L	1-16"			1328	1121	1254	1203	1077	628	6611	(9)2539	
		1-18"											
Freemont Irrigation Association	50.9L	1-14"			191	194	188	244	185	63	1065	(10) 557	
Joe Freitas	51.0L	1-8"				9	2				11	35	
Attilio Casserini	51.2L	1-8"			6	7	5	6	7		31	27	
Excelsior Ranch #2	52.4L	1-10"			17	23	34	26	11		111	120	
A. L. Galli (11)	53.0L	1-8"				34	40	40	18	10	142	35	
TOM PAINE SLOUGH - MILE 54.3—													
Totals			0	2048	11293	12463	13745	11945	7568	3104	62166	40607	
Average cubic feet per second			0	34	184	209	224	194	127	50	128		
Monthly use in per cent of seasonal			0	3.3	18.2	20.0	22.1	19.2	12.2	5.0			

* Distance along river from its mouth 4½ miles below Antioch. Mileage as established by War Department Survey of 1913-15.

(1) To junction of Old River and Indian Slough. Pumping plant is located two and one-half miles west along Indian Slough.

(2) An additional 4440 acre-feet taken from wells and interior drains.

(3) To junction of Old River and Italian Slough. Pumping plant is located 2-3/4 miles southwest along Italian Slough and extension cut.

(4) Plant is on cut which joins river at Mile 44.6 Left.

(5) An additional 60 acres served on adjoining lands of Gus Lindeman.

(6) See plant at Mile 47.2 Left.

(7) To junction of Old River with Intake Cut. Pumping plant is located one mile south along intake cut.

(8) Includes 648 acre-feet served to Tracy-Clover Irrigation District—Tom Paine Slough—Mile 2.15.

(9) An additional 7 acres served for Freemont Irrigation Association.

(10) Includes 7 acres served through plant at Mile 50.4L.

(11) New installation 1943.

TABLE 80

DELTA UPLANDS DIVERSIONS FROM TOM PAINE SLOUGH - 1943

Water User	*Mile and Bank	Number and size of pump	Monthly Diversions in Acre-Feet								Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.		General	Rice
Independent Mutual Water Corp. & Company	0.7S	2-18"		26	186	348	316	352	218	36	1482	(1)1038	
Independent Mutual Water Corp. & Company	1.2S	1-18"				19	23	80	41	17	180	(1)	
Holly Sugar Corporation	(2)2.1S	1-10" box 1-12"		31	126	93	78	145	3		476	296	
Tracy Clover Irrigation District	(2)2.1S	1-16"	NO DIVERSION (3)								(2)	(3) 600	
Pescadero R. D. #2058, Plant #1	2.9S	1-12"		5	130	170	152	126	146		729	(4)3124	150
Pescadero R. D. #2058, Plant #3	6.3S	1-12" 1-24"		798	1800	1787	1788	1640	1384	505	9702	(4)	
Pescadero R. D. #2058, Plant #5	8.3S	1-12"			201	200	152	107	167		827	(4)	
Pescadero R. D. #2058, Plant #5a	9.0S	1-12"		31	83	111	120	128	82	31	586	(4)	
—SOUTHERN PACIFIC RAILROAD CROSSING - 9.1S—													
—LINCOLN HIGHWAY - MILE 9.9S—													
Totals			0	891	2526	2728	2629	2578	2041	589	13982	5058	150
Average cubic feet per second			0	15	41	46	43	42	34	10	29		
Monthly use in per cent of seasonal			0	6.4	18.1	19.5	18.8	18.4	14.6	4.2			

* Distance along Tom Paine Slough from its mouth which is at Mile 54.3 on Old San Joaquin River (War Department Survey of 1913-15).

(1) Combined acreage is served jointly by the plants at Miles 0.7S and 1.2S.

(2) To junction of Tom Paine Slough and dredger cut. Pumping plant is located 1½ miles south along dredger cut.

(3) Acreage estimated—served through West Side Irrigation District--Old San Joaquin River Mile 47.65L.

(4) This is the total uplands area (South of Tom Paine Slough) irrigated from all Pescadero Reclamation District plants on Tom Paine Slough.

TABLE 81

DELTA UPLANDS DIVERSIONS FROM SAN JOAQUIN RIVER - 1943

Water User	*Mile and Bank	Number and size of pump	Monthly Diversions in Acre-Feet								Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.		General	Rice
—GARWOOD BRIDGE - MILE 45.3—													
Katten and Morengo Ranch	45.45R	1-8"			68	36	37	70	70		281	90	
A. Jury	45.5R	1-6"				6	5	2			13	25	
C. R. Van Buskirk	45.6R	1-5"				73	65	47	11		196	63	
		1-8"											
Mrs. John D. McDougall	46.3R	2-6"				NO DIVERSION							
Ivy Rainey	46.65R	1-6"				NO DIVERSION							
Wilhoit and Hammill	46.85R	1-10"				84	100	100	94		378	160	
L. F. Grimsley	47.2R	1-6"							49		49	40	
Wolfinger Bros.	47.3R	1-10"					13	1	4		18	8	
Alma A. Haack	48.0R	1-12"			87	87	87	86			347	148	
H. G. Learned (Lee Young)	48.3R	1-4"		2		9	5	15	8	3	42	(1) 30	
H. G. Learned	48.5R	1-3½"		1		16	7	8	5	1	38	(1)	
Joe Calcagno	48.5R	1-6"		6	11	54	39	57	22		189	100	
F. Piccardo, Dr. Carr and J. Calcagno (2)	48.55R	1-6"		5	14	21	26	29	21	6	122	48	
G. B. Figari	48.6R	1-5"				4	2	19	5		30	19	
M. O. Couper	49.0R	1-10" box				NO DIVERSION							
Mettler, Cross & Drury (Chapman)	49.5R	1-14"		7	60	71	66	69	27	27	327	100	
A. A. Rodgers	50.1R	1-10"			11	23	26	27	21	8	116	80	
—BRANDT BRIDGE - MILE 50.2—													
A. Hirata (Converse)	50.4R	1-8"				20	29	13			62	40	
B. & K. Watanabe (Toscano)	50.6R	1-8"			2	1	13	7	6		29	35	
D. Toscano	50.8R	1-6"		3	3	18	9	18	10	3	64	37	
Joseph Pastorino (3)	51.8R	1-12"				17	25	14	3		59	47	
Capital Company	52.2R	1-12"					24	38	30		92	45	
A. Giraldi	52.5R	1-5"					16	11			27	13	
F. C. Roberts	52.65R	1-6"				NO DIVERSION							
F. C. Roberts	52.8R	1-8"					56	51	3		110	52	
Capital Company	53.2R	1-12"				NO DIVERSION							
Wm. Nishimura	53.4R	1-8"			6	8	8	8	8		38	34	
M. Dos Reis Estate (4)	53.7R	1-12"				196	158	148	139	14	655	280	
R. E. Albertson	54.9R	1-10"				NO DIVERSION							

* Distance along San Joaquin River from its mouth 4½ miles below Antioch. (Mileage as established by War Department Survey of 1913-15.)

(1) Acreage combined for plants at Miles 48.3R and 48.5R.

(2) Formerly Piccardo, Vigliani and Calcagno.

(3) Formerly J. J. O'Toole.

(4) Formerly M. Dos Reis.

TABLE 81 (CONTINUED)

DELTA UPLANDS DIVERSIONS FROM SAN JOAQUIN RIVER - 1943

Water User	*Mile and Bank	Number and size of pump	Monthly Diversions in Acre-Feet								Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.		General	Rice
Oakwood Stock Farm	56.0R	1-10"				NO DIVERSION							
—JUNCTION WITH MIDDLE RIVER - MILE 56.2L—													
Oakwood Stock Farm	57.0R	1-14"				560	320	250	190		1320	228	
James Tobin	57.15R	1-7"				NO DIVERSION							
A. J. Thompson	57.3R	1-5"				NO DIVERSION							
A. Colori	57.45R					PLANT REMOVED							
G. Gardella	57.5R	1-4"		4	5	7	8	8	2		34	10	
V. Sanguenetti	58.4R	1-2½"				1	2	1			4	1	
G. B. Figari	58.6R	1-3"			1	1	3				5	3	
R. Mauro	58.7R	1-4"				NO DIVERSION							
—MOSSDALE BRIDGE - MILE 58.9 - RECORDING GAGE—													
C. C. Abersold	59.25R	1-6"		5	8	12	18	20	12	4	73	45	
H. A. Neistrath (Madruga)	59.3R	1-14"			53	82	76	213	150	66	640	150	
H. A. Neistrath (Madruga)	(1)60.1R	1-6"			7	10	16	14	14	3	64	50	
—PARADISE DAM - (HEAD OF PARADISE CUT—MILE 62.2L—													
Banta Carbona Irrigation District	67.5L	2-20"		3136	9570	7165	9781	8912	4026	1591	(2)44181	(3)16213	
		3-24"											
		1-36"											
J. Y. Matsumoto (Tong)	70.0R	1-8"				12	19	13	6		50	100	
J. Y. Matsumoto (Tong)	70.5R	1-10"				28	59	50	13		141	125	
Reclamation District #2075	71.0R	1-16"			266	318	436	432	193	67	1712	251	
Mortensen, Borges and Whitman	73.2R	1-12"					72	135			207	290	
Ralph Martin	75.7R	1-7"				NO DIVERSION							
Ralph Martin	76.2R	1-6"				NO DIVERSION							
—U.S.G.S. GAGING STATION - SAN JOAQUIN RIVER NEAR VERNALIS - MILE 76.7—													
Totals			0	3169	10172	8940	11617	10886	5142	1793	51719	19500	
Average Cubic Feet per Second			0	53	165	150	189	177	86	29	106		
Monthly use in percent of seasonal			0	6.1	19.7	17.3	22.5	21.0	9.9	3.5			

* Distance along San Joaquin River from its mouth 4½ miles below Antioch. (Mileage as established by War Department Survey of 1913-15.)

(1) Up Walthal Slough 0.2 mile and opposite this mileage on river.

(2) This is the total amount of water diverted and includes any delivered outside of District.

(3) Includes 190 acres outside of District.

TABLE 82

SAN JOAQUIN RIVER DIVERSIONS

Water User	*Mile and Bank	Number and size of pump	Monthly Diversions in Acre-Feet							Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.		General	Rice
—U.S.G.S. GAGING STATION - "SAN JOAQUIN RIVER NEAR VERNALIS" - MILE 76.7—													
—STANISLAUS RIVER - MILE 79.7R—													
—MAZE ROAD BRIDGE - MILE 81.85—													
W. C. Blewett Estate	81.95L	3-12"		222	380	410	442	416	390	194	2454	358	
El Solyo Ranch	82.0L	1-12"		318	2050	2220	2630	2520	1940	892	12570	2268	342
		3-18"											
—GAGING STATION - "SAN JOAQUIN RIVER AT HETCH HETCHY WATER SUPPLY CROSSING" - MILE 82.65—													
—TUOLUMNE RIVER - MILE 91.0R—													
West Stanislaus Irrigation District	91.8L	3-26"		1918	9292	7656	14380	10107	5639	1646	(1)50638	(1)21321	
El Pescadero Ranch #1	(2)91.8L	1-12"				NO DIVERSION							
El Pescadero Ranch #2	(2)91.8L	1-14"			50	48	67	66	66	33	330	140	
El Pescadero Ranch #3	(2)91.8L	1-12"			6	10	42	35	29	5	127	101	
Burkhard Investment Company	(2)91.8L	1-14"			60	52	45	200	199	8	564	126	
—LAIRD SLOUGH BRIDGE - GAGING STATION - "SAN JOAQUIN RIVER NEAR GRAYSON" - MILE 96.05—													
Rancho El Pescadero (Houck Ranch)	98.9L	1-16"		128	350	349	465	389	192	167	2040	704	
—PATTERSON BRIDGE - MILE 104.4—													
Patterson Water Company	104.4L	1-14"		1192	7305	7730	10032	9607	6900	1419	44185	14100	
		1-18"											
		4-26"											
Turlock Garden Land Company	104.5R	1-10"			97	76	96	59	25		353	168	
Mortgage Guarantee Co.	106.5R	1-6"				NO DIVERSION							
		1-10"											
Patterson Ranch Company	109.8L	1-12"		600	1131	1279	1497	1424	1100	315	7346	1377	
		2-16"											
Roy Ustick	112.55R	1-16"		39	81	114	134	169	100	110	747	300	
—CROWS LANDING BRIDGE - MILE 113.4—													
Laura C. Johnson	113.5R	1-10"				NO DIVERSION							
A. J. Silveria	113.85R	1-6"				NO DIVERSION							
A. J. Silveria	114.35R	1-6"			6	11	13	9	7		46	24	
F. Dutcher	114.95R	1-10"				NO DIVERSION							
L. B. Crow	116.05L	1-14"			41	160	70	45	8		324	156	
Oscar Hogan	116.4R	1-12"				NO DIVERSION							
C. L. Olinger	116.95R	1-12"				NO DIVERSION							
—U.S.G.S. GAGING STATION "SAN JOAQUIN RIVER NEAR NEWMAN"- MILE 123.7—													
—MERCED RIVER - MILE 123.75R—													
Stevinson Water District	129.4R					PLANT DISMANTLED							
—FREMONT FORD BRIDGE - GAGING STATION - MILE 129.5—													
—DELTA BRIDGE (TURNER ISLAND) - GAGING STATION - MILE - 158.7—													
Totals			0	4417	20849	20115	29913	25046	16595	4789	121724	41143	342
Average cubic feet per second			0	74	339	338	486	407	279	78	250		
Monthly Use in Per Cent of Seasonal			0	3.7	17.0	16.9	24.3	20.3	13.9	3.9			

* Mileage along San Joaquin River from its mouth 4½ miles below Antioch. (Mileage as established by War Department Survey of 1913-15.)

(1) District furnishes water to lands outside of district. This is total amount pumped from river and total area reported as being irrigated.

(2) Pump is on cut leading to West Stanislaus Irrigation District plant.

TABLE 83

MERCED RIVER DIVERSIONS - 1943

Water User	*Mile and Bank	Number and size of pump	Monthly Diversions in Acre-Feet								Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.		General	Rice
—GAGING STATION - "MERCED RIVER NEAR MOUTH" - MILE 1.1—													
Stevinson Water District	3.8R	1-15"		1	242	321	377	344	257	167	1709	469	
Floyd Anderson (1)	4.0L	1-8"				NO DIVERSION							
Salvador De Angeles (2)	4.3L	1-12"			3	12	3	1		13	32	94	
E. De Angeles	5.8L	1-10"			41	62	55	37	23	10	228	79	
J. F. Peck	6.1L	1-18"			184	191	201	143	133	30	882	178	
Stevinson Water District	6.55L	1-18"				NO DIVERSION							
Francis Hartman	8.5L	1-12"				1	64	1			66	89	
Mary Collier Estate	8.85L	(3)1-6"			30	24	22	31	32	9	148	66	
Samuel B. McCullagh	9.4L	1-10"			218	181	261	149	143		952	308	
R. W. Adams and J. B. Silva	10.35L	1-8"		48	323	463	426	361	376	57	2054	356	
		1-10"											
L. A. Brown	10.6R	1-3"				NO DIVERSION							
W. D. Adams	10.8R	1-6"				6	7	4	1		18	30	
W. D. Adams	10.85L	(4)1-5"		34	203	250	344	124	102	27	1084	387	
		1-12"											
C. G. McLaughlin	11.4L	1-8"				NO DIVERSION							
C. G. McLaughlin	11.55L	1-4"				NO DIVERSION							
L. E. Milliken and Edna McKinley	11.6L	1-10"		26	36	58	69	46	40	11	286	70	
J. Regello	11.6L	1-12"				21	32	6			59	139	
—NEW MILLIKEN BRIDGE - MILE 11.65—													
A. J. Azevedo	12.35L	1-10"					87	38			125	110	
Pacific Coast Joint Stock Land Bank	12.85L	1-10"				NO DIVERSION							
Capital Company	16.5L	1-12"			106	117	45	174	105		547	80	
Merced River Farms Co.	17.05L	1-6"				1	8	6	6	2	23	17	
—U.S.G.S. GAGING STATION "MERCED RIVER NEAR LIVINGSTON" - MILE 17.1—													
L. A. Chase	17.3L	1-4"				NO DIVERSION							
J. Clark	17.7L	1-3"				NO DIVERSION							
		1-6"											
O. B. Daniels	17.7L	1-5"			4	8	9	6	4	4	35	5	
J. H. Thomas (5)	18.4L	1-6"				14	9	8	6	2	39	13	
John Reininghaus	20.4L	1-6"			10	35	32	24	16	6	123	65	
W. J. Haskins	20.65R	1-3½"			2	2	2	2	2	1	11	6	
—SOUTHERN PACIFIC RAILROAD (MAIN LINE) - MILE 21.05—													
A. C. Jorgensen	21.1R	1-6"						5	5		10	15	
A. C. Jorgensen	22.2R	1-12"			30	47	260	135	31		503	180	

* Mileage along river above mouth.
(1) Formerly Andrew Rayle.
(2) New installation.
(3) Replaces 8" unit.
(4) 5" unit reinstalled in 1943.
(5) Formerly Rhiners and Laramore.

TABLE 83 (CONTINUED)

MERCED RIVER DIVERSIONS - 1943

Water User	*Mile and Bank	Number and size of pump	Monthly Diversions in Acre-feet								Total Diversion March to October Acre-feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.		General	Rice
A. C. Jorgensen	23.3R	1-6"		46	162	106	182	11	71		578	100	
		1-12"											
M. McConnell	23.4L	1-5"				NO DIVERSION							
Manuel A. Bettencourt	23.8R	1-6"					4		3		7	10	
T. Nishihara	24.0R	1-4"			2	3	5	6	11		27	15	
W. F. McConnell	24.2L	1-5"				NO DIVERSION							
W. F. McConnell	24.5L	1-6"				NO DIVERSION							
T. Nishihara (Torres)	24.6R	1-6"					2	4	5	7	18	26	
T. Nishihara	25.0R	1-5"					16		5		21	12	
T. Nishihara	25.5R	1-6"				NO DIVERSION							
Merced River Farms Association	26.3R	1-8"		43	133	106	120	153	72	87	714	80	
W. C. Magneson	26.55R	1-5"			12	17	16	13	11	3	72	34	
W. C. Magneson (Mellor)	27.0R	1-6"					14	8			22	8	
--SANTA FE RAILROAD CROSSING - MILE 27.05--													
W. C. Magneson (Perreira)	27.6R	1-10"			14	51	50	51	49	21	236	100	
T. Nishihara (Fessler)	27.8R	1-4"				35	25	37			97	29	
Y. Tanabe (Mondo Bros.)	28.1R	1-6"			6	5	5	5	1		22	16	
John Farie (1)	28.4R	1-4"				19	11	9	8	1	48	18	
J. Campadonica	28.6R	1-6"				NO DIVERSION							
Oliver Alves (2)	28.6R	1-5"				10	12	21		13	56	75	
		1-8"											
Anthony Demchilli (Fegundes)	29.1R	1-7"			16	44	26	50	73		209	48	
Anthony Demchilli (Bettencourt)	29.75R	1-6"			5	20		21	14	3	63	30	
Manuel Silva (3)	29.9R	1-6"					78	48	43		169	48	
Tony Rose (4)	30.2L	1-6"					21	10	2		33	15	
Manuel Silva (3)	30.95R	1-12"					50	32			82	80	
Tony Rose (4)	31.1L	1-8"					88	87			175	60	
T. H. Carlon	31.5R	1-6"				NO DIVERSION							
		1-8"											
--SOUTHERN PACIFIC RAILROAD (OAKDALE BRANCH) - MILE 32.52--													
B. H. Arkellian	32.9R					PLANT REMOVED							
B. H. Arkellian	33.55R	1-7"				12	24	42	30		108	100	
P. and A. Rnenero	39.2L	1-24" box				7	15	5			27	20	
--GAGING STATION "MERCED RIVER AT YOSEMITE VALLEY RAILROAD CROSSING" - MILE 42.1--													
Totals			0	198	1782	2249	3077	2258	1680	474	11718	3680	
Average cubic feet per second			0	3	29	38	50	37	28	8	24		
Monthly use in per cent of seasonal			0	1.7	15.2	19.2	26.3	19.3	14.3	4.0			

* Mileage along river above mouth.

(1) Formerly G. H. Lovely.

(2) Formerly D. S. Enright.

(3) Formerly American Trust Company.

(4) Formerly Capital Company.

TABLE 84

TUOLUMNE RIVER DIVERSIONS - 1943

Water User	*Mile and Bank	Number and size of pump	Monthly Diversions in Acre-Feet								Total Diversion March to October Acre-feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.		General	Rice
E. T. Mapes Ranch	1.9R	1-14"		76	95	136	56	77	56	31	527	(1) 800	
J. de Souza and J. B. Silva	2.2R	1-6"				NO DIVERSION							
E. B. Henry	3.1R	1-16"			14	9	14	22	12	13	84	40	
—GAGING STATION "TUOLUMNE RIVER AT TUOLUMNE CITY" - MILE 3.35—													
Bancroft Fruit Farms	4.1R	1-10"			4	32	59	56	13	1	165	(2) 245	
Bancroft Fruit Farms	5.0R	1-10"		11	64	76	115	95	39	18	418	(2)	
J. R. Rude (3)	7.1R	1-10"		1	69	54	52	28			204	70	
W. F. Duffy	7.2R	1-5"				NO DIVERSION							
J. J. and E. J. Shivo	7.8L	1-10"				NO DIVERSION							
W. F. Duffy	7.9R					PLANT REMOVED							
W. F. Duffy	8.4R	1-10"			53	60	66	66	66	64	381	85	
Otis Burch	9.2L					PLANT REMOVED							
A. Holmes (Benson)	10.2R	1-11"				78	9		42	6	135	47	
F. Strangio	15.25R	1-6"				9	40	11	11	10	81	23	
G. B. and L. D Podesto	15.75R	1-3"		3	3	1	5	7	7	4	30	15	
—GAGING STATION "TUOLUMNE RIVER AT MODESTO" - MILE 15.75—													
—SOUTHERN PACIFIC RAILROAD (MAIN LINE) - MILE 15.8—													
—DRY CREEK - MILE 16.5R—													
Mrs. L. R. Hughson	20.3R	1-8"			11		23	34	18	15	101	35	
W. J. Leckron	20.5R	1-10"			18	27	27	13	29	13	127	101	
—SANTA FE RAILROAD - MILE 21.6—													
L. De Martini Co. #3 (4)	25.0L	1-8"				NO DIVERSION							
L. De Martini Co. #4 (4)	25.7L	1-4"				NO DIVERSION							
L. De Martini Co. #2 (4)	26.0L	1-8"				10	40	40	39		129	60	
L. De Martini Co. #1 (4)	26.2L	1-6"		25	10	10					45	35	
L. Firpo	27.1L	1-10"				21	11	19	5		56	51	
—SOUTHERN PACIFIC R.R. (OAKDALE BRANCH) - MILE 31.5—													
—GAGING STATION "TUOLUMNE RIVER AT HICKMAN BRIDGE" - MILE 31.7—													
George H. Sawyer	39.8L	1-6"			13	12	25	52	23	8	133	219	
—GAGING STATION "TUOLUMNE RIVER AT ROBERTS FERRY BRIDGE" - MILE 39.9—													
Totals			0	116	354	541	542	520	360	183	2616	1826	
Average cubic feet per second			0	1.9	5.8	9.1	8.8	8.5	6.0	3.0	5.4		
Monthly use in per cent of seasonal			0	4.4	13.5	21.1	20.4	19.7	13.9	7.0			

* Mileage along river above mouth.
(1) An additional 1200 acres served from Turlock Irrigation District.
(2) Acreage served jointly by plants at Miles 4.1R and 5.0R.
(3) Formerly Randolph Marketing Company.
(4) Formerly P. L. Alexander.

TABLE 85

STANISLAUS RIVER DIVERSIONS - 1943

Water User	*Mile and Bank	Number and size of pump	Monthly Diversions in Acre-feet								Total Diversion March to October Acre-feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.		General	Rice
Frank Coker	1.1R	1-6"					10				10	15	
Mrs. E. W. Hawkins	1.6R	1-4"				NO DIVERSION							
J. Chisholm	2.9R	1-8"				NO DIVERSION							
J. C. Smith (1)	3.1R	1-6"				6	3	3	6		18	17	
Will Hawkins	3.2R	1-4"				NO DIVERSION							
Winfield S. Overton (Koetitz)	5.25L	2-14"			189	61	58	50	162	64	584	225	
—GAGING STATION "STANISLAUS RIVER AT BRET HARTE PUMP" - MILE 5.9—													
Reclamation Dist. #2064 (Bret Harte)	5.9R	1-16"		123	759	736	805	860	707	215	4205	950	
McMullin Recl. Dist. #2075	5.9S	2-16"		323	1177	1038	1234	1138	975	730	6615	1500	
Henry Pelucca	6.7L	1-15"			78	83	107	122	83	24	497	67	
J. W. Updike	7.4L	1-8"				NO DIVERSION							
C. C. Updike	8.2L	1-12"							36	4	40	70	
Caswell Bros.	9.8R	1-14"	3	170	446	492	636	523	417	127	2814	305	
Pacific States Savings and Loan Co.	10.0R	1-10"		196	235	226	237	272	184	48	1398	210	
D. F. Koetitz	10.1L	1-10"		60	100	196	225	191	202	117	1091	398	
Joseph Hertle	10.5L	1-10"			26	27	40	16	22		131	60	
—SOUTHERN PACIFIC RAILROAD BRIDGE (MAIN LINE) - MILE 15.9—													
—GAGING STATION "STANISLAUS RIVER NEAR RIPON" - MILE 16.0—													
A. Girardi	17.0L	1-12"			4	3	22	45	64	108	246	150	
American Trust Company	18.5R	1-10"			11	30	52	51	10		154	190	
Dr. Rollin Reeves (Garcia)	20.75R	1-14"		1	278	344	533	280	297		1733	275	
Heath Ranch	20.9L	1-5"				16	34				50	9	
DiGiorgio Fruit Corporation	21.75R	(2)1-10"				258	209	138	111	36	752	35	
Cornelius de Boer	22.0L	1-5"				NO DIVERSION							
Riverside Ranch	22.3R	1-5"				59	12	11	9		91	46	
		1-6"											
		1-10"											
—MODESTO-ESCALON BRIDGE - MILE 28.15—													
—SANTA FE RAILROAD CROSSING - MILE 31.85—													
—GAGING STATION "STANISLAUS RIVER AT RIVERBANK" (BURNEYVILLE BRIDGE) - MILE 32.0—													
Oakdale I.D. (Riverbank Pump) (3)	32.9L	1-10"			74	112	172	86	113	125	682	(3)1700	
Oakdale I.D. (Crawford Pump) (3)	35.9L	1-14"			14	354	52	104	102		626	(3) 536	
Oakdale I.D. (Brady Pump) (3)	37.0L	1-14"			48	200	17	45	18		328	(3) 692	
—SOUTHERN PACIFIC RAILROAD (OAKDALE BRANCH) - MILE 39.0—													
—GAGING STATION "STANISLAUS RIVER AT ORANGE BLOSSOM BRIDGE" - MILE 44.7—													
Totals			3	873	3439	4241	4458	3935	3518	1598	22065	7360	0
Average cubic feet per second			.05	15	56	71	73	64	59	26	45		
Monthly use in per cent of seasonal			—	4.2	15.4	19.5	20.0	17.6	16.2	7.1			

* Mileage along river above mouth.
(1) Formerly J. W. Smith.
(2) Replaces 8" unit.
(3) Oakdale Irrigation District maintains river plants at Miles 32.9L, 35.9L, 37.0L, and 45.4L to supplement District gravity supply.

CHAPTER IV

MEASUREMENTS OF RETURN WATER

Sacramento Return Waters

In the Sacramento Valley the flow of all well defined channels carrying irrigation waters returned to the Sacramento River is measured and recorded. Table 87 lists these channels in downstream order and gives the total flow as computed from the measurements. The report for 1943 gives, for most of the channels, the flow for the entire year.

Between Colusa and Red Bluff there are no large well defined return flow channels. Records or estimates of natural inflow from streams in this stretch of the river were, however, obtained. Above Red Bluff, from a point below Cottonwood to Redding there is considerable return from the Anderson-Cottonwood Irrigation District, but it is not recorded.

Return flow from Other than Sacramento River Sources

In the water returned to the Sacramento River as included in Table 87, it should be noted that practically all of that entering the river through Butte Slough is derived from Feather River diversions through the Western and Sutter Butte canals. Of the discharge entering through Sacramento Slough, that portion flowing down the East Borrow Pit of Sutter By-pass, is also practically all of Feather River origin. (See Table 111.)

Relation of Sacramento Return Water to Irrigation Draft

Tables 88 and 89 record the Sacramento River return water for the period June to December, inclusive, 1943, and indicate the relation between the return and the diversions from which it was derived. Due to high water conditions prevailing in the Spring, it was not practicable to attempt to

determine the return flow for the balance of the year. Since, in Tables 88 and 89 it is the purpose to show the return water from Sacramento River diversions only, the inflow from Butte Slough, that portion of Sacramento Slough derived from Feather River sources (Table 111) and from the Feather and American Rivers has been excluded. In Table 88 is shown the relation to the diversions of that return water only which was measured at the well defined channels. With the records available to the discharge of the Sacramento River at Red Bluff, Butte City, Colusa, Wilkins Slough, Knights Landing, and Verona and all diversions between these points, it is possible to approximate the total water returned to the river between each of those points, including not only the flow in the definite channels which were measured, but all seepage, ground water return, etc., which could not be directly measured. The figures for the return water computed in this manner and the relation of this return shown for the Verona-Sacramento section is only that contributed by the measured drains since, as explained in Chapter II, the total return in this section, including all accretions, is not susceptible of computation in the manner outlined because of the fact that no record of low water flow actually measured at Sacramento is available.

The data in Tables 88 and 89 show that seepage, ground water return, etc., (for the period July-September, inclusive) which could not be directly measured, amounted to 16 per cent of the irrigation draft, the direct return in definite channels 37 per cent, the total return being 53 per cent. The data in Table 89 shows the return flow in the Sacramento River for the period June to September, inclusive, 1943. The return flow for the balance of the year has not been computed as the flows in the stream were large and there was much rainfall and local drainage so that it would

not be practical with the data available to attempt to determine the return flow for the period not shown in the Table.

In Table 90 the return flow and accretion for the entire Sacramento Valley have been determined for the period July to September for the years from 1933 to 1943, inclusive. In the computations for this table only major inflows were taken into account, the inflow of all minor creeks was not included for during the months July to September their flow is negligible.

Draft Return Water Relation for Particular Sacramento Valley Areas

In the Sacramento Valley there are certain units or districts which are set apart physically by levees or otherwise, so that the direct return water in each district may be readily segregated when the records of all diversions to and discharges from the units are available. Included in such units are the areas above the Colusa-Williams highway crossing of the Colusa Trough, Reclamation Districts 70, 108, 1500 and 1000. The relation between draft and return water for the Colusa Trough area is shown in Table 91 and for Reclamation Districts 70, 108, 1500 and 1000 in Tables 92, 93, 94 and 95 respectively. As in the case of the return water computations for the Sacramento River, no attempt has been made to present the data for the entire year, as there probably was much seepage into the districts due to high river stages. Should it be desired to make a detailed study of these return and seepage flows for the entire year the annual pumping from the various districts is given in the return flow tables and the annual precipitation records for rainfall stations in the valley are given in Tables 122 to 133.

Tables 99 to 121, inclusive, present in detail the discharge records for the Sacramento Valley return water channels.

San Joaquin Return Waters

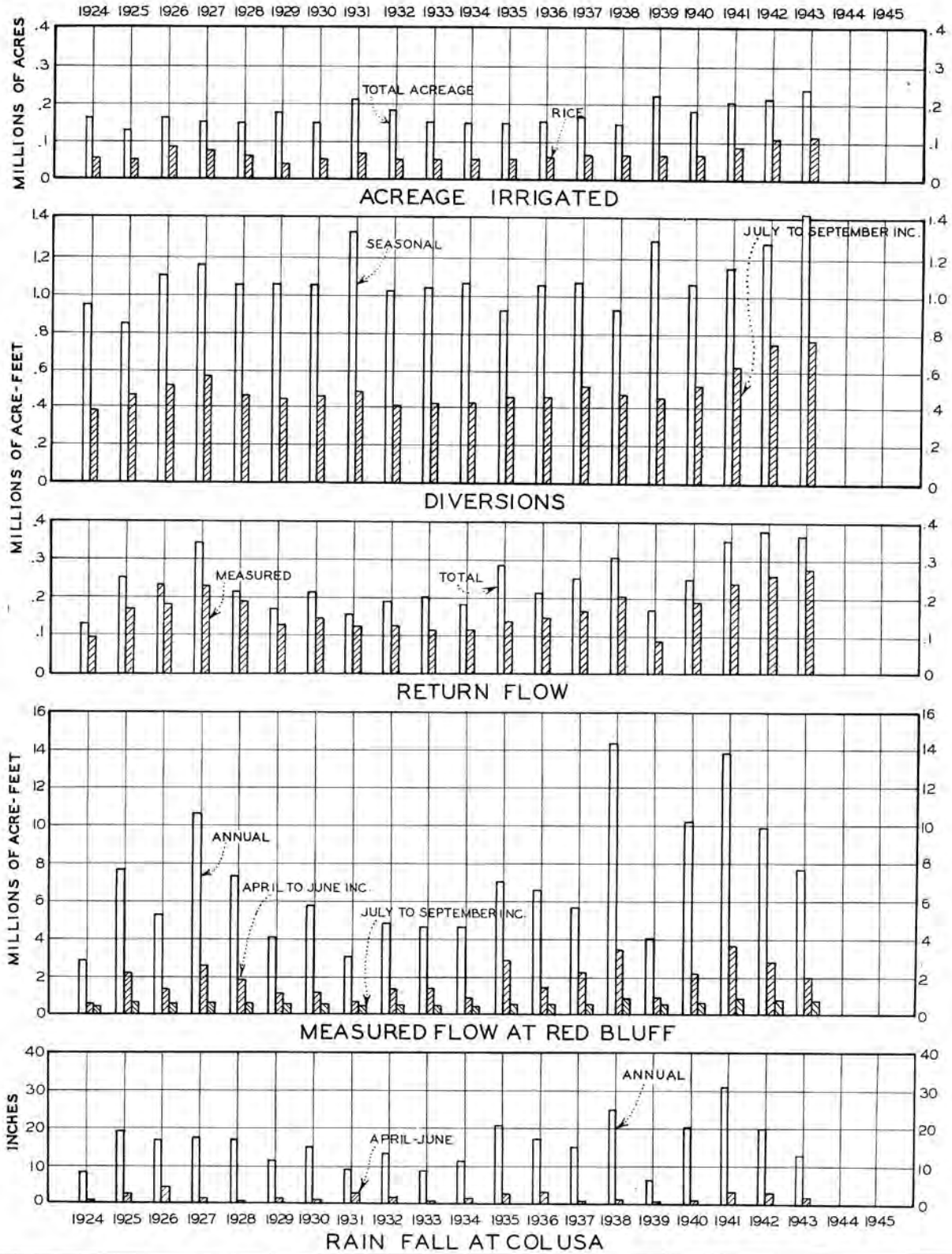
In the 1943 San Joaquin Valley return water measurements, the gaging stations were located at the same points as in previous years beginning with 1928, and the same methods were followed. A continuous record of the discharge during the entire year was obtained at most stations on each stream. An upper and lower station were maintained on each stream, to wit: San Joaquin, Merced, Tuolumne and Stanislaus rivers. On all of the streams continuous records of discharge were also obtained at intermediate stations--four on the San Joaquin River, (1) at Fremont Bridge, (2) just below the junction with the Merced River (maintained by the U. S. Geological Survey and referred to as "San Joaquin River near Newman"), (3) near Grayson (Laird Slough), and (4) at the Hetch Hetchy Water Supply Crossing below the Tuolumne River inflow; two on the Merced River, (1) near Livingston (U. S. Geological Survey station), (2) at Cressey Bridge; three on the Tuolumne River, (1) at Roberts Ferry, (2) at Hickman Bridge, and (3) at Modesto; and two on the Stanislaus River, (1) at Burneyville Bridge and (2) near Ripon. Measurements and records of all pumping diversions between stations on each stream were obtained, thereby completing the necessary data for the computations of the return water. The records for the gaging stations are given in Chapter II, Tables 29 to 50, inclusive, and the diversion records for the San Joaquin streams above Durham Ferry Bridge, are given in Chapter III, Tables 82 to 85, inclusive.

Table 96 tabulates the results of the San Joaquin return water measurements and Table 97 shows a comparison of the return water with the irrigation draft in the San Joaquin Valley.

Comparative Sacramento and San Joaquin Return Water, 1924-1943

Comparative figures, 1924 to 1943, for the Sacramento and San Joaquin seasonal return water in per cent of the irrigation draft are shown in Table 86. In order to show graphically for the Sacramento River the variation from year to year of the measured flow at Red Bluff, the return flow and irrigated acreage Plate 1 was prepared. While no definite conclusions can be reached it appears that there may be some relation between the seasonal flow and the return flow.

In the case of the San Joaquin return water data there appears to be no definite relation between the seasonal flow of the San Joaquin and its tributaries in per cent of normal and the return water percentages. This may be due to the regulation which occurs in Lake McClure Reservoir on the Merced River, Don Pedro Reservoir on the Tuolumne River and Melones Reservoir on the Stanislaus River. It is to be noted that in some years the period used in the comparison of return flow and diversions makes considerable difference in the percentage figures, and further, that for the period August-September only, the percentage is nearly always greater than when the July-September period is used. As there may be considerable lag between diversions and corresponding return flow, the figures in the last column of Table 86 were compiled to show the August-September return flow in per cent of the July-August diversions. These percentages still seem to bear no definite relation to the seasonal runoff percentages, but their variation from year to year is somewhat reduced and a more or less constant percentage of return flow is indicated.



SACRAMENTO-SAN JOAQUIN WATER SUPERVISION

SACRAMENTO RIVER

RED BLUFF TO SACRAMENTO

ACREAGE IRRIGATED, DIVERSIONS, RETURN FLOW, STREAM FLOW AND RAIN FALL

1924-1943

The average percentage of diversions occurring as return water in the San Joaquin River is shown to be considerably smaller than that for the Sacramento River (Table 86). This difference may probably be attributed to the fact that, whereas due to basin topography practically all drainage from Sacramento River diversions is quickly returned to the river; in the San Joaquin Valley considerable of the return water may never reach the river because of its contributing to underground water and being recovered by drainage pumps in low areas of many of the irrigation districts for re-use in their irrigation canals.

TABLE 86

SACRAMENTO AND SAN JOAQUIN RETURN WATER PERCENTAGES 1924-1943

Year	Sacramento River			San Joaquin River and Tributaries					
	Seasonal Run-off at Red Bluff in per cent of normal*	Return Water in per cent of Diversions		Seasonal Run-off in per cent of Normal S.J.River and tributaries**	Return Water in per cent of Diversions				Aug.-Sep. Return in per cent of Jul.-Aug. Diversions
		Jun.-Sep. inc.	Jul.-Sep. inc.		Jun.-Sep. inc.	Jul.-Sep. inc.	Aug.-Sep. inc.	Jul.-Oct. inc.	Aug.-Oct. inc.	
1924	38	33	33	24		35	41			29
1925	92		55(1)	86			38			23
1926	65	49	45	56		28	32			22
1927	125	66	59	104			32			23
1928	87	49	46	70		28	28			23
1929	50	42	39	46		19	21			16
1930	70	55	47	53	20	21	22			17
1931	38	33(2)	32	27	23(3)	27	40			18
1932	58	56	47	106			26		29	21
1933	52	56	48	54		22	20	25	25	17
1934	51	45	41	37	20(4)	21	28	25(5)	33	16
1935	86		62	103		30	24	34	31	19
1936	81	56	47	104		31	25	35	32	20
1937	68		48	105		35	28	38	35	22
1938	168		64	180			41		47	29
1939	50	38	36	46	20	20	23	24	29	17
1940	120	55	48	105		25	25	27	29	19
1941	164	69	56	127	27	32	28	35	33	21
1942	129	74	56	118	22	28	26	31	31	20
1943	97	55	53	117	30	28	28	31	32	23

* 50-year mean (1889-1939) of natural run-off. For comparison of 40 and 50 year means see Tables 1, 3 and 5.

** 50-year mean (1889-1939) of natural run-off at foothill stations of San Joaquin, Merced, Tuolumne and Stanislaus Rivers. For comparison of 40 and 50 year means, see Tables 1, 3 and 5.

(1) July-October, inclusive, 59.
(2) May-September, inclusive, 34.
(3) May-September, inclusive, 19.
(4) May-September, inclusive, 20.
(5) June-October, inclusive, 23; May-October, inclusive, 21.

TABLE 87

WATER DISCHARGED TO THE SACRAMENTO RIVER ABOVE SACRAMENTO AS MEASURED AT DEFINITE RETURN FLOW CHANNELS
1943

Return Flow Channel	Table No.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	June to Sept.	July to Sept.
		Acre-feet													
Butte Slough (1)	99	18420	0	0	0	14330	26520	14070	18440	22890	15220	6100	23430	81920	55400
R. D. 70 Drain	105	3510	3550	4610	2710	3700	3720	1720	2460	3840	536	742	359	11740	8020
R. D. 108 Drain	106	4490	6600	5530	3680	11410	14660	14040	16070	17740	3760	762	865	62510	47850
Colusa Basin Drainage (2)	108	10580	0	0	0	7080	20440	12520	21620	44670	13820	12660	9530	99250	78810
Sycamore Slough	109	Flow negligible during 1943													
Sacramento Slough (3)	110	(4)	(4)	(4)	(4)	(4)	46940	35350	32040	47000	21500	13400	13810	161330	114390
R. D. 1001 Drain (5)	119	7070	3160	4120	1740	1090	744	224	184	315	60	65	24	1470	720
R. D. 1000 Drain #3	120	3550	6000	6080	2500	1840	1610	400	317	2170	690	202	180	4500	2890
R. D. 1000 Drain	121	8170	1170	2470	0	0	0	0	0	0	1270	0	0	0	0
Totals		—	—	—	—	—	114630	78320	91130	138620	56860	33930	48200	422700	308100

(1) This flow except during high water periods is practically all of Feather River origin.
(2) A portion of the water which normally should return to the Sacramento River at this point is diverted to the Knights Landing Ridge Cut. (See Table 116.)
(3) This is the measured flow and includes return flow from Feather River diversions. (See Table 111 for segregation of waters.)
(4) See footnote Table 110.
(5) Discharged to main drain between Reclamation District 1000 and 1001, thence to Sacramento River at Mile 19.6L.

TABLE 88

RELATION BETWEEN RETURN WATER AND DRAFT, SACRAMENTO RIVER, RED BLUFF TO SACRAMENTO (USING ONLY RETURN WATER WHICH ENTERED THROUGH DEFINITE RETURN CHANNELS*) - 1943

Return Flow Channel	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	January to December	June to Sept.	July to Sept.
	Acre-feet														
R. D. 70 Drain	3510	3550	4610	2710	3700	3720	1720	2460	3840	536	742	359	31457	11740	8020
R. D. 108 Drain	4490	6600	5530	3680	11410	14660	14040	16070	17740	3760	762	865	99607	62510	47850
Colusa Basin Drainage**	111200	82700	42100	13800	20000	22700	14600	24600	48600	14000	12660	9530	—	110500	87800
Sacramento Slough***	(1)	(1)	(1)	(1)	(1)	49940	41350	38040	53000	22700	13400	13810	(1)	182330	132390
R. D. 1000 Drains	11720	7170	8550	2500	1840	1610	400	317	2170	1960	202	180	38619	4497	2887
Total Return	—	—	—	—	—	92630	72110	81490	125350	42960	27766	24740	—	371580	278950
Diversions (Red Bluff to Sacramento)	0	0	1770	61410	257700	276800	288900	288000	190500	51920	0	0	1417000	1044200	755300
Return in per cent of of diversions	—	—	—	—	—	33	25	28	66	83	—	—	—	36	37

NOTE: In order to show return water from Sacramento River irrigation only, the discharge to the river of Butte Slough is excluded, as is also the portion of the return through Sacramento Slough derived from Feather River diversions (Table 111) the surplus water diverted to Sutter By-pass from Butte Slough and the discharge from Reclamation District 1001.

* As distinguished from use of all accretions as indicated in Table 89.
** Includes water diverted to Knights Landing Ridge Cut (Table 116) and outflow from Sycamore Slough (Table 109).
*** Includes water diverted through Nelson Slough to Feather River (Table 114).

(1) See footnotes Table 110.

TABLE 89

RELATION BETWEEN RETURN WATER AND DRAFT, SACRAMENTO RIVER, RED BLUFF TO SACRAMENTO (INCLUDING ALL ACCRETIONS)* - 1943

River Section	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov	Dec.	Jan-Dec.
	Acre-feet												
Return Flow													
Red Bluff to Butte City						47700	41500	28300	16300	21000			
Butte City to Colusa						12200	2200	5700	6900	2400			
Colusa to Wilkins Slough						7200	6100	4400	-1100	-2500			
Wilkins Slough to Knights Ldg.						45400	33100	44800	67040	13900			
Knights Landing to Verona			(1)			38800	35200	33400	33900	17300			
Verona to Sacramento						3800	900	1500	4600	4000			
Total Return						155100	119000	118100	127640	56100			
Total Diversion													
Red Bluff to Sacramento						253630	262950	262130	165750	31160			
Return in per cent of draft													
Monthly return in per cent of Seasonal						61	45	45	77	—			

River Section	Return Flow Acre-feet		Red Bluff to Lower End of Section						In River Section			Red Bluff to Lower End of Section		
			Return Flow Acre-feet		Diversions Acre-feet		Return flow in % of Diversion		January to December			January to December		
	June to Sept.	July to Sept.	June to Sept.	July to Sept.	June to Sept.	July to Sept.	June to Sept.	July to Sept.	Return	Diversion	Return in % of Diver.	Return	Diversion	Return in % of Diver.
Red Bluff to Butte City	133800	86100	133800	86100	441075	325710	30	26						
Butte City to Colusa	27000	14800	160800	100900	486670	355140	33	28						
Colusa to Wilkins Slough	16600	9400	177400	110300	724010	528080	25	21						
Wilkins Sl. to Knights Ldg.	190340	144940	367740	255240	827320	603840	44	42			(1)			
Knights Ldg. to Verona	141300	102500	509040	357740	855950	624750	59	57						
Verona to Sacramento**	10800	7000	519840	364740	944460	690830	55	53						
Total	519840	364740												
Diversions (Red Bluff to Sacramento)	944460	690830												
Return in % of diversion	55	53												

NOTE: In the return water here shown, the discharge to the Sacramento River of the Feather and American rivers is excluded as is also the discharge of following return water channels, Butte Slough and that portion of the discharge of Sacramento Slough derived from Feather River waters. Also inflow from Mill, Antelope and Deer Creeks between Red Bluff and Butte City has been excluded. The diversion to the Ridge cut from Colusa Basin drainage has been credited as return flow. See Table 116.

(1) Due to high water in spring of 1943 no attempt was made to determine return flows and percentages for that period. *As the return water in this table between any two stations is computed as the difference in discharge between the upper and lower station, making due allowance for the intervening diversions, the results include both those accretions entering from definite return channels which have been measured and accretions due to seepage, groundwater return, etc., which cannot be directly measured.

** See discussion in text of Chapters II and IV.

TABLE 90

RETURN FLOW AND ACCRETIONS FOR PERIOD JULY-SEPTEMBER 1933 TO 1943
SACRAMENTO VALLEY, RED BLUFF TO SACRAMENTO

(ACRE-FEET)

	1943												
	July	Aug.	Sept.	1943	1942	1941	1940	1939	1938	1937	1936	1935	1934	1933
1 - Inflow (1)														
Sacramento River at Red Bluff	282800	244200	229100	756100	877500	933000	675400	557500	855800	595400	590600	579700	482000	527000
Feather River at Oroville	137500	121500	98200	357200	466800	406800	358800	276600	487900	321200	396100	353400	263600	253500
Yuba River at Smartville	45660	29130	30290	105080	144600	143600	62400	38900	135500	65700	71900	69900	33600	53400
American River at Fairoaks	78250	21540	14740	114530	203470	130400	93300	23100	193500	90500	137400	92000	32600	62800
1 - Total inflow (1)	544210	416370	372330	1332910	1692370	1613800	1189900	896100	1673700	1072900	1196000	1095000	811800	896700
2 - Outflow														
Sacramento River at Sacramento	299000	174800	279700	753500	1155600	1135000	713700	376100	1371200	588400	743700	741600	338400	446100
Yolo By-pass opposite Sacramento	1460	3340	4540	9340	13170	13400	5900	3800	800	3700	8300	2000	3900	1000
2 - Total outflow	300460	178140	284240	762840	1168800	1148400	719600	379900	1372000	592100	752000	743600	342300	447100
3 - Diversions														
Sacramento River	288930	288020	190460	767410	680130	630500	533000	467500	482900	523800	462700	456000	438100	425600
Colusa Trough	9830	10020	7280	27130	18760	19600	21300	16300	3100	14200	15500	2300	3500	0
Back Borrow Pit	17170	16990	7470	41630	25100	14500	11300	16000	9600	13100	9700	10200	13600	9300
Lower Butte Creek and Slough By-pass and Drainage Channels	4750	5510	9760	20020	17410	14400	18100	16500	23300	15000	13600	9600	4400	21000
Feather River	13380	12690	7400	33470	20310	28200	21100	30400	9300	92200	29900	20100	29600	13200
Yuba River	131210	123280	93310	347800	334490	282100	258000	213100	290900	279000	246100	229500	197900	234600
American River	17200	16970	16610	50780	42890	37700	37800	33900	27700	28400	28200	28000	23200	29500
	1510	1230	750	3490	3380	3100	3500	3400	3000	3600	2900	2700	2700	2600
3 - Total Diversions	483980	474710	333040	1291730	1142470	1030100	904100	797100	849800	899300	808600	758400	713000	735800
Return flow & accretion (2+3-1)	240230	236480	244950	721660	618900	564700	433800	280900	548100	418500	364600	407000	243500	286200
Total gain in % of diversions	50	50	74	56	54	55	48	35	64	47	45	54	34	39
Seasonal flow in % of normal(2)				111	133	142	118	43	167	70	92	87	45	46

(1) Only major flows considered. Flows of tributary creeks negligible during late summer months.
(2) Normal at Sacramento taken as 50-year (1889-1929) mean of natural runoff at foothill stations.

TABLE 91

RELATION BETWEEN THE RETURN WATER IN COLUSA TROUGH AT COLUSA-WILLIAMS HIGHWAY
AND
THE PRINCIPAL DIVERSIONS FROM WHICH THE RETURN WATER WAS DERIVED - 1943

(Acre-feet except as noted)

Diversion	Mile and Bank	May	June	July	Aug.	Sep.	Oct.	June to Sept. (inc.)	July to Sept. (inc.)	Acreage Irrigated	
										General	Rice
Sacramento River (Table 71)											
Glenn Colusa Irrigation District	154.8R	73835	82225	84325	81495	61757	24354	309802	227577	49345	37251
Jacinto Irrigation District	154.8R	3868	4106	3689	3699	3193	863	14687	10581	6345	0
Compton Delevan Irrigation District	154.8R	3164	4671	7071	7686	4046	0	23474	18803	0	3098
Provident Irrigation District	154.8R	7981	6994	5440	6214	4774	321	23422	16428	619	7635
Princeton-Codora-Glenn Irrigation Dist.	154.8R	13202	14368	14003	14269	10792	1884	53432	39064	1981	3942
Maxwell Irrigation District	154.8R	1785	1488	1537	2460	1082	0	6567	5079	0	1100
Colusa Trough Plants (Table 72)	—	5039	8143	9830	10018	7283	0	35274	27131	600	2766
Totals		108874	121995	125895	125841	92927	27422	466658	344663	58890	55792
Return Flow											
Colusa Trough at Colusa-Williams Highway		21510	28470	27520	33350	32540	20470	121880	93410		
Colusa Trough diversions		5039	8143	9830	10018	7283	0	35274	27131		
Total return (Acre-feet)		26549	36613	37350	43368	39823	20470	157154	120541		
Total return (Average cubic feet per second)		432	615	607	705	669	333	649	661		
Return in per cent of diversions		24	30	30	34	43	75	34	35		

TABLE 92

RELATION BETWEEN DIVERSIONS FROM AND RETURN TO THE SACRAMENTO RIVER FROM RECLAMATION DISTRICT #70 FOR 1943

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.-Dec. inc.	Mar.-Oct. inc.	Jul.-Sep. inc.	Acreage Irrigated	
	Acre-feet															Gen.	Rice
Diversions (1)	0	0	0	3180	7280	9710	10150	10070	4940	0	0	0	45330	45330	25160	6470	2740
Return water (2)	3510	3550	4610	2710	3700	3720	1720	2460	3840	540	740	360	31460	23300	8020		
Return in % of diversion	—	—	—	—	51	38	17	24	78	—	—	—	—	—	32		
Return in % of annual diversions	—	—	—	—	8.2	8.2	3.8	5.4	8.5	1.2	—	—	—	—	18		
Drainage rediverted (3)	NO COMPUTATION MADE OF REDIVERSIONS																
Rainfall (4)																	

(1) The diversions comprise those from the Sacramento River, left bank, Mile 67.5 to Mile 83.5 (Table 71) and those from Butte Slough Mile 0.3W to 7.5W (Table 74).
(2) The return water is the discharge to the Sacramento River through the drainage plant of Reclamation District 70 at Mile 68.8L (Table 105). This is a combined drainage and irrigation plant which also discharges into an irrigation canal at the plant.
(3) This is the water re-used within the district. It has not been taken into account in the percentage computations.
(4) Rainfall not taken into account in percentage figures. See Tables 122 to 133 for daily rainfall records.

TABLE 93

RELATION BETWEEN DIVERSIONS FROM AND RETURN TO THE SACRAMENTO RIVER FROM RECLAMATION DISTRICT #108 FOR 1943

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.-Dec. inc.	Mar.-Oct. inc.	July-Sep. inc.	Acreage Irrigated	
	Acre-feet															Gen.	Rice
Diversions (1)	0	0	0	13500	36240	27620	32430	34410	15480	90	0	0	159770	159770	82320	680	18100
Return water (2)	4490	6600	5530	3680	11410	16010	14960	16930	17740	3760	760	860	102730	90020	49630		
Return in % of diversion	—	—	—	—	31	58	46	49	—	—	—	—	—	—	60		
Return in % of annual diversions	—	—	—	—	7.1	10.0	9.4	10.6	11.1	2.4	0.5	—	—	—	31		
Drainage rediverted (3)																	
Rainfall (4)																	

NOTE: Flood stages prevailed in spring and winter.
(1) The diversions comprise those from the Sacramento River, right bank, from Mile 43.1 to Mile 63.2 (Table 71).
(2) The return water is the discharge to Sacramento River of Reclamation District 108 drain at Rough and Ready Bend (Table 106) and on Back Borrow Pit (Table 107).
(3) No report of any rediversion of drainage water.
(4) Rainfall not taken into account in percentage figures. See Tables 122 to 133 for daily rainfall records.

TABLE 94

RELATION BETWEEN DIVERSIONS FROM AND RETURN TO THE SACRAMENTO RIVER FROM RECLAMATION DISTRICT #1500 FOR 1943

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.-Dec. inc.	Mar.-Oct. inc.	July-Sep. inc.	Acreage Irrigated	
	Acre-feet															Gen.	Rice
Diversions (1)	0:	0:	0:	16420:	59720:	60200:	60060:	59690:	38310:	320:	0:	0:	294720:	294720:	158060:	20450:	22750:
Return water (2)	13640:	11980:	14010:	11050:	29120:	33820:	30780:	32850:	36070:	6990:	970:	500:	221780:	194690:	99700:		
Return in % of diversion	—:	—:	—:	—:	49:	56:	51:	55:	94:	—:	—:	—:	—:	—:	63:		
Return in % of annual diversion	—:	—:	—:	—:	9.9:	11.5:	10.4:	11.1:	12.2:	2.4:	0.3:	0.2:	—:	—:	34:		
Drainage rediverted (3)	0:	0:	0:	0:	0:	0:	0:	0:	0:	0:	0:	0:	0:	0:			
Rainfall (4)																	

(1) The diversions comprise those from the Sacramento River, left bank, from Mile 29.9 to Mile 63.75 (Table 71). The principal ones are the Sutter Mutual Water Company's plant at Tisdale, State Ranch Bend and Portuguese Bend. Diversions through Tisdale plant to R. D. 1660 have been excluded.
(2) The return water is the discharge through the drainage plant of Reclamation District #1500 on the West Borrow Pit of the Sutter Bypass (Table 112). This water reaches Sacramento River via Sacramento Slough (Table 109).
(3) This is the water pumped from drains and re-used within district. It has not been taken into account in the percentage computations.
(4) Rainfall not taken into account in percentage figures. See Tables 122 to 133 for daily rainfall records.

TABLE 95

RELATION BETWEEN DIVERSIONS FROM AND RETURN TO THE SACRAMENTO RIVER FROM RECLAMATION DISTRICT #1000 FOR 1943

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.-Dec. Inc.	Mar.-Oct. Inc.	July-Sep. Inc.	Acreage Irrigated	
	Acre-feet															Gen.	Rice
Diversions (1)	0:	0:	0:	5190:	7920:	11600:	12370:	12740:	7090:	280:	0:	0:	57190:	57190:	32200:	5750:	4600:
Return Water (2)	11720:	7170:	8550:	2500:	1840:	1610:	400:	317:	2170:	1960:	202:	180:	38619:	19350:	2887:		
Return in % of diversion	—:	—:	—:	—:	23:	14:	3:	3:	31:	—:	—:	—:	—:	—:	9:		
Return in % of annual diversion	—:	—:	—:	—:	3.2:	2.8:	0.7:	0.6:	3.8:	3.4:	0.4:	0.3:	—:	—:	5:		
Drainage rediverted (3)														7060:			
Rainfall (4)																	

(1) The diversions comprise those from the Sacramento River, left bank, Mile 2.4 to Mile 19.6 (Table 71).
(2) The return water is the discharge through the drainage plant of Reclamation District #1000, Plant #3 (Table 120) and 2nd Bannon Slough (Table 121).
(3) This is the water pumped from the drains within the district and at Central Mutual Water Company plant (Mile 16.0L).
(4) Rainfall is not taken into account in percentage figures. See Tables 122 to 133 for daily rainfall records.

TABLE 96

RETURN FLOW IN SAN JOAQUIN VALLEY STREAMS - 1943

(Acre-feet)

River Section	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
SAN JOAQUIN RIVER												
Fremont Ford Bridge to Vernalis												
Fremont Ford Bridge to Newman	8790	92600	171230	99530	57040	62650	290	870	100	1560	210	11140
Newman to Grayson	3700	26880	17390	22540	27570	42020	38610	23360	20440	17480	12980	6780
Grayson to Hetch Hetchy Crossing	-15500	-33140	-70900	-31840	-14670	1080	9810	11680	8540	8400	6800	4520
Hetch Hetchy Crossing to Vernalis	-30980	22250	20610	37430	10940	13670	2550	2840	2690	2330	-2140	-5590
Total return flow*	-33990	108590	138330	127660	80880	119420	51260	38750	31770	29770	17850	16850
Total diversions	0	0	0	4420	20850	20120	29910	25050	16600	4790	0	0
STANISLAUS RIVER												
Orange Blossom Bridge to Hatmark Ranch												
Orange Blossom Bridge to Riverbank	-2600	1100	-6500	-12500	-4360	4570	3610	3730	3560	3490	920	-960
Riverbank to Ripon Bridge	-15100	4200	-2600	9700	17890	19970	11810	10130	9590	11700	8710	10240
Ripon Bridge to Bret Harte Pump	17180	3350	-10	130	27860	11720	8620	4180	3050	2330	-310	-1200
Total return flow**	-520	8650	-9110	-2670	41390	36260	24040	18040	16200	17520	9320	8080
Total diversions	0	0	0	870	3250	4170	4390	3890	3350	1540	0	0
TUOLUMNE RIVER												
La Grange Bridge to Tuolumne City												
La Grange Bridge to Roberts Ferry Bridge	1800	10000	23700	13700	26500	13300	1070	3030	610	3670	3150	5270
Roberts Ferry Bridge to Hickman Bridge	5730	-500	14400	-4800	-14590	1110	5810	4940	230	350	4230	-240
Hickman Bridge to Modesto	16820	13300	14500	27920	17840	35270	15120	14710	11680	15680	6260	11340
Modesto to Tuolumne City	10650	-12640	-12790	-3040	-6020	6300	7210	7980	10710	6750	3100	1390
Total return flow**	34910	10160	39810	33780	23730	55980	29210	30660	23230	26450	16740	17760
Total diversions	0	0	0	40	-240	400	470	420	290	140	0	0
MERCED RIVER												
Yosemite Valley Railroad to Mouth												
Yosemite Valley Railroad to Livingston	-10640	1100	14100	13290	20100	21750	11760	10150	10680	11010	7700	8060
Livingston to mouth	-1570	18500	73870	41980	22750	15190	7610	5640	5580	3740	2840	1690
Total return flow**	-12210	19600	87970	55270	42850	36940	19370	15790	16260	14750	10540	9750
Total diversions	0	0	0	200	1790	2250	3080	2250	1680	480	0	0

* The return flow figure is obtained by making due allowance for diversions and deducting all measured inflow from tributaries, but it is apparent that there is a large unmeasurable accretion from lands irrigated from the tributaries. Inflow of Dry Creek treated as Tuolumne River return water. During periods of high flow a large portion of the water passing Fremont Ford bridge is in the Mud Slough channels and spreads over a large area.

**The excessive return flow in relation to diversions here shown is due to large irrigation district diversions which are made above upper station shown for each stream. This return flow enters the channels below the initial gaging stations on each.

TABLE 97

COMPARISON OF DIVERSIONS AND RETURN FLOW - SAN JOAQUIN VALLEY - 1943
(Quantities in acre-feet except as noted)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan-Dec
San Joaquin River below Friant (1)	166400	142900	279000	302500	381900	276800	152700	97450	69410	59100	48970	43050	2020180
DIVERSIONS													
Miller & Lux	12650	14240	26130	89920	177260	152310	130690	93510	68350	56810	50260	39850	911980
Merced Irrigation District	620	670	670	33080	85230	85300	87070	77750	59410	30930	720	750	462200
Turlock Irrigation Dist. Canal (1)	1370	1420	6290	51740	104400	108100	77000	76700	65710	35950	20320	6790	555790
Modesto Irrigation Dist. Canal (1)	8790	910	500	33900	64890	74010	52100	45230	42640	34340	250	250	357870
So. San Joaquin & Oakdale I.D.Canal (1)	4140	15950	0	23950	57240	57230	54500	48310	29670	9260	1480	770	302500
Oakdale Irrigation Dist. Canal (1)	0	0	0	10120	22970	22650	22610	20700	13150	5430	0	0	117630
Pumping Diversions-Tables 82,83,84,85	0	0	0	5600	26430	27150	37990	31760	22150	7040	0	0	158120
Total diversions - acre-feet	27570	33190	33590	248310	538420	526750	462020	393960	301080	179760	73030	48410	2866090
Total diversions - average c.f.s.	448	598	546	4173	8756	8852	7514	6407	5060	2923	1227	787	3959
Monthly diversion in % of annual	1.0	1.1	1.2	8.7	18.8	18.4	16.1	13.7	10.5	6.3	2.5	1.7	
RETURN FLOW (3)													
San Joaquin River near Vernalis (1)	347200	725800	1422000	1075000	920600	693400	135800	94810	100500	129600	116200	146800	5907710
Pumping Diversions-Tables 82,83,84,85	0	0	0	5600	26430	27150	37990	31760	22150	7040	0	0	158120
Undiverted Flow (2)													
at Fremont Ford Br.(San Joaquin R.)	129080	282000	523500	351300	270790	227400	33310	11180	10740	12000	7820	23900	1883020
at La Grange (Tuolumne River)	60300	169000	339000	197000	227000	158000	9580	7180	70400	31000	44900	66900	1324260
at Yosemite Val.R.R.Crossing (MercedR.)	64220	116000	262100	184800	147700	67160	2930	1880	1370	1660	1120	350	851290
at Orange Blossom Br. (Stanislaus R.)	131500	116900	322300	268100	190200	85040	2810	1600	1440	1580	7830	16620	1145920
Power release and spill (2)													
Net return - acre-feet (3)	-37900	41900	-24900	79400	111340	182950	125160	104730	88700	90400	54530	45030	861340
Net return - average c.f.s. (3)	-616	754	-405	1334	1811	3075	2036	1703	1491	1470	916	732	1190
Return in % of diversions	—	—	—	32	21	35	27	27	29	50	75	—	
Monthly return in % of annual	—	4.5	—	8.6	12.0	19.8	13.6	11.3	9.6	9.8	5.9	4.9	

NOTE: Only the major diversions from the San Joaquin River between Friant and Fremont Ford Bridge are included in figures. It is possible that some of the late summer flow at Fremont Ford Bridge considered in this table as being "Undiverted flow" is actually return water. For the periodic relation between diversion and return flow see Table 86.

(1) U.S.G.S. station.

(2) It is assumed that the stations which are above the valley diversions and below the foothill diversions represent all undiverted flow and include all spill or power release.

(3) Includes any valley floor run-off and all accretions.

TABLE 98

DISCHARGE OF COLUSA TROUGH AT COLUSA-WILLIAMS HIGHWAY - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	486	2260	373	191	608	477	476	470	542	641	308	165
2	441	2080	333	188	487	483	461	445	534	597	295	164
3	392	1650	299	183	396	539	468	439	539	541	279	161
4	354	1080	308	177	355	627	467	441	546	509	266	159
5	328	761	341	176	362	528	468	433	571	509	246	157
6	293	622	322	181	381	477	472	431	625	476	245	156
7	269	542	294	176	410	463	433	445	636	482	238	154
8	245	490	291	171	407	459	441	473	647	450	214	163
9	233	478	341	172	353	426	418	516	654	398	208	164
10	227	416	454	169	325	452	392	512	613	341	202	169
11	223	378	788	212	332	444	402	498	604	294	216	181
12	212	355	809	213	333	474	434	507	592	252	230	178
13	205	339	583	203	305	508	461	520	564	242	210	189
14	206	328	440	280	324	470	485	546	560	273	203	207
15	191	301	378	328	335	469	482	551	525	240	199	207
16	184	290	330	294	322	455	454	546	502	218	190	239
17	180	282	302	268	358	480	500	554	496	210	182	256
18	173	270	333	265	375	477	396	560	491	186	185	262
19	166	260	331	217	365	473	408	565	487	174	185	324
20	205	249	295	241	339	470	434	573	511	172	181	414
21	725	246	278	263	333	467	430	590	513	175	178	482
22	2000	337	271	263	358	464	438	605	502	184	168	509
23	2880	437	263	234	318	461	456	620	476	296	169	444
24	4080	416	261	225	245	458	457	629	480	265	169	421
25	4550	370	244	254	392	455	447	653	483	244	180	376
26	4310	353	233	282	249	480	437	634	486	256	175	336
27	3730	467	221	321	235	480	435	625	484	287	177	278
28	3110	456	212	473	243	486	439	633	525	347	171	253
29	2680		208	633	249	482	451	623	585	354	176	244
30	2560		206	620	321	481	464	601	633	358	165	251
31	2440		201		428		470	577		348		262
Mean	1235	590	340	262	350	478	448	542	547	333	207	256
Ac. Ft. for Month	75920	32750	20910	15620	21510	28470	27520	33350	32540	20470	12320	15720

NOTE: This is return water flowing in the main drain of Reclamation District 2047; it is drainage chiefly from lands irrigated by Glenn-Colusa, Provident, Princeton-Codora-Glenn, Compton-Delevan and Maxwell Irrigation Districts. Flow reaches Sacramento River via Back Borrow Pit (Table 108).

TABLE 99

DISCHARGE OF BUTTE SLOUGH TO SACRAMENTO RIVER - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	0				0	229	387	329	309	385	158	83
2	0				0	351	325	331	334	385	164	84
3	0				0	210	320	304	326	273	168	83
4	0				0	443	307	292	403	150	142	84
5	0				0	477	324	292	684	150	123	84
6	280				0	594	275	277	631	150	123	85
7	546				0	601	306	271	701	273	123	80
8	280				151	560	281	278	649	275	120	82
9	280				150	610	288	273	545	278	122	784
10	0				151	505	263	281	353	82	123	1029
11	385				450	512	299	294	381	122	122	—
12	546				360	484	284	333	375	238	118	385
13	735	FLOW	FLOW	FLOW	450	469	284	296	348	232	116	497
14	679				360	349	242	259	343	256	114	385
15	679				450	488	239	290	323	238	114	581
16	378				450	439	245	308	334	236	116	154
17	679	NO	NO	NO	671	409	271	308	301	236	98	199
18	616				807	419	285	300	307	238	81	194
19	546				351	430	214	291	318	244	78	190
20	616				233	324	126	297	333	247	76	207
21	546				214	357	128	295	333	238	72	236
22	0				196	457	103	292	333	232	60	170
23	0				202	456	134	293	398	236	61	829
24	0				190	398	145	304	372	229	40	618
25	665				157	445	153	327	317	236	70	735
26	833				151	461	161	332	529	241	74	791
27	0				167	471	112	355	293	252	76	686
28	0				156	510	141	334	266	315	68	553
29	0				259	480	142	311	236	330	78	623
30	0				248	431	137	285	165	319	78	623
31	0				251		173	263		358		679
Mean	300	0	0	0	233	446	229	300	385	248	103	381
Ac. Ft. for Month	18420	0	0	0	14330	26520	14070	18440	22890	15220	6100	23430

NOTE: This is the discharge to the Sacramento River at mile 84 left and is measured at and regulated by the gravity culverts at the mouth of the Slough. This flow together with that shown in Tables 100 and 103 is, during the summer months, made up almost entirely of return water from lands irrigated by Feather River diversions. Discharge from the Sacramento River to Butte Basin over Moulton and Colusa weirs is shown in Tables 101 and 102, respectively.

TABLE 100

DISCHARGE OF BUTTE SLOUGH TO SUTTER BY-PASS - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3200	44200	3450	1220	844	99	81	89	90	23	28	64
2	3100	35900	2820	1170	900	111	83	87	89	23	28	68
3	2810	24200	2360	1130	944	150	81	87	84	17	28	73
4	2450	15600	2050	1110	980	137	87	89	80	15	31	73
5	2080	11000	1770	1070	980	104	80	90	91	12	42	73
6	1640	7950	1560	1020	978	93	79	91	98	9	43	75
7	1060	5880	1450	1010	932	91	78	95	87	9	43	84
8	718	4760	1350	1000	806	49	83	95	79	9	43	87
9	490	3910	1400	1010	661	98	79	91	83	9	42	54
10	363	3410	5430	1020	500	102	85	95	80	13	42	43
11	274	2990	16600	1010	400	92	78	95	71	33	37	46
12	171	2660	24600	1010	281	95	74	92	52	31	33	49
13	116	2400	22300	992	218	96	83	88	47	31	32	49
14	93	2160	17900	968	172	98	74	97	43	31	31	50
15	84	1920	14800	940	130	92	75	101	39	31	31	51
16	76	1750	13800	908	105	88	85	98	37	31	31	70
17	68	1570	12500	884	92	97	84	96	38	31	32	49
18	60	1430	10500	856	86	88	85	97	37	31	40	40
19	52	1310	8200	806	80	88	79	102	38	31	43	42
20	52	1220	6300	766	85	93	81	98	35	31	46	60
21	118	1120	4750	739	88	98	76	97	29	31	49	108
22	1120	1070	3880	721	81	88	82	97	38	31	52	122
23	19200	1030	3120	682	75	88	84	97	35	31	60	138
24	66000	1510	2640	664	78	88	84	96	29	31	59	28
25	81400	4930	2300	658	82	79	90	97	26	31	52	28
26	71900	6040	1990	649	83	86	82	103	25	33	52	30
27	58400	5440	1760	649	87	82	88	102	25	37	59	28
28	51000	4300	1590	700	87	84	88	92	25	41	62	31
29	39900		1440	739	94	80	91	93	25	40	63	31
30	33800		1340	784	90	82	91	92	25	38	64	36
31	39800		1270		83		89	90		31		40
Mean	15535	7202	6362	896	358	94	83	94	53	27	43	59
Ac. Ft. for Month	955200	400000	391200	53300	22000	5590	5080	5810	3130	1640	2570	3610

NOTE: This is the discharge from Butte Slough to the Sutter By-pass. During low flow periods gates at mouth of slough are regulated (Table 99) which forces water under Long Bridge as shown in this table. Normal and summer flows are primarily from Feather River sources. During flood periods Sacramento River water enters Butte Basin above Butte City by bank spill and over Moulton and Colusa weirs. The purpose of the summer regulation is to make water available for use on Sutter By-pass lands (below Long Bridge).

TABLE 101

DISCHARGE OF MOULTON WEIR TO BUTTE BASIN - 1943

	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	0	1120	0									
2		0										
3												
4												
5												
6												
7												
8												
9	FLOW		0									
10			230									
11			1925									
12			480									
13	NO		0		NO FLOW MARCH 13 TO DECEMBER 31							
14												
15												
16												
17												
18												
19		FLOW										
20												
21	0											
22	2850	NO										
23	15500											
24	18000											
25	11100											
26	2450											
27	2180											
28	900											
29	0											
30	1270											
31	6100											
Mean	1947	40	66	0	0	0	0	0	0	0	0	0
Ac. Ft. for Month	119700	2220	5230	0	0	0	0	0	0	0	0	0

NOTE: Elevation of crest is 76.75 U.S.E.D. datum; length of crest is 500 feet.

TABLE 102

DISCHARGE OF COLUSA WEIR TO BUTTE BASIN - 1943

	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	0	45000										
2		12000										
3		1600										
4		200										
5		0										
6												
7			0									
8			200									
9	FLOW	200	6000									
10		100	34000									
11		0	50000									
12			31000									
13	NO		12000									
14			4000									
15			6000									
16			10000									
17			3000			NO FLOW MARCH 20 TO DECEMBER 31						
18			1000									
19			300									
20			100									
21	0		0									
22	27000	0										
23	78000	400										
24	84000	10000										
25	78000	4000										
26	52000	1600										
27	48000	300										
28	43000	0										
29	19000											
30	34000											
31	63000		0									
Mean	16970	2686	5086	0	0	0	0	0	0	0	0	0
Ac. Ft. for Month	1043000	149500	10100	0	0	0	0	0	0	0	0	0

NOTE: Elevation of crest is 61.80 U.S.E.D. datum; length of crest 1650 feet.

TABLE 103

DISCHARGE OF WADSWORTH CANAL TO SUTTER BY-PASS - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	89	414	54	47	89	143	113	111	127	114	60	30
2	80	304	52	48	82	144	113	113	125	520	40	30
3	72	226	52	47	79	141	115	109	125	480	59	30
4	65	210	53	44	69	152	117	108	114	420	60	30
5	62	188	52	43	75	138	120	107	118	368	44	30
6	60	158	53	42	87	137	121	107	118	370	44	30
7	58	139	111	38	76	142	119	117	117	158	39	30
8	56	125	54	40	68	144	114	117	113	125	39	30
9	55	110	63	39	61	142	114	119	117	119	40	30
10	54	101	355	39	57	145	114	118	125	119	39	30
11	53	91	311	38	55	149	114	118	127	111	38	30
12	53	88	166	38	28	152	110	119	129	40	37	30
13	51	82	135	38	0	157	109	118	140	100	37	30
14	54	79	129	38	42	158	109	115	173	145	36	30
15	50	74	97	38	43	158	107	120	150	111	35	30
16	49	71	84	38	42	154	109	117	155	103	35	30
17	49	66	88	37	50	154	114	110	157	103	35	30
18	49	63	91	41	130	150	117	109	149	111	35	29
19	49	62	74	53	166	151	118	109	174	110	34	30
20	53	62	68	54	109	145	118	110	152	112	34	29
21	280	60	65	35	107	137	114	107	156	120	34	29
22	582	60	65	28	112	148	114	111	170	115	33	28
23	678	58	65	52	122	154	115	111	118	112	31	28
24	670	57	59	59	124	160	113	113	85	112	31	27
25	375	56	58	59	127	160	115	114	92	113	31	28
26	300	56	55	97	126	160	115	119	91	108	30	29
27	180	54	53	72	131	120	115	126	89	80	30	29
28	94	54	52	74	138	116	115	125	95	95	30	30
29	335		51	69	139	109	115	130	93	76	30	30
30	658		50	104	141	110	115	129	83	89	30	30
31	584		48		—		113	128		76		30
Mean	190	113	89	50	86	144	114	116	126	159	38	30
Ac. Ft. for Month	11700	6280	5480	2950	5310	8590	7030	7110	7490	9790	2240	1820

NOTE: This is the discharge (measured at Weir #4) to the East Borrow Pit of the Sutter By-Pass at mile 16.0 (north from Chandler). This flow is made up entirely of Feather River drainage or return flows. This flow and the flow from Butte Slough (Table 100) make up the entire Feather River contribution to the Sutter By-Pass. See footnote Table 100.

TABLE 104

DISCHARGE OF TISDALE WEIR TO SUTTER BY-PASS - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	0	17600	5000	5600	2200							
2		15600	2600	4200	600							
3		9800	1500	2600	0							
4		8000	650	1800								
5		6100	300	1800								
6		6100	100	1300								
7		4200	1800	4200								
8	FLOW	3800	5600	3800								
9		7300	8600	3800								
10		7300	15600	4200								
11		5000	17600	2200								
12	NO	2600	16800	1000								
13		1300	12500	300		NO FLOW MAY 3 TO DECEMBER 31						
14		250	11000	0								
15		0	11000									
16			12500									
17			11000									
18			8600									
19			8000									
20			7300									
21	0		5600									
22	6000	0	3800									
23	18800	1300	2600									
24	20400	8600	1500									
25	21000	9800	650									
26	19600	8600	130									
27	17600	8000	0									
28	17600	6700	600	0								
29	15600		1500	650								
30	15600		1500	3100								
31	18300		4200		0							
Mean	5500	4927	5811	1352	90	0	0	0	0	0	0	0
Ac. Ft. for Month	338100	273600	357200	80400	5360	0	0	0	0	0	0	0

NOTE: Elevation of crest is 45.45 U.S.E.D. datum; length of crest is 1155 feet.

TABLE 105

DISCHARGE OF RECLAMATION DISTRICT 70 DRAIN - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	60	105	47	0	128	37	33	28	114	14	14	6
2	60	105	53	52	104	62	33	32	114	10	14	8
3	60	105	48	0	52	155	31	36	114	10	12	8
4	60	102	53	31	48	170	28	30	114	14	12	7
5	61	83	42	57	56	143	27	32	114	14	12	7
6	58	87	48	0	82	143	31	34	114	10	12	7
7	50	73	53	26	104	153	31	37	114	10	12	5
8	39	56	47	0	52	143	28	33	114	10	12	7
9	35	79	72	53	52	63	24	33	114	10	12	6
10	38	74	47	50	52	58	24	36	114	12	12	6
11	20	30	53	48	52	59	17	38	114	10	12	6
12	26	54	100	0	74	33	18	38	114	10	10	6
13	23	56	101	13	74	35	18	39	114	7	7	6
14	28	47	88	0	78	29	18	39	96	15	10	6
15	23	49	73	22	83	61	19	56	61	0	12	7
16	25	56	71	0	78	33	19	32	32	0	12	7
17	24	56	85	22	104	33	22	33	29	0	14	7
18	21	56	119	0	74	32	27	52	26	0	17	7
19	19	44	185	22	104	33	29	49	26	0	22	5
20	18	42	126	22	48	35	33	41	19	0	15	6
21	40	57	85	22	54	34	37	34	18	12	18	6
22	80	47	50	48	31	36	27	33	23	10	0	4
23	117	57	102	52	30	38	25	54	23	10	24	7
24	100	57	50	74	28	35	31	52	14	12	18	6
25	100	57	102	105	30	37	30	55	14	12	0	3
26	101	57	50	105	25	41	33	54	17	12	18	0
27	101	52	97	79	27	40	27	52	14	12	14	5
28	96	47	50	105	32	40	42	44	14	10	18	5
29	87		85	176	35	36	35	114	14	7	9	5
30	101		90	183	37	29	33	0	14	7	0	5
31	101		50		38		35	0		10		5
Mean	57	64	75	46	60	63	28	40	65	9	12	6
Ac. Ft. for Month	3510	3550	4610	2710	3700	3720	1720	2460	3840	536	742	359

NOTE: This is the drainage from Reclamation District 70 returned to the Sacramento River at mile 68.8 left. Discharge to Sacramento River both by pumping and controlled gravity flow. This is a combination irrigation and drainage plant and discharges both to the Sacramento River and to an irrigation canal.

TABLE 106

DISCHARGE OF RECLAMATION DISTRICT 108 DRAIN AT ROUGH AND READY BEND - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	194	0	0	0	162	252	182	230	290	227	0	0
2	142	0	94	0	150	264	181	227	292	199		
3	143	109	94	0	139	266	181	227	297	282		
4	136	0	97	186	136	267	187	224	305	142		0
5	97	0	0	122	129	292	187	222	305	132		170
6	142	0	0	0	127	680	199	235	309	133	0	0
7	88	124	124	0	127	240	219	230	308	109	203	
8	109	0	94	0	129	256	222	227	299	99	0	
9	73	0	136	0	134	253	240	230	309	84		
10	88	129	176	155	129	257	246	231	298	83		
11	74	0	177	106	128	210	295	233	301	71		
12	71		172	0	0	262	287	254	454	57		
13	74		149	0	137	227	290	245	291	0		
14	71	0	182	0	106	233	288	239	343	68		
15	68	137	90	157	107	211	269	244	283	0		
16	0	0	90	0	111	249	204	247	336	0		
17	0	105	91	0	158	230	228	249	329	89		
18	0	0	120	158	204	232	192	255	302	0		0
19	120	0	92	0	208	218	232	261	502			130
20	0	92	118	0	208	199	193	265	222		0	0
21	119	179	93	146	228	225	246	261	262		181	
22	0	247	91	0	264	201	197	259	248		0	
23	119	543	91	0	294	200	248	288	191	0		
24	0	565	78	0	218	232	241	299	264	123		
25	58	323	77	218	234	215	226	296	251	0		0
26	102	282	74	0	248	223	228	298	355			136
27	92	298	0	181	257	223	233	312	215			0
28	82	192	92	142	206	206	227	307	246			
29	0		0	141	281	186	233	443	243			
30	0		94	141	357	180	239	284	294		0	
31	0		0		439		241	280		0		0
Mean	73	119	90	62	186	246	228	261	298	61	13	14
Ac. Ft. for Month	4490	6600	5530	3680	11410	14660	14040	16070	17740	3760	762	865

NOTE: This is the drainage from Reclamation District 108 discharged to the Sacramento River at mile 44.0 right. Discharge through siphon and by pumping. Additional drainage from Reclamation District 108 is sometimes discharged to Back Borrow Pit at mile 20.2 left. See Table 107.

TABLE 107

DISCHARGE OF RECLAMATION DISTRICT 108 DRAIN ON BACK BORROW PIT - 1943

Day	Daily Discharge in Second-feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1							15	15				
2							15	15				
3						0	15	15				
4						50	15	15				
5						50	15	15				
6						50	15	15				
7						40	15	15				
8						40	15	15				
9						40	15	15				
10						40	15	15				
11						30	15	15				
12	FLOW	FLOW	FLOW	FLOW	FLOW	30	15	15	FLOW	FLOW	FLOW	FLOW
13						30	15	15				
14						20	15	15				
15						20	15	15				
16						20	15	15				
17	NO	NO	NO	NO	NO	16	15	15	NO	NO	NO	NO
18						16	15	15				
19						16	15	15				
20						16	15	15				
21						16	15	15				
22						16	15	15				
23						16	15	15				
24						16	15	15				
25						16	15	15				
26						15	15	15				
27						15	15	15				
28						15	15	15				
29						15	15	10				
30						15	15	5				
31						T	15	0				
Mean	0	0	0	0	0	23	15	14	0	0	0	0
Ac. Ft. for Month	0	0	0	0	0	1350	922	863	0	0	0	0

NOTE: This drain at Mile 20.2 L supplements the main drainage plant of R. D. 108 on the Sacramento River at Rough and Ready Bend (See Table 106).

TABLE 108

DISCHARGE OF COLUSA BASIN DRAINAGE TO SACRAMENTO RIVER AT KNIGHTS LANDING - 1943

Day	Daily Discharge in Second-feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1						25	290	220	510	510	376	174
2						25	290	260	510	420	336	150
3						25	290	220	460	380	298	150
4						725	320	220	460	290	298	150
5						845	320	220	460	260	262	174
6						150	350	220	510	200	200	150
7						150	350	220	510	200	200	150
8	0					150	270	260	570	200	200	150
9	0					350	270	140	660	220	174	150
10	296					370	260	140	700	150	174	150
11	728				308	400	230	140	760	110	174	150
12	665				280	400	150	140	830	90	170	174
13	592	FLOW	FLOW	FLOW	480	440	150	140	890	0	230	174
14	530				443	480	150	330	950	0	230	174
15	500				572	520	0	330	1000	0	230	200
16	340				362	570	0	370	1400	376	230	88
17	470	NO	NO	NO	820	480	0	370	1320	230	230	74
18	447				0	440	0	410	890	200	230	88
19	416				10	370	80	410	830	174	200	88
20	148				20	350	150	410	760	174	200	125
21	204				25	350	200	410	760	150	200	230
22	0				25	320	200	420	760	150	174	298
23	0				25	320	200	420	760	174	174	262
24					25	290	220	510	760	230	174	230
25					25	290	220	570	760	262	174	200
26					25	290	220	570	760	230	174	174
27					25	290	220	510	760	239	150	125
28					25	290	220	570	760	262	174	125
29					25	290	220	620	760	339	174	104
30					25	290	220	620	700	376	174	88
31					25		250	510		376		88
Mean	86	0	0	0	58	173	103	177	378	113	107	78
Ac. Ft. for Month	10580	0	0	0	7080	20400	12520	21620	44670	13820	12660	9530

NOTE: This is the drainage from Colusa Basin passing down the Back Borrow Pit of Reclamation Districts 108 and 787 and entering the Sacramento River at Mile 34.15R, just above the Knights Landing gaging station. It does not include any drainage from Reclamation District 787 entering the Back Borrow Pit via Sycamore Slough outlet (See Table 109 for Sycamore Slough contribution). Irregularities in the flow are due to checking operations at the Knights Landing outfall gates whereby a portion of the flow of the Back Borrow Pit is diverted to the Knights Landing Ridge Cut. This diversion is shown in Table 115. Total flow to

TABLE 109

DISCHARGE OF SYCAMORE SLOUGH TO FLOW OF COLUSA BASIN DRAINAGE - 1943

Day	Daily Discharge in Second-feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
31												
Mean												
Ac. Ft. for Month												

Outflow here during 1943 was negligible and can be ignored in computing total flow into Sacramento River at Mile 34.15R (Table 108).

NOTE: This water is discharged below outfall gates and is not included in the flow shown in Table 108.

TABLE 110

DISCHARGE OF SACRAMENTO SLOUGH TO SACRAMENTO RIVER - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1						719	655	605	591	662	240	203
2						706	615	526	672	639	219	203
3						1010	615	514	762	667	209	203
4						1600	657	524	816	608	200	210
5						1430	622	479	1020	529	200	210
6						940	549	488	879	464	209	210
7						778	493	468	718	474	207	210
8						713	474	554	804	427	215	203
9						680	441	451	999	420	198	203
10					*2360	661	444	491	707	401	200	210
11						673	533	491	784	365	180	210
12						789	487	521	1020	363	192	234
13						856	572	488	643	354	192	218
14					872	792	583	491	753	318	209	203
15					841	785	594	545	835	285	198	196
16					828	783	554	545	821	291	180	182
17					818	773	554	512	805	270	182	198
18					824	759	650	479	782	253	174	168
19					840	735	554	488	988	236	195	182
20					786	753	581	488	686	230	213	196
21					780	665	581	509	759	238	246	242
22					765	671	574	688	905	240	302	290
23					739	662	585	482	782	274	333	282
24					773	677	637	482	782	276	330	274
25					800	697	711	482	776	260	299	298
26					774	690	585	500	858	238	281	290
27					765	732	595	494	687	198	246	266
28					748	626	648	488	757	202	249	242
29					748	644	605	684	640	210	239	258
30					738	677	559	635	664	227	221	250
31					822		515	559		223		250
Mean						788	575	521	790	350	225	225
Ac. Ft. for Month						46940	35350	32040	47000	21500	13400	13810

RECORD / NO

* Beginning of record for season following high water period.

NOTE: This is the discharge to the Sacramento River via Sacramento Slough at Mile 21.2L. Discharge in this table from measurements made in slough and rating curve developed. This is the entire outflow of the Sutter By-pass area and R.D. #1500. To facilitate construction activities in By-pass area during 1943 a temporary cut was made from the vicinity of Chandler to divert some By-pass waters to the Feather River below Nicolaus (See Table 114). In former years flow of Sacramento Slough determined by combining outflow of R.D. #1500 with Sutter By-pass flows. During high water periods the slough is entirely submerged as it lies within the By-pass area. An annual record of the flow of Sutter By-pass is obtained. See Tables 100, 103, 104 and 112 which, when combined, will give the measured flow entering the By-pass area.

TABLE 111

SACRAMENTO SLOUGH - COMPONENT PARTS OF FLOW - 1943

Acre-feet

	From Table No.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
From Feather River via Butte Slough	100						5590	5080	5810	3130	1640	2570	3610
From Sacramento R. via Moulton Weir	101						0	0	0	0	0	0	0
From Sacramento R. via Colusa Weir	102						0	0	0	0	0	0	0
From Sacramento R. via Butte Slough	100						0	0	0	0	0	0	0
From Feather R. via Wadsworth Canal	103						8590	7030	7110	7490	9790	2240	1820
From Sacramento R. via Tisdale Weir	104		- - - -	-1- -	- - -		0	0	0	0	0	0	0
From Sacramento R. via R. D. 1500(1)	112						37200	33860	32800	36100	7690	1070	548
Sacramento Slough (2)	110						46940	35350	32040	47000	21500	13400	13810
Sacramento River water							37200	33860	32800	36100	7690	1070	548
Feather River water							9740	1490	0	10900	13810	12330	13260
Diversions East Borrow Pit							5150	6200	6220	4270	500	0	0
Diversions West Borrow Pit							1240	1980	2350	890	0	0	0
Total Diversions							6390	8180	8570	5160	500	0	0

(1) 10% added to Reclamation District 1500 measured drainage as an estimate of Sacramento River water entering By-pass and thence Sacramento Slough as seepage from Reclamation District 1500 during June and July. West borrow pit dammed off August 1st to October 1st.

(2) See footnote Table 110.

TABLE 112

DISCHARGE OF RECLAMATION DISTRICT 1500 DRAIN - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	241	397	149	148	300	549	522	601	613	342	11	0
2	0	293	157	151	520	700	486	485	660	339	14	0
3	240	348	261	154	282	677	487	533	637	364	21	0
4	138	312	137	156	363	687	554	486	568	345	67	0
5	97	291	255	158	418	579	476	478	785	181	0	0
6	0	298	184	162	433	786	485	451	645	110	60	0
7	0	293	164	101	488	579	486	420	509	188	28	0
8	58	283	194	152	363	603	486	536	560	120	44	0
9	81	262	243	52	705	596	486	486	793	98	26	0
10	81	151	297	108	373	597	424	487	505	102	38	0
11	83	254	309	163	396	585	583	540	637	14	35	0
12	56	194	307	104	400	478	486	486	838	78	34	251
13	61	231	307	162	229	666	486	546	622	188	35	0
14	66	142	336	94	306	571	486	420	673	103	27	0
15	0	232	248	162	309	541	486	601	688	54	0	0
16	0	138	272	37	434	543	478	535	686	83	0	0
17	132	202	277	163	468	543	423	531	679	65	0	0
18	0	140	292	94	626	531	543	548	686	54	0	0
19	110	143	280	168	614	481	489	552	764	80	0	0
20	81	143	260	167	537	539	486	552	560	36	0	0
21	487	143	281	0	545	522	486	490	646	83	0	0
22	361	142	227	169	425	480	488	647	612	46	0	0
23	847	140	225	247	761	552	544	544	592	44	0	0
24	653	135	186	186	615	547	488	548	556	77	0	0
25	420	148	194	304	534	526	595	552	553	34	0	0
26	394	224	194	269	519	486	487	552	595	51	0	0
27	412	196	190	287	520	534	553	552	497	59	0	0
28	367	167	153	493	472	486	546	499	348	34	0	0
29	366		145	486	420	548	543	742	336	59	0	0
30	567		199	477	552	538	535	552	342	31	0	0
31	476		142		752		420	610		60		0
Mean	222	216	228	186	474	568	501	534	606	114	16	8
Ac. Ft. for Month	13640	11980	14010	11050	29120	33820	30780	32850	36070	6990	972	498

NOTE: This is the drainage from Reclamation District 1500 discharged to West Borrow Pit of Sutter By-Pass and thence via Sacramento Slough (in the By-Pass) to Sacramento River. (Table 110)

TABLE 113

DISCHARGE OF SUTTER BY-PASS - EAST BORROW PIT (WILLOW SLOUGH AT CHANDLER) - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1						*102	190					
2						110	192					
3						162	192					
4						157	196					
5						165	196					
6						152	0					
7						84	0					
8						100	0					
9						140	0					
10						202	0					
11						230	0					
12						230	0					
13						235	200					
14						241	204					
15						16	190					
16						241	186					
17						236	180					
18						227	180					
19						217	180					
20						211	180					
21						211	180					
22						214	180					
23						214	182					
24						221	182					
25						221	180					
26						214	176					
27						217	172					
28						217	23					
29						214	113					
30						207	0					
31							0					
Mean						187	124					
Ac. Ft. for Month						11120	7644					

Flows given for June and July are towards Sacramento Slough. On July 31 a dam was placed in the West Borrow Pit of the Sutter By-pass just below Mouth of Willow Slough. This dam prevented any water reaching Sacramento Slough directly from the Sutter By-pass. When the water stage behind the dam increased sufficiently the water flowed back through Willow Slough culvert (Table 113) into Nelson Slough and thence via a temporary cut (Table 114) to the Feather River. No data available as to when West Borrow Pit dam was removed or washed out, probably some time in September.

All outflow from Sutter By-pass area is given in Table 110.

NO FLOW NO FLOW NO FLOW NO RECORD NO RECORD

* Beginning of record for season.

NOTE: This station normally records return water originating primarily from Feather River diversions and it is the net flow of Wadsworth Canal (Table 102) and a portion of the flow from Butte Basin shown in Table 99 after the diversions shown in Table 74 (East Borrow Pit of Sutter By-pass) have been served.

TABLE 114

DISCHARGE OF SUTTER BY-PASS - EAST BORROW PIT 0.4 MILE ABOVE RECLAMATION DISTRICT 1500 DRAINAGE PLANT - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1												
2												
3												
4												
5												
6												
7			No continuous record of operation kept. Plug in borrow pit above							*		
8												
9												
10			weir removed and flow started over weir June 15th. Flow plugged									
11												
12			off and all flow rediverted to Sacramento Slough via Willow									
13												
14			Slough (Table 113) on October 6th. Monthly estimate of flow made									
15							*					
16												
17			from observations and one current meter measurement. Flow entered									
18												
19			Feather River below Nicolaus.									
20												
21												
22												
23												
24												
25												
26												
27							100					
28												
29												
30												
31												
Mean						50	100	100	100	20	0	0
Acre-feet for Month						3000	6000	6000	6000	1200	0	0

TABLE 115

DISCHARGE OF SUTTER BY-PASS - WEST BORROW PIT 0.4 MILE ABOVE R.D. 1500 DRAINAGE PLANT - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1												
2												
3												
4												
5												
6												
7	THIS IS THE FLOW IN THE WEST BORROW PIT BELOW THE CONFLUENCE											
8												
9	OF THE EAST BORROW PIT FLOW ENTERING VIA WILLOW SLOUGH.											
10												
11												
12	DUE TO CHANNEL CHANGES AND CONSTRUCTION WORK DISCHARGE											
13												
14	RECORD AT THIS STATION IS NO LONGER RELIABLE											
15												
16												
17	AND STATION WAS DISCONTINUED IN 1942											
18												
19	THIS FLOW WAS JOINED BY THE DISCHARGE THROUGH R. D. 1500											
20												
21												
22	DRAINAGE PLANT AND THE COMBINED FLOW DISCHARGED VIA											
23												
24	SACRAMENTO SLOUGH, IN THE BY-PASS (TABLE 110) TO SACRAMENTO RIVER.											
25												
26												
27												
28												
29												
30												
31												
Mean												
Ac. Ft. for Month												

TABLE 116

DISCHARGE OF KNIGHTS LANDING RIDGE CUT - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	940	5280	622	82	1030	35	36	42	57	18		
2	819	5000	490	88	970	45	36	43	58	16		
3	693	4660	370	88	502	55	36	42	52	14		
4	588	4290	322	83	670	66	37	41	52	11		
5	542	3920	322	82	556	43	37	42	54	9		
6	445	3300	352	88	526	26	37	41	57	7		
7	372	2690	340	78	502	14	37	41	60	6		
8	312	2220	285	84	460	27	33	43	62	6		
9	286	1750	424	83	352	37	33	37	69	5		
10	220	1220	895	72	280	40	31	37	84	3		
11	119	824	1840	82	126	41	29	37	96	2		
12	58	604	2370	160	88	42	26	37	122	0		
13	31	544	2400	205	41	43	23	37	146	0	FLOW	FLOW
14	16	412	2020	225	33	45	22	46	190	0		
15	9	346	1690	322	23	47	20	48	240	0		
16	7	290	1300	394	14	48	20	48	210	0		
17	4	265	1030	376	12	45	22	49	47	0	NO	NO
18	0	230	829	334	20	42	26	50	30	0		
19	0	185	657	322	26	41	31	50	27	0		
20	0	146	540	538	29	39	35	50	26	0		
21	16	112	441	210	30	37	39	51	26	0		
22	800	240	423	205	29	35	40	53	25	0		
23	2070	436	351	180	29	34	41	54	25	0		
24	3480	532	269	122	26	34	42	56	26	0		
25	3920	532	66	89	24	34	41	62	26	0		
26	5170	472	131	106	21	34	42	63	25	0		
27	5580	538	104	195	21	34	41	60	25	0		
28	5700	670	88	388	20	35	41	61	25	0		
29	6380		83	730	20	35	41	67	24	0		
30	6380		82	970	20	35	41	68	21	0		
31	5760		78		24		42	58		0		
Mean	1636	1490	684	233	210	39	34	49	66	3	0	0
Ac. Ft. for Month	100600	82730	42060	13850	12940	2320	2100	3000	3940	191	0	0

NOTE: This is a portion of the Colusa Basin drainage (Table 100) flowing (in the winter) or diverted (in the summer) into the Ridge Cut above the outfall gates on the Back Borrow Pit of Reclamation District 108 and thence into Yolo By-Pass above Elkhorn. Summer diversion is made possible by blocking the gates. Water diverted is available for Yolo By-Pass diverters (Table 68). Station, since 1941, is operated cooperatively by Division of Water Resources and U. S. Geological Survey

TABLE 117

DISCHARGE OF YOLO BY-PASS* - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	2140	68200	2140	702	1360	50	22	37	69	110	7	23
2	1370	51000	1790	751	1440	55	22	38	67	107	7	26
3	1220	37000	1580	779	1450	55	22	39	66	103	7	23
4	1080	26500	1160	688	1420	52	22	38	66	98	7	18
5	984	19200	910	653	1370	50	22	36	71	91	7	16
6	904	13500	850	653	1280	47	22	36	78	86	7	15
7	809	9000	800	681	904	39	22	38	78	88	6	14
8	716	6810	750	737	660	32	23	39	78	89	6	13
9	646	5780	2420	779	548	30	25	39	83	86	6	14
10	604	5220	22800	765	482	28	21	41	82	83	6	18
11	530	4570	55400	702	402	31	16	42	80	81	6	25
12	460	3600	57800	578	330	35	12	43	90	74	6	30
13	312	2420	48800	566	254	38	9	44	98	67	6	30
14	224	1790	38800	578	203	36	8	79	111	58	6	28
15	179	1650	33600	590	157	31	10	105	104	50	7	24
16	159	1580	29200	625	112	27	39	91	101	46	6	19
17	142	1510	26500	646	80	25	38	81	92	42	7	16
18	122	1440	22800	632	63	25	34	76	77	39	7	14
19	113	1370	19200	611	64	26	32	72	67	36	8	13
20	102	1300	13500	572	76	22	27	58	59	34	8	12
21	700	1300	9400	548	89	21	23	54	51	30	10	12
22	16800	1370	6440	578	104	22	19	45	49	27	9	12
23	74000	1510	4320	716	107	21	19	42	48	24	10	16
24	133000	1650	2490	744	98	19	21	44	46	19	9	19
25	148000	1720	910	723	67	18	24	48	50	15	10	17
26	128000	1720	928	695	46	18	25	54	60	12	9	16
27	91000	1930	840	674	33	21	27	58	72	11	9	14
28	71000	2350	786	816	29	24	31	62	81	10	8	13
29	55400		772	952	27	24	31	64	105	8	9	13
30	51000		744	1130	32	23	33	70	112	8	14	12
31	68200		744		44		36	70		8		12
Mean	27420	9892	13200	695	430	32	24	54	76	53	8	18
Ac. Ft. for Month	1686000	549400	811600	41380	26440	1870	1460	3340	4540	3250	456	1080

* For the period May 16 to Dec. 31, incl., this station is located at the end of the Sacramento By-Pass and records all flow in Yolo By-Pass, except Putah Creek and flow over Sacramento Weir (Table 117), to Delta. For period Jan. 1 to May 15 the flow is given at the Woodland-Elkhorn highway crossing. To get total flow through Yolo By-Pass, below Sacramento, combine the flow in this table with that shown in Table 118 and Putah Creek. The flow in this table includes Cache Creek, Knights Landing Ridge Cut and flow over Fremont Weir. To get flow into Delta, combine Tables 15, 25, 26, 27, 35, 117, 118 and Putah Creek flow.
Station, since 1941, is operated cooperatively by Division of Water Resources and U. S. Geological Survey (Water Resources Branch).

TABLE 118

DISCHARGE OF SACRAMENTO WEIR TO YOLO BY-PASS - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	0	980	0	0								
2		790										
3		620										
4		460										
5		360		0								
6		250		5								
7		160	0	0								
8	FLOW	130	130									
9		50	910	0								
10		10	23450	10								
11		0	21060	5								
12	NO		12150	0								
13			6370				NO FLOW APRIL 12 TO DECEMBER 31					
14			2750									
15			900									
16			790									
17			690									
18		FLOW	660									
19			560									
20			460									
21	0		380									
22	4300	NO	320									
23	9400		230									
24	11960		80									
25	7400		0									
26	5920											
27	4380											
28	3000	0										
29	2000											
30	900											
31	1200		0									
Mean	1628	136	2319	—	0	0	0	0	0	0	0	0
Ac. Ft. for Month	100900	7560	142600	40	0	0	0	0	0	0	0	0

NOTE: Elevation, fixed crest 25.0 U.S.E.D., movable crest (top of needles) 31.0 U.S.E.D. Weir has 48 bays or gates each 38 feet in length.

TABLE 119

DISCHARGE OF RECLAMATION DISTRICT 1001 DRAIN INTO CROSS CANAL* - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	23	247	29	37	32	110	0	3	2	0	0	0
2	0	167	38	36	23	0	0	3	2			
3	0	118	31	37	24	0	0	3	2			
4	0	67	40	23	8	20	0	3	2			
5	0	90	49	38	33	0	0	3	2			
6	0	85	49	46	25	30	0	3	2			
7	34	42	39	37	26	0	2	3	2			
8	0	49	38	37	17	25	3	3	2			
9	0	58	65	30	18	0	4	3	2			
10	18	29	163	30	0	0	4	3	2			
11	0	45	110	30	37	0	4	3	2			
12	0	38	112	30	27	0	5	3	2			
13	0	39	93	31	18	15	5	3	2	FLOW	FLOW	0
14	0	24	109	32	18	8	6	3	2			5
15	0	41	80	33	0	0	6	3	2			7
16	0	35	81	24	28	9	7	3	1			0
17	0	33	87	32	19	38	7	3	10	NO	NO	
18	0	33	129	24	28	12	7	3	6			
19	0	34	67	32	19	12	2	3	6			
20	84	26	87	24	19	12	0	3	6			
21	20	26	58	24	19	12	2	3	6			
22	457	25	75	24	28	12	4	3	3			
23	514	33	59	24	0	12	6	3	0			FLOW
24	486	32	60	15	19	12	5	3	0			
25	256	48	53	0	—	12	4	3	0			
26	217	46	62	34	19	0	4	3	58			
27	220	44	47	25	0	6	4	3	22			NO
28	158	37	40	25	0	12	4	3	11			
29	262		48	33	0	6	5	3	0		0	
30	401		39	32	47	0	6	3	0	0	33	
31	416		38		0		7	3		30		0
Mean	115	57	67	29	18	12	4	3	5	1	1	—
Ac. Ft. for Month	7070	3160	4120	1740	1090	744	224	184	315	60	65	24

* Cross Canal, the main drain between Reclamation District 1000 and 1001, joins the Sacramento River at mile 19.6L.

TABLE 120

DISCHARGE OF RECLAMATION DISTRICT 1000 DRAIN (#3 PLANT) - 1943

Day	Daily Discharge in Second Feet*											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	20	124	50	50	30	30	7	0	12	12	0	5
2	20	124	50	50	30	30	16		16	10	3	5
3	20	124	50	50	30	30	7		16	14	3	3
4	20	124	50	50	30	30	7		16	17	5	3
5	20	124	50	50	30	30	7		16	19	5	0
6	20	124	75	50	30	30	15		16	22	5	5
7	20	124	125	50	30	30	15		16	24	5	3
8	20	124	175	50	30	30	15		16	26	3	5
9	20	124	158	50	30	30	15	FLOW	16	19	5	17
10	20	124	158	50	30	30	15		16	17	3	3
11	22	124	158	50	30	30	15		16	17	5	0
12	22	124	158	50	30	30	15	NO	16	19	3	0
13	22	124	158	50	30	30	15		73	22	3	0
14	22	124	158	50	30	30	15		73	19	3	3
15	22	124	158	50	30	30	15		73	17	3	5
16	23	124	158	50	30	30	8		60	12	5	5
17	23	124	158	50	30	30	0		53	7	5	10
18	23	124	158	50	30	30			41	5	5	12
19	23	124	108	30	30	30		0	41	7	5	7
20	23	118	108	30	30	30		8	56	10	3	0
21	124	100	108	30	30	30		8	65	10	0	0
22	124	90	108	30	30	10		8	60	7	0	0
23	124	80	108	30	30	26		8	53	5	0	0
24	124	70	10	30	30	19	FLOW	16	60	3	0	0
25	124	60	10	30	30	20		16	46	0	0	0
26	124	50	50	30	30	22		16	38	0	0	0
27	124	50	50	30	30	21	NO	16	41	0	5	0
28	124	50	50	30	30	21		16	34	5	10	0
29	124		50	30	30	20		16	19	3	7	0
30	124		50	30	30	21		16	22	0	3	0
31	124		50		30		0	16		0		0
Mean	58	108	99	42	30	27	7	5	37	11	3	3
Ac. Ft. for Month	3550	6000	6080	2500	1840	1610	400	317	2170	690	202	180

* No record of daily operation available for period January 1 to June 21. Distribution estimated for that period.

NOTE: This is drainage from Reclamation District 1000 returned to Sacramento River by pumping and gravity at mile 6.85L. Additional water returned to Sacramento River at mile 2.1L. (See Table 121.)

TABLE 121

DISCHARGE OF RECLAMATION DISTRICT 1000 DRAIN (2ND BANNON SLOUGH) - 1943

Day	Daily Discharge in Second-Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	0	121	0									
2		78										
3		80										
4		68										
5		68										
6		62										
7		43										
8	FLOW	72	0									
9		0	189									
10			315									
11			77									
12	NO		62	FLOW	FLOW	FLOW	FLOW	FLOW	FLOW	0	FLOW	FLOW
13		FLOW	45									
14			45									
15			63							65		
16			64							57		
17		NO	71	NO	NO	NO	NO	NO	NO	71	NO	NO
18			78							71		
19			80							0		
20	0		53							64		
21	334	0	27							57		
22	562		75							64		
23	586		0							0		
24	581									50		
25	361									21		
26	213									0		
27	104									28		
28	119	C								56		
29	313									0		
30	535									35		
31	411		0							0		
Mean	133	21	40	0	0	0	0	0	0	21	0	0
Ac. Ft. for Month	8170	1170	2470	0	0	0	0	0	0	1270	0	0

NOTE: This is drainage from Reclamation District 1000 returned to the Sacramento River by pumping at mile 2.1L. Additional water returned to Sacramento River at mile 6.85L (See Table 120).

TABLE 122

DAILY RECORD OF PRECIPITATION (IN INCHES) AT CHICO - 1943*

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	.03					T						
2	.11											
3			.05			.16						
4		.28	.09		.42							
5		.01	.03	.77		.06						.53
6			.01									
7		.06	.04									
8		.01	.31	.11								
9		.11	.55									
10			1.38									
11			.17									
12												
13			.03									
14			.18									
15												
16												
17		T	.43								T	
18										T		
19										T	.93	.64
20	1.22									T	.44	1.58
21	1.62	.11	.22			.06				.10	.70	.02
22	.23	.80	.12				T					
23	1.12	.80								.01		
24	.64	.25				.03				.05		.23
25	.78	T				T						.09
26	.43	.13	.03	T								
27	.06	.05		.97						.16		
28				1.40						.01		
29	1.11		.22							.01		.02
30	.71										.17	.20
31												.44
Total for Month	8.06	2.61	3.86	3.25	.42	.31	T	0	0	.34	2.24	3.75
Total for Year	24.84											

* United States Weather Bureau records.

TABLE 123

DAILY RECORD OF PRECIPITATION (IN INCHES) AT M. & T. INC. - CHICO LANDING - 1943*

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1												
2	.16											
3												
4		.23										
5		.05		.27		.12						.35
6				T								
7			.25									
8		.10	.24									
9		.15	.40									
10			1.25									
11												
12												
13												
14												
15												
16												
17												
18			.36							T		
19											.50	.20
20	.53										.10	1.53
21	1.16										.62	.10
22	.84	.60	.28									
23	.83	.65										
24		.27								T		
25	.05	.05				.02						.15
26	.80											
27	.09	.11		.16						T		
28				1.65								
29	.35			.27								T
30	.75		.08								.20	.44
31	.05											.10
Total for Month	5.61	2.21	2.86	2.35	0	.14	0	0	0	T	1.42	2.87
Total for Year	17.46											

* Record kept by M. & T. Inc., at pumping plant at junction of Chico Creek and Sacramento River.

TABLE 124

DAILY RECORD OF PRECIPITATION (IN INCHES) AT LLANO SECO RANCHO - 1943*

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	0.12											
2	T											
3			.05			T						
4		.33	.14			T						.23
5			.07	.33								
6		.01	.02									
7			.03									
8			.15	.02								
9			.31							T		
10			.78									
11			.03									
12												
13			T									
14			.08									
15												
16												
17			.29									
18												
19				T							.29	.70
20	1.01						T			.04	.13	.93
21	1.30	T	.25			T					.08	
22	.74	.99	.04				.04					
23	.50	.32										
24		.13										.07
25	.69									T		.05
26	.20	.16	.01									
27	.05			.85						.08		
28				1.13						.28		.03
29	.69		.11	T							.13	
30	.35			T								.53
31												.02
Total for Month	5.65	1.94	2.36	2.33	0	0	.04	0	0	.40	.63	2.56
Total for Year	15.91											

* Record kept at ranch headquarters six miles below Chico Landing.

TABLE 125

DAILY RECORD OF PRECIPITATION (IN INCHES) AT COLUSA - 1943*

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	.07											
2	.05											
3												
4	T	.11	.30							.04		
5		T		.21		.02				.07		T
6			.09									.13
7		T	.02									
8		.03	.10									
9			.19	.03								
10			.30									
11			.15									
12												
13												
14			.06									
15												
16												
17		.01	.01		.01						T	
18			.30								T	
19											.08	.79
20	.53						.02			.09	.33	.85
21	1.16					T					.17	.01
22	1.15	.70	.12			.02						
23	.55	.25										
24												
25	.03	.25				T						.10
26	.28	.02										
27	.02	.24		.06						.11		
28				1.56						.06		T
29	.20			.02								.08
30	.51		.21	T							.02	.17
31					T							.08
Total for Month	4.55	1.61	1.85	1.88	.01	.04	.02	0	0	.37	.60	2.21
Total for Year	13.14											

* United States Weather Bureau records.

TABLE 126

DAILY RECORD OF PRECIPITATION (IN INCHES) AT MARYSVILLE - 1943*

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	.02					.06						
2	.04											
3												
4	T	.15	.51									
5		.02		.73								
6		T	.30	T								.12
7												
8		.04	.16									
9			.37									
10			1.53									
11			.03									
12												
13												
14			.40									
15												
16												
17			.07								.01	
18			.37									
19											.34	.98
20	.54									.05	.13	.73
21	1.33					.07				.12	.20	.03
22	.65	.17	.21				.06					
23	.96	.03										
24	T											
25	.03	.54										.31
26	.54											
27	.17	.12		.07						.08		
28	.01			1.72								
29	.31											.12
30	1.08		.41								.19	.39
31	.09				.05							.03
Total for Month	5.77	1.07	4.36	2.52	.05	.13	.06	0	0	.25	.87	2.71
Total for Year	17.79											

* U. S. Weather Bureau records.

TABLE 127

DAILY RECORD OF PRECIPITATION (IN INCHES) AT WILKINS SLOUGH - 1943*

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1												
2												
3			.30									
4		.18		.14								.02
5			.21									.03
6												
7			.07									
8			.44									
9			.88									
10												
11												
12												
13			.15									
14												
15												
16		.02										
17			.63									
18											.22	.76
19	.58									.05	.17	.79
20	1.26									.02	.11	
21	.60	.09	.15			.04						
22	.84	.06										
23												
24	.38	.16										.26
25	.10											
26		.27								.12		
27	.18			1.55								
28	.21											.12
29	.65		.14									.26
30											.08	
31												.08
Total for Month	4.80	.78	2.97	1.69	0	.04	0	0	0	.19	.58	2.32
Total for Year	13.37											

* Near Grimes, at Reclamation District 108 pumping plant. Record kept by District.

TABLE 128

DAILY RECORD OF PRECIPITATION (IN INCHES) - RECLAMATION DISTRICT 1500 AT HINSDALE - 1943*

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1												
2												
3		.24	.38									
4												
5			.34									
6												
7		.12	.08									
8			.40									
9			.64				Station Discontinued as of					
10			.05				March 18. See Table 128A					
11												
12												
13			.24									
14												
15												
16			.12									
17			.50									
18												
19	.64											
20	.66											
21	.38	.12										
22	1.04											
23		.10										
24	.12	.23										
25	.22	.04										
26	.16	.16										
27												
28	.18											
29	.64											
30												
31												
Total for Month	4.04	1.01										
Total for Year												

* North end of Reclamation District 1500 - 2 miles east of Tisdale Weir. Record kept by Reclamation District 1500.

TABLE 128A

DAILY RECORD OF PRECIPITATION (IN INCHES) - RECLAMATION DISTRICT 1500 AT EVERGLADE - 1943*

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1												
2												
3		.18	.40									
4			.02	.11								
5			.18	.02								.10
6			.02									
7		.04	.16									
8			.56									
9			.45									
10			.04									
11												
12												
13			.17									
14												
15												
16			.03								T	
17			.46									.59
18											.19	.36
19	.35									.08	.14	
20	1.16									.03	.10	
21	.67	.09	.10			.07						
22	.85	.07										
23		.08										
24		.20										.25
25	.25	.02										
26	.15	.28	.02	.15						.05		
27				1.34								
28	.18											.15
29	.34		.16								.06	.25
30					.07							.04
31												.02
Total for Month	3.95	.96	2.77	1.62	.07	.07	0	0	0	.16	.49	1.76
Total for Year	11.85											

* North end of Reclamation District 1500 - at Everglade (Camp 2) 3 miles south of Hinsdale. Record kept by Reclamation District 1500.

TABLE 129

DAILY RECORD OF PRECIPITATION (IN INCHES) RECLAMATION DISTRICT 1500 AT ROBBINS - 1943*

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	.02											
2												
3		.23	.58									
4			T	.31								
5			.12									.05
6												
7		.09	.08									
8			.64							T		
9			.12									
10												
11												
12												
13			.37									
14												
15												
16			.18								.02	
17			.31									
18											.29	.70
19	.54									.09	.29	.51
20	1.49									.10	.13	.01
21	.95	.16	.09			.05						
22	1.19	.09										
23		.08										
24	.13	1.34										.18
25	.16	.03										
26	.19	.34		.14						.05		
27				1.30								
28	.28			.19								.30
29	.73		.24								.07	.23
30	.04				.06							.04
31												.40
Total for Month	5.72	2.36	2.73	1.94	.06	.05	0	0	0	.24	.80	2.42
Total for Year	16.32											

* South central portion of Reclamation District 1500. Record kept by Reclamation District 1500.

TABLE 130

DAILY RECORD OF PRECIPITATION (IN INCHES) AT NICOLAUS - 1943*

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1						.03						
2												
3												
4		.14	.56									
5				.56								
6			.07	.06								.01
7												
8		.11	.03							.08		
9		.02	.80							.02		
10			.06									
11			.09									
12												
13												
14			.28									
15												
16												
17			.08								T	
18			.52								.01	
19											.19	.67
20	.43									.05	.27	.58
21	1.56									.09	.16	.07
22	1.05	.22	.19			.10						
23	1.28	.03										
24	T	T										
25	.11	.32										.22
26	.31											
27	.15	.17		.06						.16		
28				1.43								
29	.25											.21
30	.96		.30								.13	.20
31	.03				.04							
Total for Month	6.13	1.01	2.98	2.11	.04	.13	0	0	0	.40	.76	1.96
Total for Year	15.52											

* U. S. Weather Bureau records.

TABLE 131

DAILY RECORD OF PRECIPITATION (IN INCHES) RECLAMATION DISTRICT 1500 AT KARNAK - 1943*

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1												
2												
3		.16	.55									
4			T	.34								
5			.35									
6												
7		.12	.04									
8			.43									
9			.09									
10												
11												
12												
13			.26									
14												
15												
16			.13								T	
17			.40									
18											.26	.61
19	.48									.02	.37	.46
20	1.86									.02	.15	.02
21	1.77	.12	.10			.10						
22	1.04	.04										
23		.09										.16
24	.12	.63										
25	.25	.04										
26	.08	.31								.10		
27				1.35								
28	.18											.27
29	.96		.33								.14	.20
30					.08							
31												.04
Total for Month	6.74	1.51	2.68	1.69	.08	.10	0	0	0	.14	.92	1.76
Total for Year	15.62											

* Southeast corner of Reclamation District 1500. Record kept by Reclamation District 1500.

TABLE 132

DAILY RECORD OF PRECIPITATION (IN INCHES) AT KNIGHTS LANDING - 1943*

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1						T						
2	.02											
3		.11										
4		T	.47									
5				.26								
6			.19									T
7			T									
8		.05	.05									
9			.30									
10			.03									
11			.01									
12												
13												
14			.21									
15												
16												
17		T	.15								T	
18			.30							T		
19											.23	.50
20	.38						T			.02	.38	.43
21	1.40									.03	.08	.02
22	1.05	.10	.07			.08	T					
23	1.18	.03										
24		.06										
25	.04	.73										.14
26	.15	.04										
27	.10	.34		.12						.04		
28				1.18								
29	.19											.22
30	.50		.18	T	.03						.06	.22
31					.03							.02
Total for Month	5.01	1.46	1.96	1.56	.06	.08	T	0	0	.09	.75	1.55
Total for Year	12.52											

* U. S. Weather Bureau records.

TABLE 133

DAILY RECORD OF PRECIPITATION (IN INCHES) AT SACRAMENTO - 1943*

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1	T					.02						
2												
3			.24									
4		.03	.20									
5			.17	.40								.04
6			T									
7		.08	.11	.01								
8		T	.93	.05						.03		
9			.47									
10	.01		.17									
11	.01											
12						.31						
13			.16									
14			.09									
15												
16		T										
17			.61								.02	
18										T	.12	.50
19	T			T						.01	.29	.70
20	1.15						T			T	.09	.22
21	3.14	.07	.21			.02				.02	T	
22	1.16	.07										
23	.05	.33										
24	T	.30										.13
25	.15	.07							T			
26	.09	.31	T							.10		
27	T			1.38								
28	T			.07								.07
29	.81		.24								.09	.34
30	.47			T	.14						.01	.02
31					T							
Total for Month	7.04	1.26	3.60	1.91	.14	.35	T	0	T	.16	.62	2.02
Total for Year	17.10											

* U. S. Weather Bureau Records.

CHAPTER V

USE OF WATER IN THE SACRAMENTO-SAN JOAQUIN DELTA AND IN THE SACRAMENTO-SAN JOAQUIN VALLEYS

SACRAMENTO-SAN JOAQUIN DELTA

As outlined in detail in preceding reports (1924-1933, inclusive) an investigation having as its objective a complete annual determination of the consumptive use of water in the entire Sacramento-San Joaquin Delta, comprised of experimental work to determine the unit consumptive use of water by the various irrigated crops and vegetation in the Delta and the general field work to obtain annually a complete census of the irrigated crops and water consuming areas. With the unit consumptive use of water determined by the experimental work and the complete census available, the former may be applied to the data of the latter to derive the consumptive use of water in the Delta as a whole or on individual tracts or islands.

Annual Census of Irrigated Crop Acreages and Water Consuming Areas

Detailed results of the census of the irrigated crop acreage in water consuming areas of the Delta as conducted by the Division of Water Resources are shown in the Reports for the years 1924 to 1932, inclusive, and 1938, the detailed census being omitted for the years 1933 to 1937 and 1939 to 1943, inclusive. In 1942 a survey of the Delta crops was made by the U. S. Bureau of Reclamation. In the course of the Delta salinity investigations, in 1929 and 1930, it was found that in general all lands below certain elevation (5.0 U.S.G.S. datum) whether idle or cropped, receive and consume water derived by seepage from the adjacent channels. It was necessary, therefore, that all such lands be accounted for in computing the total consumptive use of water.

The cropped area is not suddenly changed from year to year, so that by making detailed surveys at intervals to determine the trend of land use it is possible to determine the total consumptive use for any particular year.

Consumptive Use of Water

In Table 134 is shown the unit consumptive use of water in the Sacramento-San Joaquin Delta. These unit figures are those developed from experimental data and with one exception are those which are used in the computation for Bulletin 27 of the Division of Water Resources. The exception is the use of water by weeds which has been increased to correspond with a total annual consumption of 2.15 acre-feet per acre. This change was based on later weed tank experiments. It is possible that a continuation of the experimental work terminated in 1932 would indicate certain other changes in these unit figures with respect to aquatic growths, weeds and open water surfaces, but other than the above mentioned change for the item of idle land with weeds, the results of the work to date would apparently afford no justification for any material revision at this time of the figures previously used.

Table 135 shows the consumptive use of water in the Sacramento-San Joaquin Delta for the period 1924-1932 inclusive and 1938.

In previous years, when the crop surveys were made, the total consumptive use of water has been segregated to show the use in each river delta. Also shown was a classification of the irrigated crops with respect to the peat and sedimentary soils on which they were produced.

SACRAMENTO-SAN JOAQUIN VALLEYS

Use of Water

When the annual crop survey was made for inclusion in the Water Supervision Report the practice in the early years was to classify the crops either as "general" or "rice" and to publish the data under these two classifications. Tables 71 to 85 of this report follow this same procedure. Gross duty of water figures for the individual stream channels in the territory under supervision are given for the Sacramento Valley in Tables 51 to 54 and for the San Joaquin Valley in Tables 60 to 66.

TABLE 134

UNIT CONSUMPTIVE USE OF WATER IN SACRAMENTO-SAN JOAQUIN DELTA**
Acre-feet per Acre

Crop or Classification	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total Seasonal Use	Total Annual Use
Alfalfa	(.06)	(.08)	.10	.30	.40	.50	.65	.55	.50	.20	(.10)	(.07)	3.20	3.51
Asparagus	.05	.05	.05	.05	.08	.14	.40	.68	.55	.42	.12	.10	2.69	2.69
Beans	(.06)	(.08)	(.08)	(.16)	(.20)	.14	.24	.58	.37	(.09)	(.07)	(.05)	1.33	2.12
Beets	(.06)	(.08)	(.08)	.13	.32	.51	.61*	.53*	.20*	(.13)	(.10)	(.07)	2.30	2.82
Celery	(.04)	(.04)	(.04)	(.08)	(.10)	.10	.10	.20	.25	.30	.20	.05	1.20	1.50
Corn	(.04)	(.04)	(.04)	(.08)	(.10)	.24	.85	.84*	.40*	.10	(.10)	(.07)	2.43	2.90
Fruit	(.04)	(.04)	(.04)	.18	.32	.50	.57	.40	.23	.07	(.07)	(.05)	2.27	2.51
Grain and Hay	(.04)	(.04)	.07	.60	.83	.20	(.14)	(.23)	(.21)	(.14)	(.07)	(.05)	1.70	2.62
Onions	(.04)	(.04)	.08	.13	.27	.49	.43	.20	(.16)	(.13)	(.10)	(.07)	1.60	2.14
Pasture	.08	.10	.20	.25	.25	.25	.25	.25	.20	.15	.10	.08	2.16	2.16
Potatoes	(.06)	(.08)	(.08)	(.16)	.15	.38	.52	.30	.15	(.09)	(.07)	(.05)	1.50	2.09
Seed	(.09)	(.08)	(.08)	.10	.25	.50	.50	.50	.35	.10	(.10)	(.07)	2.30	2.69
Truck	(.06)	(.08)	.10	.10	.25	.50	.45	.45	.30	.15	.10	(.07)	2.40	2.61
Tules	.16	.09	.30	.74	1.10	1.28	1.53	1.32	1.18	.98	.59	.36	9.63	9.63
Willows	.05	.03	.09	.22	.33	.38	.46	.40	.35	.29	.18	.10	2.88	2.88
Bare Land	.04	.04	.04	.08	.10	.13	.14	.13	.11	.09	.07	.05	1.02	1.02
Idle Land with Weeds***	.07	.09	.10	.19	.24	.31	.33	.28	.19	.15	.12	.08	2.15	2.15
Open Water Surfaces	.08	.13	.23	.34	.60	.76	.84	.78	.60	.33	.14	.08	4.91	4.91

NOTE: Figures shown in brackets () represent estimated consumptive use on cropped areas before planting and after harvest. (Evaporation from bare land, use by weeds, etc.)

* Includes estimated additional use by weeds during these months.

** These are the data as determined for and published in Bulletin No. 27 - "Variation and Control of Salinity in Sacramento-San Joaquin Delta and Upper San Francisco Bay" - Table 1, except that the figures for "Idle Land with Weeds" have been increased somewhat based upon later experimental work on the use of water by weeds.

*** Average for land below elevation 5.0 U.S.G.S. datum. Use on unirrigated lands above elevation 5.0 is considered zero.

TABLE 135

CONSUMPTIVE USE OF WATER IN THE SACRAMENTO-SAN JOAQUIN DELTA
1924 TO 1932 AND 1938

Year*	Water Consuming Area in Acres		Seasonal (2) Use of Water in Acre-feet		Seasonal Unit Consumption in Ac. Ft. per Ac.		Annual (3) Use of Water in Acre-feet		Annual Unit Consumption in Acre-feet per Ac.	
	Total (1)	Irr. Crops	Total	Irr. Crops	Total	Irr. Crops	Total	Irr. Crops	Total	Irr. Crops
1924		319800		674840		2.11				
1925		315600		660900		2.10				
1926		316200		649560		2.06				
1927		315600		649090		2.06				
1928		321500		674920		2.10				
1929	420900	321800	1100140	689550	2.62	2.14	1250180	839590	2.97	2.61
1930	446800	338000	1161000	744000	2.60	2.20	1322000	895000	2.96	2.65
1931	446310	339300	1167390	756010	2.61	2.23	1319250	907870	2.96	2.68
1932	447430	336440	1181030	746800	2.64	2.22	1334060	899830	2.98	2.67
1938	448750	335670	1226850	760850	2.73	2.27	1380120	914120	3.08	2.72

*Annual census omitted for years 1933 to 1937, inclusive.

(1) Total includes interior and exterior water surface, bare and weed lands which consume seepage water, willow and tule areas, etc.

(2) Includes water used by crops and vegetation during the composite growing season and by evaporation for the entire year.

(3) Includes in addition to seasonal use, the use of water on the cropped area during the non-growing or dormant season.

NOTE: Prior to 1929 the annual census was not complete with respect to water consuming areas other than irrigated crop lands.

CHAPTER VI

SALINITY INVESTIGATIONS

Purpose

The purpose of the salinity investigation, as outlined in previous reports, has been to record the occurrence and extent of salinity encroachment from San Francisco Bay, and to establish the relation between movement of salinity, stream flow to the Delta, and tidal action. As reported in Bulletin 27 of the Division of Water Resources, this relation was established for the conditions which obtained during the period of the special investigation for that bulletin and upon the basis of all data available to that time. Subsequent investigations, therefore, have been directed to the maintenance of an unbroken record of the salinity, tidal and stream flow variations, essential not only in corroboration of the relation as at present established, but as the basis for a check of possible modifications in the relation due to changes in channel and tidal conditions which may have taken place or will occur in the future. Also, during periods of low stream flow, the continuation of salinity sampling has been essential in keeping Delta irrigators advised of conditions through periodic bulletins so that damage from the use of water of too high salt content might be averted.

Scope

The general scope of this investigation each season prior to July 1941 has been such as to insure that samples of water to be tested for salinity would be taken at regular intervals at a sufficient number of stations throughout the Delta and upper bay region so that the advance and retreat of the salinity from early summer to late fall would be completely recorded. Plate 2 shows the limit of encroachment into the Delta of 100 parts of salinity for the years 1920 to 1943 inclusive.

Prior to 1941 twenty Bay and Delta sampling stations were maintained permanently throughout the year.

Station Maintenance and Records

Due to curtailment of appropriations by the Legislature to the 1941-1942 budget of the Division of Water Resources, sampling for salinity at all key stations in the Bay and Delta areas was stopped by the Division of Water Resources on July 15, 1941. Through cooperation of the Fontana Farms Company, the City of Antioch Water Department, the U. S. Bureau of Reclamation, the Dow Chemical Company at Pittsburg and the City of San Francisco, miscellaneous samples were taken during the 1943 season and the results of the analyses are presented in Table 138.

In Table 139 is assembled the results of a large number of complete analysis of waters from the channels in the Sacramento-San Joaquin valleys and Delta. This tabulation was prepared by the U. S. Bureau of Reclamation and is presented practically in its original form. All of the samples in the second section of the table were taken by the Bureau and analyzed by the Bureau of Standards.

The salinity sampling at all stations, prior to July 15, 1941, was done by local observers. Each observer was provided with a schedule showing the exact time for taking the samples, so that, throughout the Delta at four-day intervals, all samples were taken at approximately one and one-half hours after the same high tide. Table 137 gives the location and description of each station. The observers were furnished with stamped containers for the sample bottles so that the latter could be mailed as filled, to the laboratory at Sacramento. All testing was done at the Materials and Research Laboratory of the Division of Highways.

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF WATER RESOURCES

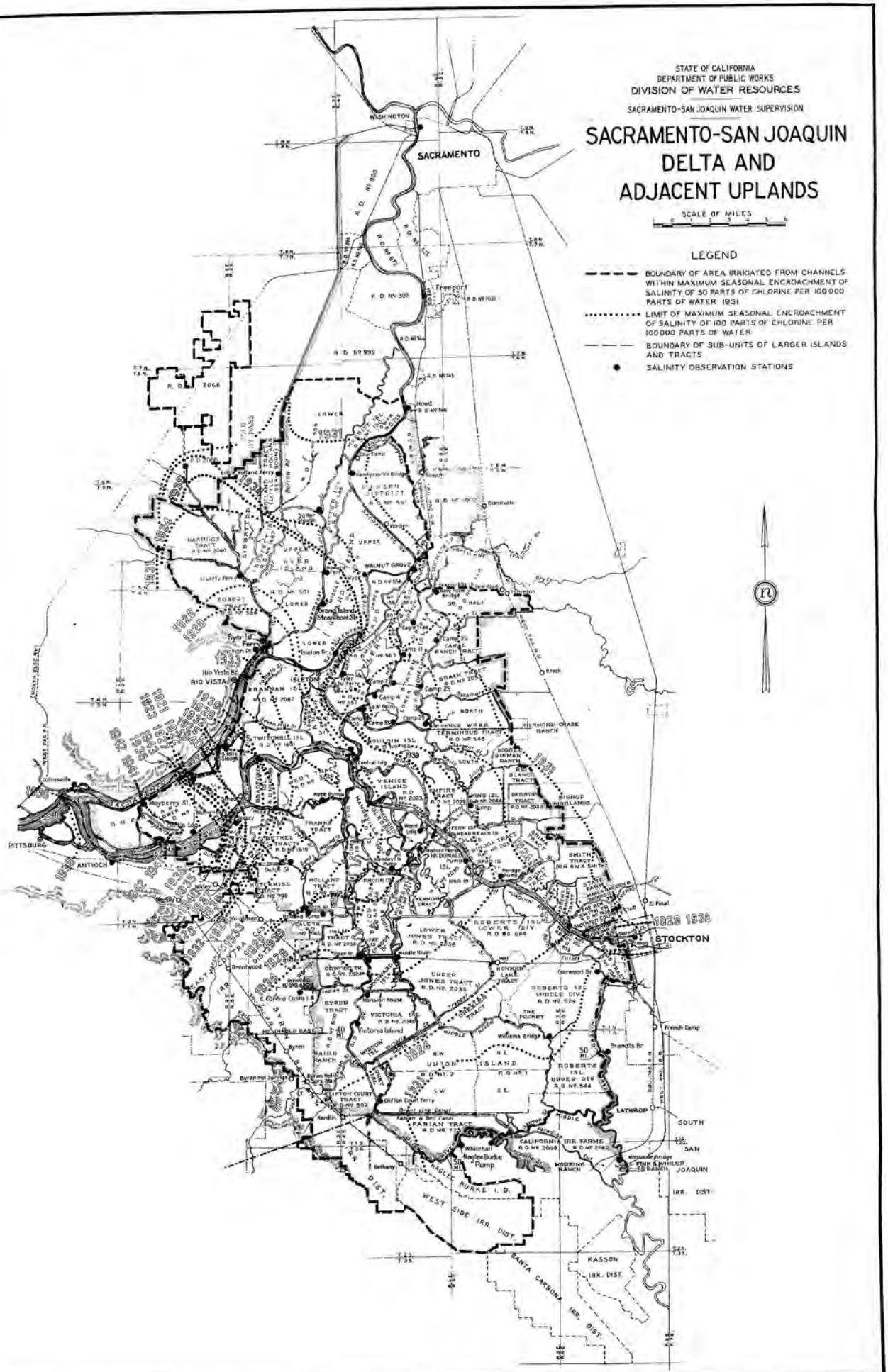
SACRAMENTO-SAN JOAQUIN WATER SUPERVISION

SACRAMENTO-SAN JOAQUIN DELTA AND ADJACENT UPLANDS

SCALE OF MILES

LEGEND

- BOUNDARY OF AREA IRRIGATED FROM CHANNELS WITHIN MAXIMUM SEASONAL ENCROACHMENT OF SALINITY OF 50 PARTS OF CHLORINE PER 100 000 PARTS OF WATER 1931
- LIMIT OF MAXIMUM SEASONAL ENCROACHMENT OF SALINITY OF 100 PARTS OF CHLORINE PER 100 000 PARTS OF WATER
- BOUNDARY OF SUB-UNITS OF LARGER ISLANDS AND TRACTS
- SALINITY OBSERVATION STATIONS



MAXIMUM SEASONAL SALINITY ENCROACHMENT OF 100 PARTS OF CHLORINE PER 100,000 PARTS OF WATER, SACRAMENTO-SAN JOAQUIN DELTA 1920-1943

The maximum salinity as recorded at the stations operated prior to 1943 is shown in Table 136. For comparative purposes, this table shows also the maximum salinity recorded at these stations in previous years beginning with 1933.

Salinity Bulletins

During 1943 the stream flow into the Sacramento-San Joaquin Delta did not reach a stage low enough to allow any great penetration of saline water into the Delta. Therefore, no salinity bulletins were mailed during the year.

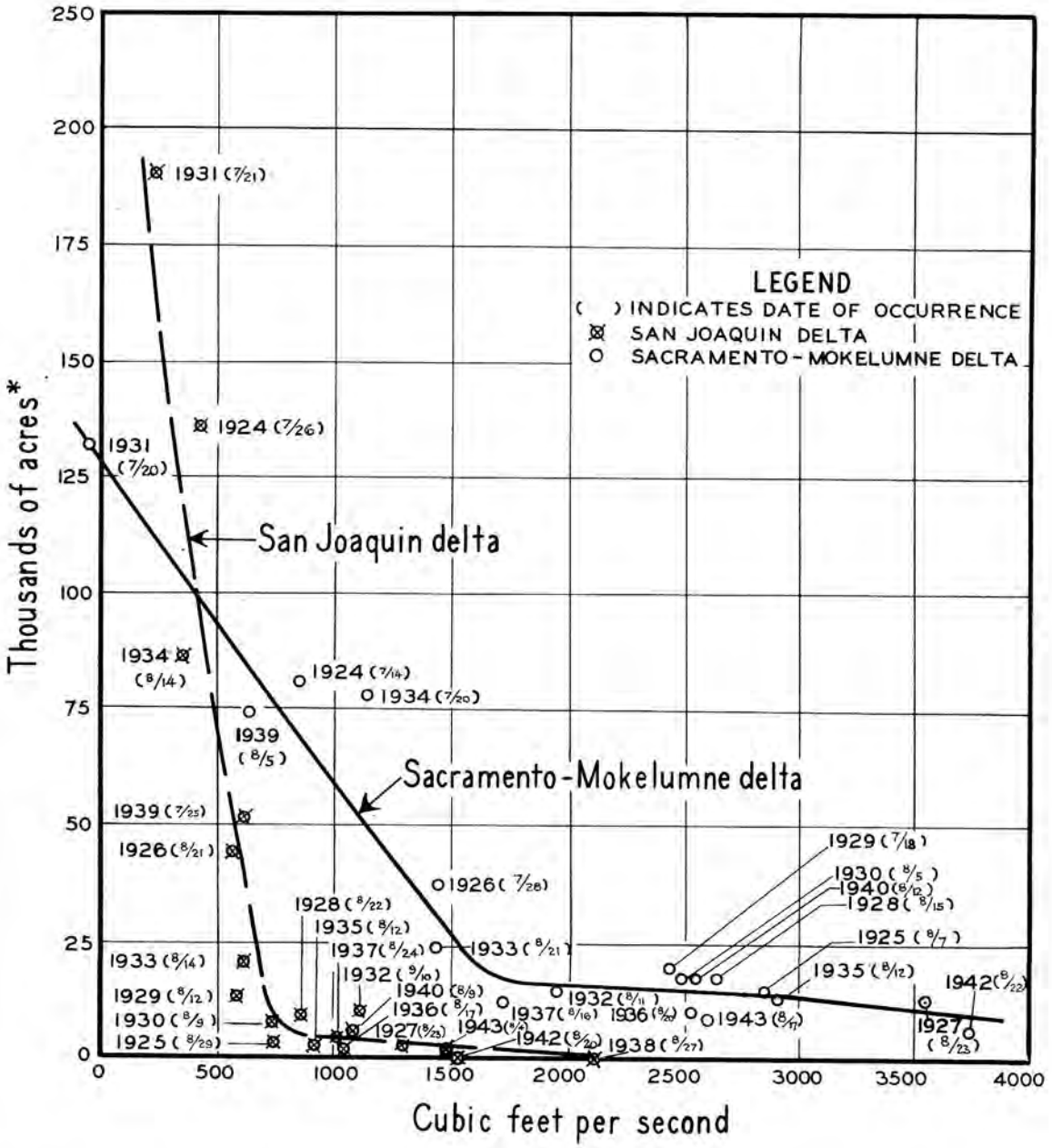
Area of Salinity Encroachment

There is a definite relation between the minimum ten-day stream flow to the Deltas to the area affected by salinity encroachment. This relationship is shown in Plate 3. The relation of the flow of the Sacramento and San Joaquin rivers to the area of their respective deltas affected by salinity has been shown rather than combining the flows and treating the Delta as one area. Inspection of the plate indicates that when the flow to either delta drops below a certain point, the rate of salinity encroachment greatly accelerates. This point for the Sacramento-Mokelumne Delta is about 1750 cubic feet per second and for the San Joaquin Delta about 750 cubic feet per second. This shows that with a combined flow into the Delta, measured at Sacramento and Vernalis, of 2500 cubic feet per second, the whole Delta, with the exception of 25,000 acres in the extreme lower end, is protected from a salinity encroachment greater than 100 parts of chlorine per 100,000 parts of water. It also shows that when the flow drops below 2500 cubic feet per second the area affected increases much faster per unit of drop in flow than the area would decrease for the same unit of increase in flow. The areas shown on this plate are gross areas within the Delta

boundaries and include all water surfaces, channels, levees, etc., and are not net irrigable areas. In Table 140 are shown the data from which Plate 3 has been constructed.

Salinity Observations of Stream and Return Flow Channels

No samples of water were taken by the Division of Water Resources from stream and return flow channels in the Sacramento-San Joaquin areas during 1943, the sampling of these channels having been discontinued at the same time as the Delta sampling.



SACRAMENTO-SAN JOAQUIN WATER SUPERVISION

RELATION OF MINIMUM 10 DAY STREAM FLOW OF SACRAMENTO AND SAN JOAQUIN RIVERS TO THEIR RESPECTIVE DELTAS, TO THE AREA OF EACH AFFECTED BY A SALINITY ENCROACHMENT GREATER THAN 100 PARTS OF CHLORINE PER 100.000 PARTS OF WATER

* AREA INCLUDES ALL LANDS, LEVEES, WATER SURFACES

TABLE 136

MAXIMUM RECORDED SALINITY AT BAY AND DELTA STATIONS
1933-1943 INCLUSIVE*

Year	1933	1934	1935	1936	1937	1938	1939	1940	(3)1941	1942	1943
Sacramento-San Joaquin Runoff in per cent of Normal**	48	43	91	96	80	170	43	115	137	129	114
Station (1)	Maximum Recorded Salinity in parts of Chlorine per 100,000										
San Francisco, San Pablo and Suisun Bays											
Point Orient	1800	1840	1720	1740	1700	1700	1920	1840			
Point Davis	1680	1800	1500	1440	1460	(2)1460	1840	1760			
Bullshead point	1380	1640	1260	1340	1270	1160	1640	1340			
Bay Point	1160	1460	720	960	920	580	1480	990			
O and A. Ferry	900	1200	540	580	660	256	1180	720			
Innisfail Ferry	900	1260	720	580	700	330	1360	790			
North San Pablo Bay											
Sonoma Creek Bridge	1620										
Grandview	1660										
Vallejo	1420										
Cutting Wharf	1320										
Sacramento River Delta											
Collinsville	620	1080	390	300	490	86	1040	450	195	190	340
Emmaton	380	760	88	54	102	7	580	140			
Three Mile Slough Bridge	320	660	77	57	120		590				
Rio Vista Bridge	130	520	12	8	33		405				
Junction Point	74	410									
Ryer Island Ferry							375				
Liberty Ferry		230					241				
Grand Island (Steamboat Slu)		350					271				
Isleton Bridge	46	310					250				
Reclamation District 2068		176					82				
Howard Ferry		232					158				
Sutter Slough		50									
Little Holland Ferry		14					43				
Ryde		11					38				
Walnut Grove		10					18				
Paintersville Bridge		8									
Lisbon							8				
Sacramento	7	7	4	4	13	6	7	6			

* For maximum salinities recorded 1924-1932, see previous reports.
** Normal taken as 50-year mean (1889-1939) of natural runoff at foothill stations of major tributaries.
(1) For location and description see Table 137.
(2) Estimated. Samples not taken during period of maximum salinity.
(3) Sampling by state discontinued in 1941.

TABLE 136 (CONTINUED)

MAXIMUM RECORDED SALINITY AT BAY AND DELTA STATIONS
1933 - 1943 INCLUSIVE

Year	1933	1934	1935	1936	1937	1938	1939	1940	(5)1941	1942	1943
Sacramento-San Joaquin Runoff in per cent of Normal**	48	43	91	96	80	170	43	115	137	129	114
Station (1)	Maximum Recorded Salinity in parts of Chlorine per 100,000										
Mokelumne River Delta											
Southwest Point	17	107					86				
Camp 33, Staten Island	13										
Tyler Island Ferry		10					16				
Camp 11, Staten Island	5	25					13				
Camp 29, Staten Island		52					32				
Camp 25, Staten Island	7						31				
Camp 20, Staten Island		18					22				
San Joaquin River Delta											
Antioch	580	960	290	270	350	51	620	440	158	140	312
Curtis Landing	470	810	180								
Jersey	280	(2)620	86	78	102	9	500				
Opposite Jersey					136						
Webb Pump	122	(3)340	16	16	25	8	265	27			
Central Landing	25	(4) 90	8	7							
Opposite Central Landing					11	10	138	15			
Dutch Slough	80	280	21	21	28	11	225	42			
Rock Slough West of Dam			8	11	13	9	94	15			
Camp 2, Medford Island							121				
Ward Landing		190									
Bacon Pump	25	160	11								
Mandeville Pump	29	166					104				
King Island Pump		104					79				
Rock Slough East of Dam			8	11	12	11	71	18			
Rindge Pump	22	94	18	20	20	15	62	29			
Orwood Bridge		107					54				
East Contra Costa I.D.		73					32				
Middle River	18	108	11	12	16	13	60	55			
Mansion House		90									
Victoria Island							35				
Stockton Country Club		44									
Clifton Court Ferry		40					19				
Stockton	66	76					32				
Garwood Bridge		38									
Brants Bridge		21									
Williams Bridge		43									
Naglee Burke Pump							14				
Whitehall		12									
Mossdale Bridge	13	25	12	14	12	12	16	14			

* For maximum salinities recorded 1924-1932 see previous reports.
** Normal taken as 50-year mean (1889-1939) of natural runoff at foothill stations of major tributaries.
(1) For location and description, see Table 137.
(2) Estimated maximum of 670 in period not covered by sampling.
(3) Estimated maximum of 350 in period not covered by sampling.
(4) Estimated maximum of 125 in period not covered by sampling.
(5) Sampling by State discontinued in 1941.

TABLE 137

DESCRIPTION OF SALINITY STATIONS AT WHICH OBSERVATIONS ARE OR HAVE BEEN TAKEN

STATION	Miles from Golden Gate (1)	Time Interval between high tide at Golden Gate and time for taking samples at Station		LOCATION
		Hours	Mins.	
				SAN FRANCISCO, SAN PABLO AND SUISUN BAYS
Point Orient*	12.3	2	20	North End of San Francisco Bay, East Shore, one-half mile south of Point San Pablo Wharf of Standard Oil Company
Point Davis*	25.2	3	15	East End San Pablo Bay, South Shore, Oleum Wharf of Union Oil Company
Bullshead Point*	34.0	3	50	West End Suisun Bay, South Shore, Wharf of Mountain Copper Company
Bay Point*	39.9	4	15	Suisun Bay, South Shore, Bay Point Wharf of Coos Bay Lumber Company
O & A Ferry*	46.5	4	40	Upper End Suisun Bay between Mallard Station and Chipps Island at Sacramento Northern Railroad Ferry Crossing
Innisfail Ferry*	47.3	4	50	Montezuma Slough, about one mile east of Junction with Cutoff Slough, near North End of Grizzly Island
				SACRAMENTO RIVER DELTA
Collinsville*	50.8	5	25	Sacramento River, North Bank, at Junction with San Joaquin River
Emmaton*	57.7	5	45	Sacramento River, South Bank, Lower end of Horseshoe Bend
Three Mile Slough Bridge	60.0	5	55	At Junction of Slough and Sacramento River
Rio Vista Bridge	63.5	6	05	At Highway Bridge near Northerly limits of Rio Vista
Junction Point	65.2	6	10	Sacramento River, Right Bank, just below the Junction with Steamboat Slough
Ryer Island Ferry	66.5	6	20	Lower end of Cache Slough, just above Steamboat Slough junction
Liberty Ferry	67.6	6	25	Cache Slough at Junction with Prospect Slough
Grand Island (Steamboat Slough)	68.2	6	30	Steamboat Slough at Grand Island Drainage Pumping Plant, three miles from Junction Point
Isleton Bridge	68.7	6	30	Sacramento River, one mile upstream from Isleton
Reclamation District 2068	70.7	6	45	Haas Slough, at Reclamation District 2068 pumping plant
Howard Ferry	71.4	6	55	Steamboat Slough, 1½ miles below junction with Sutter Slough
Sutter Slough	72.8	7	00	At junction with Miner Slough

* Permanent station maintained throughout the year (prior to July 1941).

(1) Mileage measured to station along main channel. For stations off the main channel, the mileage shown is the distance along the main channel to a point whereon the time of the occurrence of the tidal phase is the same as that of the observation station.

TABLE 137 (CONTINUED)

DESCRIPTION OF SALINITY STATIONS AT WHICH OBSERVATIONS ARE OR HAVE BEEN TAKEN

STATION	Miles from Golden Gate (1)	Time Interval between high tide at Golden Gate and time for taking samples at Station		LOCATION
		Hours	Mins.	
				SACRAMENTO RIVER DELTA (CONTINUED)
Little Holland Ferry	73.2	7	05	Back Borrow Pit of Reclamation District 999, two miles above junction with Miner Slough
Ryde	74.4	7	15	Sacramento River, Right Bank, at town of Ryde
Walnut Grove	77.4	7	25	Sacramento River, Highway Bridge, at Walnut Grove
Paintersville Bridge	77.6	7	25	Sacramento River one mile below Courtland
Lisbon	85.0	8	20	East Borrow Pit of Yolo By-pass at Lisbon
Sacramento*	103.5	9	30	Sacramento River at Southern Pacific Railroad Bridge
				MOKELUMNE RIVER DELTA
Southwest Point	78.8	7	25	Staten Island, North Fork Mokelumne River, South Bank, just above junction with South Fork
Camp 33, Staten Island	80.2	7	30	South Fork, Mokelumne River, North Bank, two miles above North Fork Junction
Tyler Island Ferry	81.9	7	40	On Georgiana Slough, about due east of Isleton
Camp 11, Staten Island	83.1	7	45	North Fork, Mokelumne River, East Bank, four miles above South Fork Junction
Camp 29, Staten Island	83.4	7	50	South Fork, Mokelumne River, North Bank, opposite Terminus
Camp 25, Staten Island	86.4	8	05	South Fork, Mokelumne River, West Bank, one mile above Sycamore Slough Junction
Camp 20, Staten Island	88.9	8	30	South Fork, Mokelumne River, West Bank, one-half mile below Beaver Slu Junction
				SAN JOAQUIN DELTA
Antioch*	54.9	5	55	San Joaquin River, at City Water Works pumping plant
Curtis Landing	58.9	6	10	San Joaquin River, Right Bank, about three-fourths mile above Antioch Toll Bridge
Jersey	61.4	6	20	San Joaquin River, Left Bank, one mile below mouth of False River
Opposite Jersey	61.4	6	20	San Joaquin River, Right Bank, opposite Jersey
Webb Pump*	72.0	7	00	False River, two miles below Old River Junction
Central Landing	72.0	7	00	Mokelumne River at Central Landing, Bouldin Island (Prior to 1937)

* Permanent station maintained throughout the year. (Prior to July 1941)

(1) Mileage measured to station along main channel. For stations off the main channel, the mileage shown is the distance along the main channel to a point whereon the time of the occurrence of the tidal phase is the same as that of the observation station.

TABLE 137 (CONTINUED)

DESCRIPTION OF SALINITY STATIONS AT WHICH OBSERVATIONS ARE OR HAVE BEEN TAKEN

STATION	Miles from Golden Gate (1)	Time Interval between high tide at Golden Gate and time for taking samples at Station		LOCATION
		Hours	Mins.	
				SAN JOAQUIN DELTA (CONTINUED)
Opposite Central Landing*	72.0	7	00	Mokelumne River, on Andrus Island directly opposite Central Landing on Bouldin Is.
Dutch Slough*	73.0	7	05	At Bethel Island Bridge
Rock Slough West of Dam*	77.0	7	20	In Rock Slough, West of Dam at Junction of Sand Mound Slough and Rock Slough.
Camp 2, Medford Island	78.0	7	25	San Joaquin River (Stockton Channel) at north end of Medford Island
Ward Landing	79.6	7	35	San Joaquin River near junction with Little Connection Slough on Southwest side of Empire Tract.
Holland Pump	80.6	7	40	Rock Slough, North Bank, 1⅝ miles west of Old River junction
Bacon Pump	82.9	7	50	Old River at Bacon Island Drainage Pumping Plant, near Junction with Rock Slough
Mandeville Pump	83.0	7	50	Connection Slough, North Bank, one mile west of Middle River on South end of Mandeville Island
King Island Pump	84.2	8	00	Honker Cut at Empire Tract - King Island Ferry
Rock Slough East of Dam*	85.4	8	05	In Rock Slough, three-fourths of a mile East of Junction with Sand Mound Slough
Rindge Pump*	86.1	8	10	San Joaquin River, North Bank, one mile below Fourteen Mile Slough Junction
Orwood Bridge	86.3	8	10	Old River, at Santa Fe Railroad Crossing, Orwood
East Contra Costa I.D.	86.7	8	20	Indian Slough, at East Contra Costa Irrigation District Pumping Plant
Middle River P. O.	87.7	8	20	Middle River, East Bank, at Santa Fe Railroad Crossing
Mansion House	88.4	8	30	Victoria Island, Old River, East Bank, at Junction with North Victoria Canal
Victoria Island	89.6	8	35	Old River at Borden Highway Crossing
Stockton Country Club	90.8	8	45	Old Lindley Cutoff (San Joaquin R.), North Bank, 3/4 mile above Burns Cutoff Jct.
Clifton Court Ferry	94.2	9	10	Old River just below Junction with Grant Line Canal
Stockton	94.8	9	15	Near head of Stockton Channel at wharf of California Transportation Company
Port Stockton*	94.0	9	15	At lower end of Port Stockton wharves
Garwood Bridge	95.3	9	15	San Joaquin River. At drawbridge one mile above Santa Fe Railroad Crossing
Brandt Bridge	100.6	9	50	San Joaquin River. At drawbridge six miles above Santa Fe Railroad Crossing
Williams Bridge	101.6	9	55	Middle River, about four miles below Salmon Slough Junction
Naglee Burke Pump	102.5	10	00	Old River at Naglee Burke Pumping Plant
Whitehall	104.8	10	20	Old River West of Junction of Salmon Slu and Paradise Cut. Due north of Tracy
Mossdale Bridge*	108.5	10	50	San Joaquin River at Lincoln Highway Crossing about 3 miles southwest of Lathrop

* Permanent station maintained throughout the year. (Prior to July 1941.)

(1) Mileage measured to station along main channel. For stations off the main channel, the mileage shown is the distance along the main channel to a point whereon the time of the occurrence of the tidal phase is the same as that of the observation station.

TABLE 138

MISCELLANEOUS SALINITY OBSERVATIONS 1943
SACRAMENTO-SAN JOAQUIN DELTA
Chlorides in parts per 100,000 parts of water

Samples taken by Fontana Farms Company			
		Montezuma Slough	
Date	Sacramento River (1)	Ferry (2)	Meins Landing (3)
1943			
Jan. 1	3	14	62
Feb. 1	2	9	11
13	2	9	11
Mar. 1	2	9	11
Apr. 2	3	9	9
May 3	2	4	
20	2	7	
June 2	3	7	
20	2	11	
24	2	12	
July 2	4 LLW	5	
8	6 LLW	6	
18		64	
27	60		
Aug. 1	102		
17	311	320	
23	241	397	427
Sep. 10	340 Est.		
21	220	572	
Oct. 7	151	358	
19	95	277	
Nov. 6	58	428	
20	78	342	
27	74	356	
Dec. 10	23 LLW	35	
10	104	285	364
20	86	301	
23	77	277	
27	109	326	550
30	46 LH		
30	57 HH		
31	49 LH		

NOTE: Except as noted all samples taken 1½ hours after H.H. tide.
(1) Samples taken at tide gate 1700' west of Collinsville gage.
(2) Samples taken at Roaring River Ferry.
(3) Samples taken at Meins Landing.

TABLE 138 (CONTINUED)

MISCELLANEOUS SALINITY OBSERVATIONS - 1943
SACRAMENTO-SAN JOAQUIN DELTA

Samples taken by City of Antioch
San Joaquin River at Water Works Wharf
Chlorides in parts per 100,000 parts of water

Date	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
2	3	2	2	2	1	2	10		279	153	45	18
6	2	3	2	2	1	2	9	135	298	170	27	19
10	3	2	2	2	1	2	7	85	312	96	45	32
14	2	2	1	2	1	1	19	180	266	90	51	48
18		2	2	2	1	2	44	270E	267	77	37	26
22	3	2	2	1	2	3	62	220E	203	47	34	32
26	2	2	2	2	2	2	32	210E	175	56	28	36
30	2		2	1	2	3		232	155	47	29	46

E Estimated
NOTE: Samples taken one and one-half hours after High Tide.

Samples taken by Dow Chemical Company
San Joaquin River at Pittsburg
Chlorides in parts per 100,000 parts of water (1)

Date	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
7	5	3	2	5	2	10	10	135	275	180	75	40
14	4	5	2	5	4	10	20	190	260	160	55	45
21	9	5	4	5	4	10	50	260	270	125	65	45
28	5	5	4	2	9	10	70	290	300	75	50	45

(1) Analysis made weekly from composite of daily samples. Values in table taken from graph.

TABLE 138 (CONTINUED)

SALINITY OBSERVATIONS SACRAMENTO-SAN JOAQUIN DELTA - 1943
Samples taken by U.S. Bureau of Reclamation (1)
Chlorides in parts per million parts of water

1943	San Joaquin R. at Mossdale Br.	French Camp Slough South of Stockton	Stockton Ship Channel at Burns Cut-off	Rock Slough at Contra Costa Canal Intake	Indian Slough at East Contra Costa I.D. Intake	San Joaquin R. at Brandt Bridge	Rock Slough east of Dam in Rock Slough	Sand Mound Slough at Junction of Rock Slough	Old River at Clifton Ferry	San Joaquin R. at Antioch	Suisun Bay at Benicia	Sacramento River at Collinsville	Sacramento River opposite Snodgrass Slough	Sacramento River at Freeport Bridge	Sacramento River at Sacramento	Mokelumne River at Woodbridge
Station No.	58	59b	59c	59f	59f3	59w	84	85	59b	81	167	59u	59n	88	70	63
January	7th	2nd	7th	6th	6th	7th	6th	6th		6th	15th	6th	6th	6th	6th	2nd
Chlorides	31	36	35	61	130	30	15	61		25	3200	37	3.9	3.9	7.6	1.1
February		10th	10th	9th	9th	10th	9th	9th		9th	3rd	9th	10th	10th	10th	8th
Chlorides		19	15	79	130	12	59	71		21	25	13	6.4	6.2	4.8	1.7
March	8th	8th	15th	5th	5th	8th	5th	5th		5th	10th	5th	6th	6th	6th	4th
Chlorides	7.8	5.8	9.7	52	130	7.4	55	52		23	40	13	4.8	4.9	6.5	1.1
April	6th	8th	8th	6th	6th	8th	6th	6th		6th	7th	6th	6th	6th	6th	5th
Chlorides	11	44	13	40	130	12	30	30		15	500	64	4.1	3.5	3.0	1.8
May	10th	10th	10th	8th		10th	8th	8th		10th	12th	8th	8th	8th	8th	6th
Chlorides	9.1	27	11	20	25	9.6	15	15		11	53	10	4.3	3.9	3.9	1.2
June	2nd	15th	2nd	4th	4th	2nd	4th	4th		4th	3rd	4th	3rd	3rd	3rd	2nd
Chlorides	6.2	19	7.1	19	11	6.8	26	15		17	260	61	4.1	5.5	7.8	1.2
July	3rd	3rd	3rd	2nd	2nd	3rd	2nd	2nd		2nd	15th	2nd	2nd	2nd	5th	3rd
Chlorides	71	20	50	27	27	67	26	27		41	7800	33	14	20	17	1.4
August	5th	5th	5th	3rd	3rd	5th	3rd	3rd		3rd	7th	3rd	6th	6th	6th	2nd
Chlorides	93	41	98	62	93	86	63	63		530	9700	1400	35	31	31	1.4
September	7th	7th	7th	8th	8th	7th	8th	8th		8th		8th	7th	7th	7th	6th
Chlorides	81	68	100	85	100	91	86	91		1700		2800	44	51	46	2.4
October	8th	8th	8th	9th	9th	8th	9th	9th		9th		9th	9th	9th	9th	8th
Chlorides	66	100	77	91	90	63	90	88		460		820	18	20	17	2.6
November	4th	4th	4th	9th	9th	4th	9th	9th		9th		9th	9th	9th	9th	4th
Chlorides	83	79	78	73	100	78	72	71		130		170	11	7.5	12	1.9
December	6th	6th	6th	10th	10th	6th	10th	10th	6th	10th		10th	10th	10th	10th	6th
Chlorides	63	64	69	83	83	53	79	78	60	120		230	8.9	9.2	9.6	2.1

TABLE 138 CONTINUED

MISCELLANEOUS SALINITY OBSERVATIONS - SACRAMENTO-SAN JOAQUIN DELTA - 1943
SAMPLES TAKEN BY CITY OF SAN FRANCISCO - HETCH HETCHY WATER SUPPLY

Chlorine in parts per million of water

Station	Date	Time	Cl.	Date	Time	Cl.	Date	Time	Cl.	Date	Time	Cl.
San Joaquin River												
at Antioch	4/15	8:35A	19	6/18	8:10A	16	8/5		500	12/20	10:30A	89
at Big Break	4/15	9:05A	57	6/18	8:35A	26	8/5		180	12/20	11:00A	51
at Garwood Bridge	4/15	11:30A	12	6/18	11:20A	24	8/5		88	12/20	2:30P	57
at Mossdale Bridge	4/15	12:45P	12	6/18	12:25P	41	8/5		95	12/20	3:55P	46
Dutch Slough												
at Bass Landing	4/15	9:25A	19	6/18	9:05A	15	8/5		70	12/20	11:20A	56
Rock Slough												
at Holland Tract Road	4/15	9:40A	27	6/18	9:15A	17	8/5		66	12/20	11:35A	75
Old River												
at Orwood Bridge	4/15	9:55A	14	6/18	9:35A	17	8/5		81	12/20	12:05P	59
at Borden Highway	4/15	10:40A	14	6/18	10:25A	21	8/5		93	12/20	1:05P	60
at West Side Irr. Dist. pump	4/15	1:25P	115*	6/18	1:00P	44	8/5		137	12/20	4:00P	213*
Indian Slough												
at E.C.C.I.D. pump	4/15	10:15A	50*	6/18	9:55A	20	8/5	Presumably $1\frac{1}{2}$ hours after High High Tide	93	12/20	12:40P	94*
Middle River												
at Borden Highway	4/15	11:05A	13	6/18	10:55A	21	8/5		97	12/20	1:55P	58
French Camp Slough												
North Fork	4/15	12:05P	350	6/18	11:50A	425	8/5		400	12/20	2:50P	155
South Fork	4/15	12:10P	43	6/18	11:55A	19	8/5		53	12/20	2:55P	128
Italian Slough												
at Byron-Bethany pump	4/15	2:00P	517*	6/18	1:30P	378	8/5		119	12/20	4:25P	251*

* Indicates pumping plant not in operation at time of sampling.

TABLE 139

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO-SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943*

Parts per Million

Location	Date of Sampling	Stream Flow c.f.s.	Total Solids	CO_3 HCO_3	Cl	SO_4	Ca	Mg	Alkali Bases	Per cent Sodium	Source of Data
SAN JOAQUIN RIVER - MENDOTA DAM TO DELTA											
San Joaquin River at Friant	10/1/37		39	17	2	1	0.3	0.1	8	93	State Laboratory
at Herndon	9/2/36	(1) 1460	46.0	15.3	7.0	8.2	1.1	3.1	7.1	50	Twining Laboratories
	10/20/36	(1) 764	35.6	21.4	7.0	5.8	4.6	3.1	4.2	27	" "
	12/29/36	(1) 1180	63.2	33.6	10.5	4.5	2.0	4.7	10.4	48	" "
	7/14/37	(1) 2620	46.4	21.4	9.1	7.4	3.4	3.3	7.3	42	" "
	8/3/37	(1) 1620	30.0	18.3	7.0	1.2	1.4	0.6	9.3	77	" "
	9/2/37	(1) 1380	31.5	18.3	3.5	4.9	4.4	1.5	3.6	32	" "
	10/19/37		50.0	24.4	10.5	7.2	1.1	1.2	16.0	82	" "
above Mendota Dam	10/20/37		71.5	24.4	14.0	16.5	2.9	2.8	17.5	63	Twining Laboratories
at Mendota	8/23/37		48	24	2.0	1.0	4.0		6.0	57	State Laboratory
Arroyo Canal	9/23/37		54	39	6	1	8		10	52	State Laboratory
Poso Canal at Los Banos-Merced Hwy	9/28/37		34	17	2	1	6		1	12	State Laboratory
Delta Canal North of Delta Ranch	9/28/37		60	44	4	2	14		4	20	State Laboratory
San Joaquin River at Santa Rita Bridge	8/11/36		100.5	85.4	14.0	9.9	19.7	11.2	2.2	5	Twining Laboratories
	9/2/36		162.4	97.6	14.0	11.9	20.6	5.5	17.5	34	" "
	9/21/36		110.0	108.3	14.0	7.5	22.6	11.4	6.6	12	" "
	10/20/36		125.2	106.8	14.0	10.7	23.7	6.1	15.7	29	" "
	12/29/36	1200	59.2	30.5	10.5	4.9	1.7	5.4	8.5	41	" "
	7/14/37	200	58.4	27.5	10.5	7.8	4.0	3.6	9.5	45	" "
	8/3/37		96.4	73.2	14.0	2.5	13.1	5.4	12.6	33	" "
	9/2/37		119.5	91.5	10.5	14.0	17.2	5.4	18.1	38	" "
	10/19/37		129.6	112.8	14.0	13.2	26.3	5.1	18.1	31	" "
Chamberlain Slough	9/23/37		124.0	112.0	8.0	1.0	26.0	9.0	2.0	4	Twining Laboratories

* See footnote page

(1) San Joaquin River at Friant.

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO-SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943*

Parts per Million

Location	Date of Sampling	Stream flow c.f.s.	Total Solids	CO_3 HCO_3	Cl.	SO_4	Ca	Mg	Alkali Bases	Per Cent Sodium	Source of Data
SAN JOAQUIN RIVER – MENDOTA TO DELTA (Cont'd)											
San Joaquin River											
at Fremont Ford Bridge	8/11/36	162	806.0	119.0	301.0	119.8	51.5	33.2	175.4	59	Twining Laboratories
	9/2/36	178	479.2	134.2	129.5	64.2	30.9	19.7	93.0	56	" "
	9/21/36	189	355.6	122.0	105.0	45.7	25.7	19.2	70.2	52	" "
	10/20/36	212	316.0	112.9	94.5	44.4	27.4	14.7	66.1	53	" "
	12/29/36	1300	122.0	39.7	28.0	24.3	2.9	9.1	24.2	54	" "
	7/14/37	(1000)	192	51.9	49.0	28.4	16.0	12.1	21.4	34	" "
	8/3/37	200	605.2	119.0	234.5	84.8	45.5	26.4	135.3	57	" "
	9/2/37	120	558.8	137.3	196.0	76.5	35.4	20.5	136.1	63	" "
	9/24/37	175	345.0	137.0	96.0	20.0	27.0	12.0	70.0	57	State Laboratory
	10/19/37	185	639.2	128.1	203.0	152.2	39.7	24.8	160.3	69	Twining Laboratories
at Rendering Plant (Above Merced R.)	7/30/36	239	902	115.9	217	188.5	54.3	42.4	132.3	48	Twining Laboratories
	8/11/36	172	1092	128.1	406	233.7	64.9	49.3	255.6	60	" "
	9/2/36	188	536	144.9	189	63.0	40.0	26.8	110.7	53	" "
	9/21/36	199	502	125.1	154	90.9	32.9	26.4	103.9	55	" "
	10/20/36	222	438.8	112.8	129.5	87.2	30.6	20.6	94.1	56	" "
	12/29/36	1380	190.8	54.9	42.0	29.6	7.4	8.6	59.4	71	" "
	7/14/37	1160	294.4	70.2	84.0	58.4	17.4	14.0	62.4	57	" "
	8/3/37	210	1072.8	137.3	378	223.9	58.3	44.7	252.5	63	" "
	9/2/37	130	798.8	152.5	269.5	158.0	48.3	34.8	186.6	61	" "
	10/19/37	195	561.2	125.1	171.5	114.8	41.4	22.0	124.2	58	" "
Near Newman	7/30/36	534	409.6	103.7	119	79.8	32.6	20.9	100.5	57	" "
	8/11/36	381	512.0	106.8	171.5	106.6	26.0	23.2	128.7	64	" "
	9/2/36	402	412.4	119.0	105.0	119.9	16.9	17.3	114.3	69	" "
	9/21/36	434	277.2	103.7	80.5	45.6	19.4	16.1	60.4	53	" "
	10/20/36	450	310	109.8	73.5	47.3	23.4	12.9	82.4	62	" "
	12/29/36	1550	185.6	51.9	45.5	34.2	7.4	8.7	40.5	62	" "
	7/14/37	1500	249.2	73.2	73.5	52.7	19.2	14.3	51.4	51	" "
	8/3/37	534	509.2	100.7	168.0	100.8	32.0	21.9	116.9	60	" "
	9/2/37	450	369.6	109.8	115.5	64.2	25.4	16.4	86.8	59	" "
	9/19/37	450	318.0	115.0	76.0	53.0	18.0	15.0	69.0	58	State Laboratory
	10/19/37	470	286.4	119.0	77.0	33.3	27.4	14.9	51.1	46	Twining Laboratories
at Crows Landing Bridge	8/11/36		548	125.1	175	119.3	40.9	25.9	121.8	56	Twining Laboratories
	9/2/36		409.6	125.1	115.5	77.8	30.0	17.9	91.0	57	" "
	9/21/36		350.8	115.9	94.5	61.7	23.7	20.5	68.5	51	" "
	10/20/36		363.6	106.7	98.0	63.4	24.3	17.3	96.5	61	" "
	12/29/36		194.4	64.1	38.5	23.9	9.7	7.4	35.4	58	" "

* See footnote page 195.

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943*

Parts per Million

Location	Date of Sampling	Stream flow c.f.s.	Total Solids	CO_3 HCO_3	Cl.	SO_4	Ca	Mg	Alkali Bases	Per Cent Sodium	Source of Data
SAN JOAQUIN RIVER - MENDOTA TO DELTA (Cont'd)											
San Joaquin River											
at Crows Landing Bridge (Cont'd)	7/14/37		268.0	79.3	77.0	49.8	18.6	15.4	53.2	51	Twining Laboratories
	8/3/37		550.4	115.9	164.5	97.1	31.4	24.5	114.4	58	" "
	9/2/37		444.0	134.2	133.0	71.2	29.2	21.1	97.5	57	" "
	10/19/37		318.8	122.0	91.0	65.4	39.4	14.5	63.7	47	" "
near Patterson	7/30/36		470.8	109.8	143.5	94.7	36.9	23.2	93.5	52	" "
	8/11/36		520.4	125.1	164.5	104.9	40.6	25.1	110	54	" "
	9/2/36		388.8	119	119	69.5	32.3	18.8	82.7	52	" "
	9/21/36		384	135	108.5	64.6	30.9	18.5	77.9	53	" "
	10/20/36		387.6	125	108.5	65.0	32.9	18.3	76.6	52	" "
	12/29/36		210.4	67.1	42.0	31.7	10.6	8.1	40.2	60	" "
	7/14/37		275.2	85.4	70.0	53.5	17.7	14.6	55.3	54	" "
	8/3/37		534.0	128.1	168.0	100.0	35.2	24.2	118.9	58	" "
	9/2/37		440.8	128.1	129.5	83.1	29.4	20.2	100.0	58	" "
	10/19/37		368.0	134.2	105.0	56.8	36.3	11.4	82.5	57	" "
at Lairds Slough Bridge	4/4/34	427	676	132	195	147	52	25	142	57	Thos. H. Means
	5/1/34	260	704	143	199	141	49	28	140	56	" "
	6/4/34	265	700	162	213	140	52	33	146	57	" "
	7/9/34	122	813	171	240	127	63	35	146	51	" "
	8/7/34	125	852	174	202	137	53	30	151	56	" "
	8/23/35	572	546(a)	134	159	119	44	29	109	51	City of San Francisco
	8/14/36	540	613(a)	189	189	98	53	28	131	54	" "
	9/19/37	590	420	127	100	71	34	18	78	52	State Laboratory
	10/19/37	700	380	146	112	71	33	17	91	57	Twining Laboratories
at Hetch Hetchy Crossing (above Stanislaus)	4/4/34	750	522	159	145	78	35	25	108	55	Thos. H. Means
	5/1/34	424	468	140	122	35	39	19	71	46	" "
	6/4/34	542	453	146	142	58	37	22	92	52	" "
	7/9/34	287	385	152	109	29	40	16	66	47	" "
	8/7/34	244	444	140	107	8	37	12	64	49	" "
	8/23/35	975(b)	431(a)	146	130	51	40	18	84	51	City of San Francisco
	8/14/36	830(b)	393(a)	134	122	49	36	18	78	51	" "
	10/19/37		254	101	70	31	21	10	56	57	Twining Laboratories

* See footnote page 195.

(a) Total solids by addition but excluding $\frac{1}{2}$ HCO_3.

(b) Estimate from San Joaquin at Vernalis.

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943*

Parts per Million

Location	Date of Sampling	Stream flow c.f.s.	Total Solids	CO_3 HCO_3	Cl	SO_4	Ca	Mg	Alkali Bases	Per Cent Sodium	Source of Data
SAN JOAQUIN RIVER - MENDOTA TO DELTA (Cont'd)											
San Joaquin River											
Below Stanislaus	9/19/37	1350	284	105	70	20	30	13	40	40	State Laboratory
	10/19/37	1940	238	98	66	31	21	9	54	57	Twining Laboratories
at Vernalis	6/4/34	627	378	140	107	43	30	17	79	54	Thos. H. Means
	7/9/34	430	320	135	79	19	31	14	51	45	" "
	8/7/34	373	378	140	67	7	31	7	56	53	" "
at Mossdale Br.(near Lathrop)	6/4/34	627(1)	358	140	105	40	34	19	66	46	" "
	8/14/36	1010	336(a)	120	110	23	30	15	65	51	City of San Francisco
	9/19/37	low tide	292	110	68	20	26	5	62	61	State Laboratory
	9/19/37	high tide	286	92	72	10	28	17	37	37	" "
	10/19/37		237	101	63	34	20	9	54	57	Twining Laboratories

* From "Quality of Water to be Supplied to Mendota Canals Under Proposed Exchange Agreement" an unpublished report by Engineering Offices of J. B. Lippincott, 1937.

(1) San Joaquin at Vernalis.

(a) Total solids by addition but excluding $\frac{1}{2}$ HCO_3.

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943*

Parts per Million

Location	Date of Sampling	Stream flow c.f.s.	Total Solids	CO_3 HCO_3	Cl	SO_4	Ca	Mg	Alkali Bases	Per Cent Sodium	Source of Data
MERCED RIVER											
Merced River near Mouth	7/30/36	252	143.2	79.3	17.5	13.2	14	10	12.6	27	Twining Laboratories
	8/11/36	237	248	146	21	10.3	51.1	6.7	2.0	3	" "
	9/2/36	190	177.6	112.9	29.8	15.2	16.6	10.0	29.3	44	" "
	9/21/36	222	118.0	85.4	24.5	7.4	10.6	8.2	24.0	46	" "
	10/20/36	207	156.8	115.9	24.5	4.9	18.9	8.4	24.4	39	" "
	12/29/36	166(1)	204.0	125.1	28.0	11.9	17.2	10.4	31.6	44	" "
	7/14/37	340	124.4	85.4	17.5	11.5	13.4	8.1	18.3	38	" "
	8/3/37	250	112.4	76.3	21.0	3.3	13.4	6.6	16.1	37	" "
	9/2/37	265	142.4	88.5	24.5	9.5	13.1	7.7	21.9	42	" "
	9/19/37	289	137.0	85	14	2	17	4	24	47	" "
	10/19/37	293	136.4	106.8	28.0	15.2	20.3	5.9	31.3	48	" "
TUOLUMNE RIVER											
Tuolumne River at Tuolumne City	4/4/34	351	274	127	67	8	27	11	45	45	Thos. H. Means
	5/1/34	307	289	137	75	6	31	13	44	42	" "
	6/4/34	328	280	140	73	18	28	15	51	45	" "
	7/9/34	300	310	150	80	12	32	13	55	46	" "
	8/7/34	290	395	149	78	3	33	6	59	54	" "
	8/23/35	382	286(a)	149	81	10	31	11	57	50	City of San Francisco
	8/14/36	420	278(a)	130	87	5	29	12	52	48	" "
	9/19/37	593	164	68	48	1	17	8	31	47	State Laboratory
	10/19/37	985	146	73	42	4	12	6	31	55	Twining Laboratories
at Hatmark Ranch	6/4/34	167	160	119	14	16	17	9	26	41	Thos. H. Means
	8/23/35	250	133(a)	112	12	7	20	7	17	32	City of San Francisco
	8/14/36	260	131(a)	119	11	7	17	8	22	39	" "
	9/19/37	217	150	90	10	1	19	12	11	20	State Laboratory
	10/19/37		139	119	17	15	19	9	23	37	Twining Laboratories

* From "Quality of Water to be Supplied to Mendota Canals Under Proposed Exchange Agreement" an unpublished report by Engineering Offices of J. B. Lippincott, 1937.

(1) Near Livingston.

(a) Total solids by addition but excluding $\frac{1}{2}$ HCO_3.

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943'

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Gage Height	c.f.s.	Discharge		Parts per million								
				At time c.f.s. #	Mean Daily c.f.s.*	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	Total Solids
SAN JOAQUIN RIVER BELOW FRIANT**														
4/12/38	5:45pm	10.3	6160	7760c	6160a								2.5	47
5/10/38	1:30pm	11.35	9770		10100a	3.0	1.4	3.3	1.0	0.0	16	1.4	1.4	36
6/7/38	1:30pm	13.40	15000		15400a								0.4	40
7/6/38	4:00pm	10.58	8448	8448c	8500a								0.2	25
8/18/38	10:10am	6.34	1732	1704c	1710a								2.0	29
9/6/38	2:25pm		1480		1450a								2.5	31
10/6/38	3:50pm	5.34	1072	1037c	1406b								1.6	30
12/2/38	1:55pm	5.88	1396	1366c	1380b					0.0	17	0.6	3.2	38
12/27/38	11:15am	4.60	700	655c	884b					0.0	19	0.7	4.1	68
1/21/39	8:30am	5.52	1142	1142c	1180b					0.0	17	1.1	3.4	36
2/27/39	8:00am	5.56	1170	1166c	1170b					0.0	22	1.3	4.4	58
3/23/39	1:30pm	7.11	2400		2210b					0.0	18	1.1	3.2	50
4/29/39	8:30am	7.61	2920		2870b					0.0	13	0.3	0.7	34
5/26/39	2:00pm	6.35	1730		1800b					0.0	12	0.3	2.0	30
6/27/39	4:05pm	6.18	1580		1470b					0.0	15	0.8	2.1	31
7/27/39	2:00pm	5.51	1140		1400b					0.0	13	1.0	1.4	29
9/1/39	9:45am	5.30	1015		1120b					0.0	18	1.4	1.8	54
10/24/39	11:50am	3.59	310		766b					0.0	16	0.5	4.3	39
12/20/39	11:20am	3.75	600	607d	430b					0.0	22	1.2	5.3	45
1/25/40	11:25am	3.83	648	648d	860b	5.3	1.4	7.2	0.5	0.0	28	1.7	5.5	56
2/23/40	11:25am	6.66	3370	3232d	3050b					0.0	30	2.1	3.0	71
4/22/40	11:30am	8.50	5820	5900d	5520b					0.0	17	0.1	1.1	41
6/24/40	9:50am	6.88	3640	3580d	3990b					0.0	7.5	0.3	1.1	22
8/21/40	11:10am	4.78	1340	1340d	1340b					0.0	12	0.4	2.1	28
10/23/40	12:30pm	4.50	1110	1120d	1220b					0.0	17	0.9	3.7	40
12/21/40	11:50am	3.91		706d	742b					0.0	25	1.8	5.1	55
2/25/41	11:30am	6.84	3600	3530	3570	5.8	1.6	5.7	0.3	0.0	34	1.5	3.2	71
4/22/41	1:15pm	6.54	3220	3170	3240					0.0	26	1.0	2.3	57
6/21/41	11:15am	11.36	10740	11390	11300					0.0	8.8	0.9	1.1	25

NOTE: See footnotes page 198.

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Gage Height	c.f.s.	Discharge		Parts per million								
				At time c.f.s.#	Mean Daily c.f.s.*	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	Total Solids
SAN JOAQUIN RIVER BELOW FRIANT**														
8/21/41	10:45am	5.32		1820	1820					0.0	15	1.8	1.6	38
11/21/41	10:30am	4.64		873						0.0	17	1.5	3.0	42
1/23/42	11:10am	5.55		2050						0.0	20	2.5	2.9	47
2/20/42	10:45am	5.48		1980						0.0	25	1.6	2.7	59
3/19/42	3:45pm	6.00	2540	2540						0.0	27	1.1	2.2	53
4/18/42	11:25am	7.81	4850	4850						0.0	18	1.0	1.3	54
5/25/42	10:30am	10.82	10200	10200						0.0	10	1.1	1.1	30
6/20/42	10:00am	10.07	8660	8640						0.0	9.5	0.5	0.7	33
7/18/42	9:45am	7.49	4410	4410						0.0	9.0	0.8	0.4	22
8/21/42	9:35am	5.12	1640	1640						0.0	12	0.7	2.3	30
9/21/42	8:30am	4.47	1100	1100						0.0	11.7	0.7	1.9	28
10/20/42	8:30am	4.54	1150	1150						0.0	14	1.2	2.3	32
11/20/42	8:20am	6.64	3290	3290										
12/21/42	8:30am	4.20	890	890						0.0	20	1.5	3.5	48
1/20/43	8:30am	3.94								0.0	21	3.1	4.2	58
2/20/43	8:30am	5.75	2270							0.0	25	0.8	2.1	52
3/20/43	8:30am	7.71								0.0	16	0.8	1.6	41
4/20/43	8:30am	7.77	4800							0.0	14	0.5	1.2	38
5/22/43	8:30am	7.54								0.0	9.4	0.4	1.2	24
6/21/43	8:30am	7.73	4740							0.0	11	0.8	1.1	23
7/21/43	8:30am	5.45	1980							0.0	14	0.6	3.4	33
8/25/43	11:30am	4.80	1360							0.0	12	0.7	2.1	31
9/22/43	2:15pm	4.23												

* From U. S. Geological Survey Water Supply papers.
** For period prior to about 12/20/39 samples were taken at the "near Friant" station.
\# Using indicated gage heights and U. S. Geological Survey rating tables.
a Near Friant.
b Below Friant.
c For near Friant applicable 3/3/38 to 3/13/39.
d For below Friant stations.

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Gage Height	Discharge c.f.s.	Discharge At time c.f.s.#	Discharge Mean Daily c.f.s.	Parts per million Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	Total Solids
SAN JOAQUIN RIVER AT LAIRD SLOUGH (NEAR GRAYSON)														
1/20/38	5:05pm		4590	4720									23	140
3/1/38			4313	12900		17	6.1	24	2.8	0	83	14	25	160
3/31/38	1:35pm	44.04	15297a	18000									19	150
5/4/38	2:20pm	43.62	13963b	15900									12	83
6/1/38	2:00pm	44.58	16904	20300									8.4	73
7/13/38	1:45pm	42.50	11020	12400									9.6	78
8/10/38	3:33pm	3.48	2301	2480									54	270
9/1/38	2:30pm	0.25	1093.1	1130									99	530
10/4/38	3:20pm	30.35	1053.7	1200									89	540
11/17/38	1:55pm	31.30	1440	1450		22	8.3	49	0.3	0.0	87	38	54	160
12/28/38	1:45pm	31.94	1650	1910						0.0	71	39	57	280
1/30/39	11:00am	30.93	1558	1660						0.0	81	58	73	290
2/27/39	11:00am	32.48	2222.9	2200						0.0	65	32	50	210
3/23/39	9:35am	28.58	764.8	775						0.0	130	140	180	640
4/27/39	3:10pm	29.20	979.5	1000						0.0	94	62	77	320
5/26/39	2:55pm	29.18	1040	1050						0.0	110	47	71	300
6/21/39	2:00pm	27.28	390	400						0.0	130	100	140	500
7/26/39	3:30pm	26.66	256	250						0.0	160	110	150	580
8/23/39	9:00am	26.80	281	290						0.0	160	100	140	540
9/20/39	3:45pm	27.31	413	405						0.0	140	70	98	390
10/25/39	9:30am	27.45	470	470						0.0	150	82	130	480
11/22/39	9:00am	27.03	321	350						0.0	180	130	190	660
12/21/39	9:00am	27.81	547	580		27	14	70	3.1	0.0	120	64	79	360
1/26/40	10:25am	31.41	1800	1760						0.0	80	24	36	190
2/24/40	10:15am	35.01	3600	3490						0.0	69	18	27	150
3/22/40	9:30am	35.91	4158	4150						0.0	72	28	39	190
4/23/40	2:30pm	37.32	5180	5320						0.0	47	12	18	110
5/24/40	11:15am	41.15	8600	8710						0.0	34	3.5	6.4	61
6/24/40	9:30am	37.01	4930	4900						0.0	37	5.2	11	62
7/19/40	4:20pm	29.73	1200	960						0.0	110	83	120	440
8/21/40	4:20pm	27.99	600	510						0.0	140	92	140	500
9/24/40	8:25am	28.41	750	615						0.0	130	58	87	370
10/23/40	8:30am	27.65	500	427		43	23	113	2.6	0.0	170	110	140	600
11/19/40	8:20am	27.28	400	350						0.0	170	140	200	700
12/21/40	8:25am	29.96	1180	1180						0.0	97	41	50	240
1/23/41	8:20am	35.87	4140	4260						0.0	84	28	33	170

NOTE: See footnotes page 200.

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943.

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Gage Height	c.f.s.	Discharge		Parts per million								
				At time c.f.s.#	Mean Daily c.f.s.	Ca	Mg	Na	K	CO_3	HCO_3	SO	Cl	Total Solids
SAN JOAQUIN RIVER AT LAIRD SLOUGH (NEAR GRAYSON)														
2/24/41	8:40am:	43.81:	12000	14760						0.0	83	16	17	170
3/24/41	8:50am:	40.83:	8300	8675		16	6.7	24	1.9	0.0	75	22	26	160
4/22/41	5:50pm:	41.66:	9100	10170						0.0	71	17	19	150
5/22/41	4:15pm:	43.38:	10900	13100						0.0	35	5.9:	7.8	69
6/21/41	4:00pm:	43.40:	10950	13350						0.0	29	3.6:	6.2	58
7/22/41	3:20pm:	34.80:		3400						0.0	55	23	42	170
8/21/41	4:30pm:	29.34:		1000						1.8	120	83	160	530
9/26/41	4:10pm:	28.43:		720						0.0	130	73	110	440
10/25/41:	10:30am:	28.96:		940						0.0	130	59	96	390
11/23/41:	9:30am:	28.43:		770						0.0	160	100	130	530
12/24/41:	6:45am:	33.42:		2720						0.0	69	28	33	180
1/24/42	10:40am:	36.80:				11	5.3	29	5.3	0.0	57	19	18	130
2/21/42	1:10pm:	38.29:				14	6.9	26	1.0	0.0	65	23	28	150
3/27/42	10:45am:	36.81:				13	5.6	25	0.3	0.0	60	22	29	150
4/24/42	9:20am:	40.37:								0.0	50	13	16	120
5/29/42	8:40am:	41.38:	8800							0.0	33	7.1:	11	78
6/26/42	8:50am:	42.61:	10800			5.8:	2.1	8.1:	1.5	0.0	31	4.5:	7.6	66
7/24/42	9:30am:	32.92:	2500							0.0	53	27	41	180
8/28/42	8:45am:	28.26:	650							0.0	120	96	130	490
9/25/42	11:40am:	28.12:	700			33.0	16.0	90.0:	1.9	0.0	130	73	110	410
10/23/42:	3:15pm:	28.67:	822							0.0	120	53	79	340
11/27/42:	11:45am:	30.61:	1609											
12/24/42:	12:40pm:	30.31:	1346											
1/22/43	11:10am:	32.24:								0.0	85	64	69	300
2/26/43	10:45am:	36.81:	4800							0.0	47	17	19	120
3/26/43	10:50am:	43.71:								0.0	56	12	14	110
4/23/43	11:20am:	40.00:	7500							0.0	38	9.0:	10	97
5/28/43	11:00am:	38.91:								0.0	32	9.9:	16	86
6/25/43	10:55am:	35.46:	4100							0.0	37	9.4:	16	90
7/30/43	10:30am:	25.14:	665							0.0	140	100	130	570
8/27/43	10:25am:	28.00:	590							0.0	120	70	91	380
9/24/43	11:50am:	27.99:	680							0.0	130	67	89	380

\# From Water Supervision Report.
(a) 8629 through slough, 6668 via Grayson.
(b) 8408 through slough, 5555 via Grayson.

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Gage Height	c.f.s.	Discharge		Parts per Million								
				At time c.f.s.	Mean Daily c.f.s.	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl.	Total Solids
SAN JOAQUIN RIVER NEAR VERNALIS (DURHAM FERRY BRIDGE)														
1/24/38		13.5	7160	7060	7160								20	130
3/4/38		22.00	26500	20800	26500	17	5.6	18	6.0	0.0	79	16	18	140
4/2/38	10:15am	22.8	22600	23760	22600	14	5.3	18	3.4	0.0	72	13	18	130
5/4/38	4:00pm	23.02	25100	24710	25100								10	82
6/2/38	10:30am	24.80	37500	35900	37500								6.7	67
7/11/38	12:30pm	21.50	19200	19200	19200								8.3	83
8/12/38	12:30pm	0.65	3600	3560	3600								53	220
9/1/38	12:15pm	9.02	2240	2260	2240								82	350
10/4/38	11:30am	9.12	3196	2820(e)	2680								47	210
11/15/38	2:30pm	10.35	3320	3760(e)	3660					0.0	63	19	32	160
12/14/38	2:10pm	9.95	3000	3440(e)	3570	16	6.8	31	2.8	0.0	70	22	41	180
1/20/39	4:40pm	10.94	4640	4680	4640					0.0	56	16	30	140
2/17/39	8:40am	10.85	4430	4590	4430					0.0	65	18	31	160
3/15/39	3:45pm	8.23	2200	2510	2200					0.0	100	48	84	340
1/24/42	11:50am	14.30		7960	8080					0.0	48	12	17	110
2/21/42	11:40am	6.80			11400					0.0	55	15	21	140
3/28/42	12:30pm	14.84	10000	8610	8680	12	5.5	19	0.8	0.0	57	15	23	130
4/25/42	1:30pm	20.65	18000	18760	18800					0.0	43	7.2	9.4	85
5/30/42	12:15pm	7.71	21500	1400	21700					0.0	30	3.6	8.4	67
6/27/42	1:15pm	21.05	19000	19090	19200	5.5	1.9	7.0	0.6	0.0	28	3.5	7.6	59
7/25/42	12:30pm	11.11	4500	3530	3400					0.0	70	21	52	210
8/29/42	12:15pm	1.85	2000							0.0	92	38	78	280
9/26/42	1:00pm	8.40	1840							0.0	98	28	72	290
10/24/42	1:05pm	1.79	2304							0.0	91	23	59	230
11/28/42	1:10pm	9.57	2886			15	6.7	31.0	1.4	0.0	63	22	43	180
12/26/42	2:20pm	11.79	5479			12	5.5	22	1.3	0.0	56	17	26	130
1/23/43	1:00pm	12.70	6370							0.0	71	23	27	190
2/27/43	2:00pm	17.69	11660							0.0	41	9.0	11.0	89
3/27/43	9:00am	22.25								0.0	52	8.8	13	150
4/24/43	12:30pm	19.06	15600							0.0	39	6.8	10	85
5/29/43	12:25pm	20.40								0.0	24	3.8	7.1	53
6/26/43	11:00am	13.27	6850							0.0	49	8.4	24	120
7/31/43	4:25pm	8.02	1600							0.0	110	32	88	350
8/28/43	2:15pm	7.86	1526							0.0	120	32	80	310
9/25/43	1:15pm	8.18	1934							0.0	95	26	64	250

\# Using indicated gage height and United States Geological Survey rating tables.
* United States Geological Survey Water Supply Papers and unpublished records.
(e) Estimated.

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Gage Height	c.f.s.*	Discharge: At time c.f.s.	Discharge: Mean Daily c.f.s.	Parts per million: Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl.	Total Solids
						SAN JOAQUIN RIVER AT MOSSDALE BRIDGE								
2/8/38	3:00pm												17	140
3/19/38		19.7				13	5.1	20	1.6	0.0	75	14	16	130
4/4/38	2:10pm	12.7											18	130
5/2/38	3:00pm	13.8											9.1	83
6/1/38	9:30am												6.7	86
7/11/38	9:45am	11.40											8.7	79
8/11/38	9:00am												42	180
9/1/38	2:00pm	1.00											86	360
10/12/38	9:30am	.95				18	8.0	35	2.3	0.0	81	20	48	200
11/15/38	9:55am	1.01								0.0	65	20	34	180
12/14/38	12:25pm	1.50								0.0	70	21	41	180
1/20/39	4:25pm	2.20								0.0	56	18	31	150
2/17/39	8:15am	2.02								0.0	68	17	29	160
3/15/39	4:20pm	1.04								0.0	96	45	83	310
4/20/39	8:00am	1.80				15	6.7	28	0.4	0.0	65	17	39	160
5/17/39	8:00am	1.49								0.0	88	33	69	260
6/15/39	9:00am	0.70								0.0	140	50	130	490
7/19/39	3:05pm	-0.6								0.0	120	23	87	310
8/17/39	12:15pm	0.28								0.0	120	30	99	320
9/13/39	2:05pm	-0.75								0.0	120	31	93	330
10/18/39	2:30pm	0.50								0.0	100	33	71	290
11/15/39	9:35am	0.75								0.0	100	35	79	340
12/14/39	2:40pm	0.10								0.0	96	33	66	270
1/17/40	8:20am	2.41								0.0	64	13	20	140
2/19/40	10:40am	5.25								0.0	56	11	14	110
3/13/40	8:50am	9.58								0.0	60	4.1	12	130
4/16/40	2:50pm	8.65								0.0	46	7.8	11	110
5/16/40	3:30pm	9.65								0.0	33	2.4	5.2	76
6/18/40	4:00pm	6.50				6.3	2.3	7.9	0.7	0.0	30	3.7	9.8	68
7/15/40	9:00am	0.67								0.0	120	39	94	340
8/17/40	9:00am	1.26								0.0	140	40	110	380
9/6/40	9:50am	0.55								0.0	98	24	66	250
10/5/40	12:50pm	0.85								0.0	110	28	70	290
11/5/40	2:20pm	0.80								0.0	97	34	74	300
12/6/40	4:50pm	0.90				21	10	44	3.1	0.0	80	33	63	240

SUBJECT TO TIDAL ACTION

NOTE: See footnotes page 203.

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Gage Height	c.f.s.*	Discharge		Parts per million								
				At time c.f.s.	Mean Daily c.f.s.	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl.	Total Solids
SAN JOAQUIN RIVER AT MOSSDALE BRIDGE														
1/3/41	3:45pm	4.74								0.0	66	13	22	170
2/4/41	3:10pm	4.70								0.0	75	18	31	200
3/6/41	4:15pm	15.45								0.0	66	15	14	130
4/4/41	9:30am	14.80				13	6.0	18	1.7	0.0	62	17	20	140
5/8/41	8:30am	16.30								0.0	39	6.9	9.4	86
6/6/41	8:45am	18.75								0.0	28	3.7	6.6	58
7/3/41	8:45am	14.55								0.0	33	4.5	17	82
8/11/41	12:15pm	6.70								0.0	130	43	120	410
9/3/41	11:15am	0.68								0.0	100	28	73	280
11/10/41	3:35pm	—								0.0	100	38	85	310
12/8/41	2:00pm	1.85								0.0	63	30	45	200
1/7/42	2:00pm	4.88								0.0	61	13	19	140
2/6/42	1:50pm	8.90								0.0	54	12	16	110
3/9/42	3:45pm	4.92								0.0	62	26	29	150
4/7/42	3:15pm	5.19								0.0	61	19	32	170
5/6/42	2:55pm	9.15								0.0	39	9.0	15	68
6/4/42	2:40pm	11.66								0.0	29	5.5	9.1	66
7/3/42	2:40pm	8.92								0.0	33	5.2	13	78
8/17/42	2:25pm	0.76								0.0	100	37	90	320
9/15/42	3:15pm	2.47								0.0	96	29	68	260
10/14/42	2:40pm	2.92								0.0	82	20	56	220
11/12/42	2:35pm	2.65								0.0	100	37	80	300
12/8/42	10:40am	3.77								0.0				
1/7/43	12:05pm	2.68								0.0	58	15	31	150
3/8/43	4:10pm	12.90								0.0	39	6.4	7.8	79
4/6/43	10:30am	11.67								0.0	44	74	11	90
5/10/43	1:00pm	11.78								0.0	33	43	9.1	72
6/2/43	2:50pm	13.07								0.0	26	3.4	6.2	57
7/3/43	11:50am	4.05								0.0	95	29	71	270
8/5/43	11:40am	3.03								0.0	120	38	93	340
9/7/43	2:50pm	2.84								0.0	120	31	81	300
10/8/43	12:00m	1.68												

SUBJECT TO TIDAL ACTION

* Flow at Vernalis.

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Gage Height	c.f.s.	Discharge: At time c.f.s.	Discharge: Mean Daily c.f.s.	Parts per million: Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl.	Total Solids
SAN JOAQUIN RIVER AT BRANDT BRIDGE														
8/6/40	9:00am	6.90				33	15	67	1.5	0.0	130	40	100	390
9/6/40	9:30am	6.08								0.0	110	29	65	280
10/5/40	12:15am	5.55								0.0	110	25	58	290
11/5/40	1:35pm	5.80								0.0	99	31	69	270
12/6/40	3:55pm	5.52								0.0	79	32	61	250
1/3/41	4:00pm	7.30								0.0	66	12	22	140
2/4/41	1:50pm	7.66								0.0	74	18	29	160
3/6/41	3:25pm	14.70				13	5.7	15	0.8	0.0	65	14	14	130
4/3/41	8:50am	9.95								0.0	68	17	23	150
5/8/41	9:00am	10.75								0.0	40	6.9	10	82
6/6/41	9:20am	12.35								0.0	28	3.5	8.0	57
7/3/41	4:15pm	9.52								0.0	39	5.2	14	82
8/4/41	3:50pm	5.80								0.0	100	33	90	310
9/3/41	10:35am	4.49								0.0	110	28	70	270
11/4/41	10:55am	5.18								0.0	92	35	70	280
12/5/41	3:00pm	5.50								0.0	90	35	63	260
1/5/42	3:30pm	6.62								0.0	60	15	22	130
2/4/42	2:00pm	9.53								0.0	50	12	15	110
3/5/42	10:50am	7.68								0.0	62	17	25	140
4/1/42	1:45pm	6.33								0.0	64	20	36	170
5/5/42	12:00m	10.30								0.0	39	8.2	14	88
6/3/42	3:15pm	10.90								0.0	29	5.4	8.6	72
7/8/42	10:30am	9.30								0.0	29	5.3	11	71
8/5/42	11:40am	3.85								0.0	100	38	91	320
9/9/42	7:50am	6.50								0.0	94	32	74	290
10/12/42	1:00pm	5.25								0.0	93	22	60	240
11/13/42	1:30pm	5.97								0.0	100	36	82	300
12/7/42	2:45pm	5.72												
1/7/43	1:10pm	5.52				12	5.3	25	0.7	0.0	58	16	30	140
2/10/43	3:40pm	9.67				8.6	3.4	12	0.6	0.0	43	9.2	12	96
3/8/43	3:30pm	9.12				7.6	3.5	7.8	0.4	0.0	38	6.1	7.4	76
4/8/43	11:15am					9.3	4.0	11	1.8	0.0	45	93	12	92
5/10/43	11:55am	10.25*				7.0	26	88	0.6	0.0	32	4.7	9.6	73
6/2/43	2:25pm	9.15**				5.5	2.1	5.9	0.3	0.0	27	3.4	6.8	56
7/3/43	11:25am	6.27				23	9.9	47	2.1	0.0	94	24	67	
8/5/43	11:10am	5.01				29	12	58	0.3	0.0	110	34	86	310
9/7/43	2:20pm	6.20				31	13	61	0.7	0.7	120	35	91	320
10/8/43	11:00am	3.35												

SUBJECT TO TIDAL ACTION

* Middle Bridge Staff--Recorder 9.82.
** Recorder.

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Gage Height	c.f.s.	Discharge: At time c.f.s.	Discharge: Mean Daily c.f.s.	Parts per million: Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl.	Total Solids
SAN JOAQUIN RIVER AT GARWOOD BRIDGE (SOUTH OF STOCKTON)														
11/4/38	12:30pm									0.0	85	21	44	210
12/1/38	8:30am									0.0	82	23	49	220
1/5/39	4:50pm									0.0	89	38	71	310
2/3/39	11:00am					19	9.0	39	4.5	0.0	77	30	53	220
3/3/39	3:00pm									0.0	63	25	60	220
4/3/39	3:20pm									0.0	93	33	73	270
5/4/39	9:00am									0.0	74	27	57	210
2/5/40	11:15am									0.0	68	13	19	130
3/4/40	12:20pm									0.0	55	9.6	10	130
4/4/40	1:00pm					8.8	3.7	6.8	0.2	0.0	45	5.7	7.8	100
5/6/40	1:20pm									0.0	61	7.6	24	140
6/6/40	1:10pm									0.0	46	4.7	12	83
7/3/40	10:10am									0.0	91	20	56	240
8/5/40	3:40pm									0.0	140	34	92	360
9/6/40	10:20am									0.0	130	27	110	360
10/5/40	11:55am					26	11	47	0.9	0.0	110	25	69	290
11/4/40	4:05pm									0.0	110	32	74	290
12/6/40	11:10am									0.0	92	32	69	270
1/3/41	1:00pm									0.0	66	13	22	170
2/4/41	12:55pm									0.0	74	17	29	190
3/6/41	3:25pm									0.0	69	12	12	130
4/3/41	9:30am	6.40								0.0	68	17	22	150
5/8/41	4:10pm	6.45								0.0	38	6.8	9.9	95
6/6/41	9:45am	6.05								0.0	29	3.7	7.1	61
7/3/41	10:15am									0.0	41	4.4	14	86
8/4/41	3:15pm	3.98								0.0	110	28	83	290
9/3/41	3:25pm	3.90				26	11	54	2.4	0.0	120	28	75	290
11/4/41	1:25pm	2.57								0.0	97	33	70	280
12/5/41	1:35pm	2.80								0.0	97	38	67	280
1/5/42	2:35pm	3.50								0.0	65	15	22	130
2/4/42	10:40am	6.19								0.0	53	12	16	110
3/5/42	12:05pm	3.97								0.0	63	10	25	140
4/6/42	11:10am	6.02				15	7.0	27	1.5	0.0	62	21	37	160
5/6/42	1:40pm	5.72											14	
6/4/42	1:05pm	6.38											9.1	
7/3/42	1:20pm	5.52											17	
8/17/42	1:15pm	3.45											100	
9/15/42	1:30pm	3.00											71	
10/14/42	1:25pm	3.13											58	
11/12/42	1:30pm	3.09											83	

SUBJECT TO TIDAL ACTION

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Gage Height	c.f.s.	Discharge		Parts per million								
				At time c.f.s.	Mean Daily c.f.s.	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl.	Total Solids
STOCKTON SHIP CHANNEL (SAN JOAQUIN RIVER) AT LOWER END OF PORT STOCKTON WHARVES														
11/10/41	1:55pm												100	
12/8/41	12:35pm												88	
1/7/42	12:35pm	5.48											87	
2/6/42	12:25pm												31	
3/9/42	2:20pm												33	
4/7/42	1:50pm												46	
5/6/42	1:30pm												20	
6/4/42	1:15pm												32	
7/3/42	1:00pm												18	
8/17/42	1:00pm												120	
9/15/42	1:10pm												84	
10/14/42	1:15pm												81	
11/12/42	1:10pm													

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Gage Height	c.f.s.	Discharge: At time c.f.s.	Discharge: Mean Daily c.f.s.	Parts per million: Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl.	Total Solids
STOCKTON SHIP CHANNEL (SAN JOAQUIN RIVER) NEAR STOCKTON (BURNS CUTOFF)														
8/2/39	3:35pm									0.0	150	32	220	610
9/1/39	2:15pm									0.0	150	27	200	610
10/4/39	1:10pm					35	14	68	3.5	0.0	120	15	120	370
11/1/39	1:45pm									0.0	120	31	130	440
12/5/39	9:50am									0.0	110	34	140	400
1/2/40	3:15pm									0.0	89	26	81	300
2/5/40	11:35am									0.0	61	19	45	180
3/4/40	11:25am					10	4.6	11	2.1	0.0	53	8.0	11	120
4/4/40	12:25pm									0.0	40	5.7	7.1	100
5/6/40	11:55am									0.0	45	4.7	20	140
6/6/40	11:30am	4.97								0.0	30	4.0	9.1	57
7/3/40	9:10am	4.87								0.0	74	17	58	240
8/5/40	11:55am	4.85								0.0	130	32	140	430
9/6/40	12:55pm	4.90				42	16	81	3.4	0.0	140	36	140	460
10/5/40	8:55am	6.77								0.0	110	24	88	300
11/4/40	1:35pm	4.92								0.0	120	31	100	350
12/6/40	11:35am	6.68								0.0	91	30	100	340
1/3/41	11:20am	7.65				15	6.2	23	2.4	0.0	72	15	25	180
2/4/41	11:30am	7.52								0.0	80	18	34	210
3/6/41	11:00am	8.89								0.0	63	12	14	130
4/3/41	9:50am	7.90				15	6.7	20	5.4	0.0	67	17	24	160
5/8/41	1:30pm	6.74								0.0	46	7.7	12	100
6/6/41	12:35pm	6.00								0.0	30	3.3	11	65
7/3/41	2:00pm	6.85								0.0	39	4.7	21	97
8/4/41	11:55am	3.88								0.0	94	26	84	290
9/3/41	3:05pm	6.21								0.0	110	32	96	330
11/4/41	2:25pm	6.05								0.0	110	28	73	280

SUBJECT TO TIDAL ACTION

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Gage Height	c.f.s.	Discharge		Parts per Million								
				At time c.f.s.	Mean Daily c.f.s.	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl.	Total Solids
STOCKTON SHIP CHANNEL (SAN JOAQUIN RIVER) NEAR STOCKTON (BURNS CUTOFF)														
12/5/41	1:10pm	5.02	SUBJECT TO TIDAL ACTION							0.0	98	31	73	280
1/6/42	11:45am	6.06								0.0	63	15	23	130
2/4/42	11:00am	7.38								0.0	60	13	19	120
3/5/42	10:10am	6.48								0.0	69	17	28	150
4/1/42	2:50pm	4.40								0.0	70	18	33	170
5/5/42	3:45pm	4.90								0.0	41	8.9	15	91
6/3/42	4:30pm	4.65								0.0	32	5.9	9.8	71
7/10/42	5:00pm	6.41								0.0	38	6.9	15	92
8/7/42	10:50am	3.90								0.0	100	34	90	310
9/8/42	2:25pm	4.66								0.0	120	37	98	340
10/12/42	12:30pm	4.97								0.0	100	22	70	260
11/13/42	10:00am	6.00								0.0	120	33	91	320
12/7/42	2:05pm	5.96												
1/7/43	2:10pm	4.88				14	5.9	27	0.6	0.0	64	16	35	160
2/10/43	12:10pm	7.54				9.9	3.9	14	0.6	0.0	47	9.7	15	110
3/15/43	1:20pm	6.45				8.4	3.8	10	0.6	0.0	44	7.0	9.7	86
4/8/43	12:20pm	7.15				9.9	4.4	12	1.5	0.0	48	9.5	13	93
5/10/43	10:45pm	7.02				7.3	2.7	9.3	0.2	0.0	34	4.9	11	74
6/2/43	1:45pm	4.55				5.7	2.3	6.2	0.4	0.0	27	3.3	7.1	55
7/3/43	10:20am	6.10				18	7.4	35	0.6	0.0	74	18	50	200
8/5/43	10:00am	6.74				31	13	63	1.1	0.0	120	33	98	330
9/7/43	1:20pm	6.72				33	14	67	0.7	0.0	130	31	100	340
10/8/43	9:50am	3.60												

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Gage Height	c.f.s.	Discharge		Parts per Million								
				At time c.f.s.	Mean Daily c.f.s.	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl.	Total Solids
STOCKTON SHIP CHANNEL (SAN JOAQUIN RIVER) AT RINDGE PUMP														
2/5/40	10:30am	6.40								0.0	64	24	32	170
3/4/40	10:30am	8.25								0.0	54	9.0	12	130
4/4/40	11:05am	7.80				9.0	3.7	6.7	0.3	0.0	46	6.2	7.6	98
5/6/40	11:00am	5.35								0.0	48	7.7	20	120
6/6/40	10:30am	6.37								0.0	35	2.5	13	65
7/3/40	8:20am	6.32								0.0	62	17	50	190
8/5/40	10:20am	6.35								0.0	100	34	110	350
9/6/40	1:50pm	0.26								0.0	140	36	150	470
10/5/40	10:40am	1.98								0.0	110	27	96	320
11/4/40	11:50am	1.30				34	14	66	3.0	0.0	120	31	110	390
12/6/40	2:25pm	1.79								0.0	95	33	110	370
1/3/41	10:30am	3.50								0.0	70	22	38	230
2/5/41	1:00pm	3.59								0.0	78	19	36	210
3/6/41	10:00am	4.52								0.0	61	11	13	130
4/3/41	11:00am	3.20								0.0	75	18	27	160
5/8/41	11:45am	1.07								0.0	43	8.1	15	110
6/6/41	1:30pm	2.55								0.0	36	8.5	25	110
7/3/41	2:50pm	2.03								0.0	41	5.5	22	100
8/11/41	9:45am	2.20								0.0	90	29	85	280
9/4/41	2:00pm	0.82				31	14	68	2.2	0.0	120	35	110	340
11/10/41	12:50pm	1.89											75	
12/8/41	11:30am	1.97											74	
1/7/42	11:30am	2.31											30	
2/6/42	11:25am	4.45											15	
3/9/42	1:20pm	2.73											31	
4/7/42	12:45pm	3.08											36	
5/6/42	12:25pm	3.02											15	
6/4/42	12:10pm	2.78											11	
7/3/42	11:55am	2.93											16	
8/17/42	11:55am	1.87											85	
9/15/42	12:05pm	1.71											93	
10/14/42	12:10pm	1.61											77	
11/12/42	12:05pm	1.68											76	

SUBJECT TO TIDAL ACTION

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Gage Height	c.f.s.	Discharge		Parts per Million								
				At time c.f.s.	Mean Daily c.f.s.	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl.	Total Solids
					SAN JOAQUIN RIVER AT ANTIOCH AT CITY WATER WORKS PUMPING PLANT									
10/10/41	9:30am	1.20	SUBJECT TO TIDAL ACTION										500	
11/10/41	10:35am	1.90											120	
12/8/41	9:15am	1.79											54	
1/7/42	9:10am	2.18											30	
2/6/42	9:00am	3.98											24	
3/9/42	10:55am	2.40											23	
4/7/42	10:55am	2.95											22	
5/6/42	10:05am	2.55											13	
6/4/42	9:50am	2.20											9.5	
7/3/42	9:35am	2.70											12	
8/17/42	9:35am	1.65											600	
9/15/42	9:45am	1.40											820	
10/14/42	9:50am	1.00											230	
11/12/42	10:00am	1.55											220	
1/6/43	2:15pm	6.51											25	
2/9/43	12:00m	1.30											21	
3/5/43	11:50am	5.27											23	
4/6/43	12:15pm	3.01											15	
5/10/43	2:00pm	1.80											11	
6/4/43	11:30am	2.50											17	
7/2/43	12:30pm	2.55											41	
8/3/43	11:25am	2.35											530	
9/8/43	11:20am	5.00											1700	

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sampling	Time of Sample	Gage Height	c.f.s.	Discharge: At time c.f.s.	Discharge: Mean Daily c.f.s.	Parts per Million: Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl.	Total Solids
FRENCH CAMP SLOUGH SOUTH OF STOCKTON														
5/4/39	11:00am	4.70				27	13	51	4.6	0.0	220	12	24	270
6/1/39	3:10pm	3.70								0.0	240	13	27	300
8/2/39	4:10pm	3.80								0.0	250	13	28	320
11/1/39	8:35am	4.40								0.0	190	18	150	520
12/5/39	9:05am	3.50								0.0	300	15	52	420
2/6/40	2:00pm	6.92								0.0	87	12	14	140
3/4/40	3:35pm	9.80								0.0	140	15	21	280
4/4/40	12:45pm	10.10								0.0	110	12	17	230
5/6/40	1:05pm	5.35								0.0	150	7	1400	3000
6/6/40	12:55pm	6.95				28	13	48	4.4	0.0	220	22	11	300
7/3/40	9:55am	4.80								0.0	220	9.9	23	270
8/5/40	4:00pm	2.90								0.0	240	11	22	290
9/6/40	10:15am	6.24								0.0	200	16	66	340
10/5/40	11:40am	5.52								0.0	190	11	54	310
11/5/40	1:20pm	5.71				52	21	96	1.4	0.0	270	20	130	530
12/6/40	3:40pm	5.40								0.0	260	19	120	490
1/3/41	11:45am	7.35								0.0	160	19	26	330
2/4/41	1:20pm	6.95								0.0	200	19	30	380
4/3/41	9:15am	8.20								0.0	170	19	28	250
5/8/41	9:30am	7.70								0.0	180	13	20	270
6/6/41	9:35am	8.70								0.0	250	14	27	310
7/3/41	3:45pm	7.20								0.0	220	12	24	290
8/1/41	3:35pm	5.60								0.0	210	12	27	280
9/3/41	3:45pm									0.0	210	14	100	400
11/4/41	12:10pm									0.0	320	17	36	420
12/5/41	2:10pm									0.0	200	22	69	360
1/6/42	11:00am									0.0	81	15	24	150
2/5/42	10:20am									0.0	91	15	16	170
3/5/42	11:20am									0.0	81	17	29	160
4/6/42	3:30pm									0.0	110	9.3	13	170
11/13/42	2:05pm									0.0	130	35	83	330
12/7/42	3:05pm									0.0	170	18	69	300
1/2/43	3:00pm									0.0	60	15	36	160
2/10/43	12:45pm									0.0	12	24	19	210
3/8/43	5:10pm									0.0	66	7.8	5.8	110
4/8/43	10:00am									0.0	130	1.8	44	240
5/10/43	1:30pm									0.0	150	9.6	27	220
6/15/43										0.0	160	9.1	19	210
7/3/43	1:00pm									0.0	170	9.6	20	230
8/5/43	12:15pm					25	11	47	0.9	0.0	170	13	41	260
9/7/43	3:15pm					29	12	53	1.7	0.0	150	21	68	290
			SUBJECT TO TIDAL ACTION											

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sampling	Time of Sample	Gage Height	c.f.s.	Discharge: At time c.f.s.	Discharge: Mean Daily c.f.s.	Parts per Million: Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl.	Total Solids
						CALAVERAS RIVER NEAR STOCKTON								
6/8/38	12:30pm:												4.2	120
7/28/38	11:45am:					5.8	2.0	4.6	2.5	0.0	34	2.4	3.9	54
8/31/38	1:30pm:												3.4	44
9/30/38	1:30pm:												8.5	62
2/3/39	2:35pm:		69.8							0.0	100	19	8.9	190
3/10/39	3:05pm:		349.6			9.7	4.4	5.0	0.7	0.0	50	7.7	4.6	89
4/4/39	9:05am:		87.0							0.0	90	14	6.0	130
2/26/40	3:40pm:	19.6	2000							0.0	52	5.8	2.3	93
3/26/40	3:10pm:	14.6	60							0.0	93	16	6.8	130
4/30/40	3:10pm:	13.9	20							0.0	94	13	6.2	160
5/28/40	2:30pm:	12.4								0.0	110	15	8.3	150
						OLD RIVER BELOW TOM PAINE SLOUGH								
2/8/38	12:15pm:												15	120
3/19/38	:					14	5.4	21	2.1	0.0	81	19	17	140
4/4/38	1:30pm:	4.7											19	140
5/2/38	1:55pm:												10	81
5/31/38	3:30pm:												7	69
7/11/38	10:30am:	7.55:											10	79
8/11/38	9:45am:	5.80:											39	170
9/1/38	1:00pm:	5.80:											88	340
10/12/38:	10:30am:	6.10:											48	210
11/21/38:	3:00pm:	5.40:								0.0	69	17	29	160
12/21/38:	4:15pm:	6.20:								0.0	72	25	45	200
1/27/39	2:10pm:	5.87:				18	8.5	35	3.5	0.0	71	28	50	200
2/23/39	11:10am:	6.70:								0.0	67	20	37	170
3/22/39	10:30am:	6.40:								0.0	100	56	98	370
			SUBJECT TO TIDAL ACTION											
						OLD RIVER AT MANSION HOUSE								
2/5/40	12:45pm:	3.17:								0.0	64	37	45	210
3/4/40	1:00pm:	5.06:								0.0	51	17	17	140
4/4/40	1:55pm:	4.40:								0.0	40	7.9	11	100
5/6/40	2:05pm:	.80:				9.5	3.3	13	2.4	0.0	42	6.9	18	93
6/6/40	1:50pm:	1.00:								0.0	29	2.4	7.6	57
7/3/40	10:45am:	1.20:								0.0	61	16	38	140
8/5/40	1:40pm:	.95:								0.0	110	37	80	300
9/6/40	10:55am:	3.03:								0.0	120	68	99	390
10/5/40	8:20am:	2.80:								0.0	98	28	63	240
11/4/40	2:35pm:	1.67:								0.0	110	37	77	290
12/6/40	10:30am:	2.48:								0.0	78	48	62	270
1/3/41	1:40pm:	3.68:				24	10	37	1.7	0.0	65	52	49	270
3/6/41	11:45am:	15.60:								0.0	65	19	21	140

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Gage Height	c.f.s.	Discharge: At time c.f.s.	Discharge: Mean Daily c.f.s.	Parts per Million: Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl.	Total Solids
MIDDLE RIVER AT BORDEN HIGHWAY														
2/5/40	11:55am	5.89								0.0	65	34	34	190
3/4/40	12:45pm	8.20								0.0	50	18	14	140
4/4/40	1:40pm	7.64								0.0	39	5.8	6.7	93
5/6/40	1:45pm	4.13				11	4.3	14	3.2	0.0	49	6.8	19	100
6/6/40	1:30pm	4.76								0.0	33	3.1	8.3	62
7/3/40	10:25am	4.81								0.0	53	13	30	120
8/5/40	1:20pm	4.58								0.0	110	38	83	310
9/6/40	10:40am	6.52								0.0	130	48	100	370
10/5/40	8:35am	6.08				23	10	44	1.1	0.0	100	27	63	270
11/4/40	2:05pm	5.28								0.0	110	34	73	280
12/6/40	10:50am	5.71								0.0	86	34	66	260
1/3/41	1:20pm	7.35								0.0	67	32	34	200
2/4/41	11:00am	7.18								0.0	74	26	31	210
3/6/41	11:25am	9.00								0.0	63	17	16	140
4/3/41	12:25pm	7.30								0.0	69	20	25	160
5/8/41	3:45pm	7.69								0.0	40	7.8	12	92
6/6/41	10:10am	5.95								0.0	30	2.9	7.8	63
7/3/41	10:30am	5.54								0.0	37	4.8	13	82
8/11/41	11:15am	6.15								0.0	86	32	78	270
9/13/41	1:35pm	6.40								0.0	110	34	86	300
11/4/41	1:50pm	4.95								0.0	90	26	62	250
12/5/41	12:15pm	5.35								0.0	88	33	63	270
1/5/42	2:10pm	5.52								0.0	62	25	29	150
2/4/42	11:30am	7.72								0.0	55	22	21	140
3/5/42	11:50am	6.15								0.0	63	18	26	140
4/6/42	1:35pm	7.23								0.0	66	24	41	180
MIDDLE RIVER AT SANTA FE RAILROAD CROSSING - EAST BANK														
10/10/41	11:40am												84	
11/10/41	1:10pm												66	
12/8/41	11:45am												71	
1/7/42	11:40am												38	
2/6/42	11:30am												41	
3/9/42	1:25pm												32	
4/7/42	12:55pm												43	
5/6/42	12:35pm												15	
6/4/42	12:20pm												11	
7/3/42	12:05pm												13	
8/17/42	12:05pm												56	
9/15/42	12:15pm												91	
10/14/42	12:20pm												77	
11/13/42	12:40pm												65	

SUBJECT TO TIDAL ACTION

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943.

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Gage Height	c.f.s.	Discharge		Parts per Million								
				At time c.f.s.	Mean Daily c.f.s.	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl.	Total Solids
INDIAN SLOUGH AT EAST CONTRA COSTA I. D. INTAKE														
1/5/40	12:10pm									0.0	81	91	74	370
2/5/40	1:10pm					40	24	110	0.2	0.0	160	110	140	530
3/4/40	1:20pm									0.0	290	110	120	620
4/4/40	2:15pm									0.0	250	100	130	560
5/6/40	3:25pm									0.0	85	27	49	250
6/6/40	2:10pm									0.0	38	8.1	14	98
7/3/40	11:05am					11	4.7	18	1.7	0.0	57	13	25	130
8/5/40	2:00pm									0.0	110	43	83	360
9/6/40	11:15am									0.0	130	58	110	460
10/5/40	8:00am									0.0	120	41	79	340
11/4/40	2:50pm									0.0	250	140	170	690
12/6/40	10:10am									0.0	330	140	140	710
1/3/41	2:50pm									9.4	270	110	130	650
2/4/41	10:00am									0.0	310	120	140	640
3/5/41	1:00pm									0.0	300	120	140	680
4/3/41	1:15pm									12	320	130	180	770
5/8/41	2:10pm	2.20								0.0	280	140	170	730
6/6/41	10:45am	.06								0.0	37	5	12	62
7/3/41	11:45am	1.68								0.0	41	10	18	100
8/4/41	2:30pm	.50								0.0	97	38	76	280
9/3/41	1:50pm									0.0	120	51	120	390
11/5/41	11:50am									6.1	300	120	130	650
12/5/41	11:45am									2.4	310	130	150	690
1/5/42	1:50pm									11	290	120	130	640
2/4/42	1:05pm									1.8	300	110	130	580
3/5/42	11:25am									15	310	160	180	760
4/6/42	1:10pm									10	230	170	220	840
5/5/42	10:35am									0.0	72	28	44	190
6/4/42	11:25am									0.0	37	7.9	14	89
7/3/42	11:05am									0.0	43	10	20	110
8/17/42	10:15am									0.0	99	39	86	310
9/15/42	11:30am									0.0	120	46	100	360
10/14/42	1:45pm									0.0	110	36	87	310
11/12/42	1:05pm									5.8	300	110	120	660
1/6/43	4:05pm									2.4	300	110	130	660
2/9/43	10:20am									2.4	300	110	130	660
3/5/43	2:35pm									1.4	270	110	130	690
4/6/43	2:15pm									2.6	280	110	130	620
	3:45pm									0.0	43	13	25	110
6/4/43	1:15pm									0.0	31	7.8	11	78
7/2/43	3:00pm									0.0	52	20	27	150
8/3/43	1:05pm									0.0	110	43	93	340
9/8/43	1:15pm									0.0	130	46	100	370

SUBJECT TO TIDAL ACTION

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943.

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Gage Height	c.f.s.	Discharge: At time c.f.s.	Discharge: Mean Daily c.f.s.	Parts per Million: Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl.	Total Solids
ROCK SLOUGH AT CONTRA COSTA CANAL INTAKE														
6/17/38	10:45am:												11	110
7/18/38	9:00am:												12	110
8/18/38	11:10am:					14	5.9	23	2.1	0.0	67	17	26	140
9/15/38	9:20am:												55	240
10/20/38	9:15am:												75	340
11/22/38	9:10am:	0.30								0.0	150	61	68	340
12/21/38	8:40am:	0.91								0.0	110	51	58	280
1/27/39	8:45am:	1.78								0.0	99	66	64	300
2/3/39	9:30am:	0.08								0.0	110	70	66	330
3/15/39	8:25am:	0.02				38	21	72	2.3	0.0	180	84	73	400
4/3/39	4:10pm:	2.32								0.0	160	82	81	430
5/4/39	8:15am:	0.84								0.0	120	72	96	330
6/1/39	4:15pm:	1.22								0.0	120	54	76	310
7/6/39	3:25pm:	-0.96								0.0	110	40	85	310
8/3/39	8:30am:	1.42								0.0	120	80	290	750
9/1/39	3:35pm:	0.60								0.0	130	150	730	1700
10/4/39	2:30pm:	-0.08								0.0	150	150	720	1700
11/1/39	2:45pm:	0.90				41	29	170	8.8	0.0	160	81	280	740
12/5/39	11:05am:	1.80								0.0	140	79	140	510
1/5/40	10:50am:	2:25								0.0	140	91	110	460
2/5/40	2:45pm:	3.42								0.0	190	120	94	490
3/4/40	2:10pm:	3.74				35	24	110	3.8	0.0	120	140	130	590
4/4/40	2:55pm:	3.20								0.0	120	90	97	440
5/6/40	2:45pm:	1.00								0.0	110	72	110	430
6/6/40	2:45pm:	0.50								0.0	110	82	110	410
7/3/40	11:50am:	0.55								0.0	85	59	70	290
8/5/40	2:40pm:	0.59								0.0	100	69	92	400
9/6/40	11:35am:	1.12				31	15	58	1.7	0.0	110	56	84	340
10/4/40	7:40am:	1.46								0.0	120	62	95	320
11/5/40	11:15am:	1.80								0.0	130	51	82	320
12/6/40	9:45am:	0.98								0.0	150	60	83	360
1/3/41	2:20pm:	1.80								0.0	110	81	86	380

SUBJECT TO TIDAL ACTION

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943.

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Gage Height	Discharge c.f.s.	Discharge At time c.f.s.	Discharge Mean Daily c.f.s.	Parts per Million Ca	Mg.	Na	K	CO_3	HCO_3	SO_4	Cl.	Total Solids
ROCK SLOUGH AT CONTRA COSTA CANAL INTAKE (Cont'd)														
2/4/41	9:30am	2.20				41	21	82	4.2	0.0	150	110	97	470
3/6/41	2:30pm	3.41								0.0	140	74	72	370
4/3/41	2:15pm	1.40								0.0	99	30	41	220
5/8/41	3:00pm	2.80				19	9.7	34	1.4	0.0	92	30	37	210
6/6/41	11:10am	0.32								0.0	47	9.4	14	87
7/3/41	12:15pm	1.97								0.0	44	7.5	12	86
8/4/41	2:00pm	0.50								0.0	59	17	32	140
9/3/41	1:25pm	0.32								0.0	110	46	83	300
11/5/41	11:15am	0.22								0.0	120	40	73	300
12/5/41	9:30am	1.63				28	14	60	3.4	0.0	110	48	80	320
1/5/42	1:30pm	0.83								0.0	97	99	85	400
2/4/42	12:20pm	2.45								0.0	110	91	76	400
3/5/42	11:05am	1.46								0.0	110	73	72	340
4/6/42	12:40pm	2.54								0.0	83	37	47	230
5/5/42	10:00am	3.32								0.0	65	24	28	150
6/4/42	10:45am	3.10								0.0	48	11	14	100
7/3/42	10:40am	3.15								0.0	44	9.7	13	95
8/17/42	10:45am	2.05								0.0	68	28	45	180
9/15/42	10:30am	1.90								0.0	100	44	88	320
10/14/42	11:30am	1.40								0.0	110	35	81	290
11/12/42	1:40pm	1.55								0.0	110	47	69	290
1/8/43	3:05pm	1.79								0.0	84	72	61	310
2/9/43	9:50am	5.20								0.0	120	92	79	390
3/5/43	1:00pm	0.84								0.0	92	52	52	270
4/6/43	1:15pm	1.25								0.0	93	3.9	40	
5/8/43	2:45pm	0.10								0.0	55	14	20	120
6/4/43	12:25pm	1.21								0.0	46	13	19	110
7/2/43	1:25pm	0.30								0.0	49	18	27	150
8/3/43	12:00n	0.61								0.0	84	36	62	250
9/8/43	12:00n	0.95								0.0	120	42	85	320
10/9/43	2:20pm	1.42												

SUBJECT TO TIDAL ACTION

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Gage Height	c.f.s.	Discharge		Parts per Million								
				At time c.f.s.	Mean Daily c.f.s.	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl.	Total Solids
ROCK SLOUGH EAST OF DAM, IN ROCK SLOUGH 3/4 MILE EAST OF SAND MOUND SLOUGH														
1/5/40	11:25am									0.0	99	100	120	580
2/5/40	1:25pm	6.10								0.0	110	92	96	380
3/4/40	1:40pm	6.80				33	18	82	3.8	0.0	98	110	100	450
4/4/40	2:30pm	6.40								0.0	74	51	52	250
5/9/40	3:05pm									0.0	77	21	34	180
6/6/40	2:25pm									0.0	49	11	17	97
7/3/40	11:25am									0.0	51	11	21	97
10/10/41	10:50am	1.60											84	
11/10/41	12:15pm	1.85											68	
12/8/41	11:25am	1.90											76	
1/7/42	11:20am	2.70											60	
2/6/42	11:10am	4.45											69	
3/9/42	1:10pm	2.58											40	
4/7/42	12:30pm	3.15											46	
5/6/42	12:10pm	3.00											24	
6/4/42	12:05pm	2.20											11	
7/3/42	11:40am	2.90											11	
8/17/42	11:45am	1.80											52	
9/15/42	12:00n	1.40											88	
10/14/42	12:10pm	1.40											80	
11/12/42	12:20pm	1.00											67	
12/7/42	12:05pm	-0.08												
1/6/43	3:30pm	2.38											15	
2/9/43	10:50am	3.20											59	
3/5/43	2:05pm	1.95											55	
4/6/43	1:35pm	1.05											30	
5/8/43	3:00pm	-0.03											15	
6/4/43	12:45pm	1.45											26	
7/2/43	2:10pm	-0.50											26	
8/3/43	12:25pm	0.33											63	
9/8/43	12:30pm	1.52											86	
10/9/43	1:10pm	0.96												

SUBJECT TO TIDAL ACTION

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Gage Height	c.f.s.	Discharge: At time c.f.s.	Discharge: Mean Daily c.f.s.	Parts per Million: Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl.	Total Solids
					DUTCH SLOUGH AT ROCK SLOUGH									
1/5/40	11:20am	5.60	SUBJECT TO TIDAL ACTION							0.0	100	100	120	460
					DUTCH SLOUGH AT BETHEL ISLAND BRIDGE									
10/10/41	10:15am	4.80											86	
11/10/41	11:45am	5.22											76	
12/8/41	10:30am	5.20											66	
1/7/42	10:30am	5.52											55	
2/6/42	10:20am	7.50											57	
3/9/42	12:15pm	5.70											39	
4/7/42	11:45am	6.20											36	
5/6/42	11:25am	6.20											16	
6/4/42	11:10am	5.90											10	
7/3/42	10:25am	6.35											12	
8/17/42	11:05am	4.95											43	
9/15/42	11:05am	4.88											78	
10/14/42	11:10am	4.70											73	
11/12/42	10:55am	4.95											60	
	SAND MOUND SLOUGH NORTH OF DAM, IN SAND MOUND SLOUGH; NORTH OF DAM AT JUNCTION OF SAND MOUND SLOUGH AND ROCK SLOUGH													
10/10/41	10:40am	1.10											88	
11/10/41	12:30pm	1.45											81	
12/8/41	11:30am	1.35											79	
1/7/42	11:30am	1.70											78	
2/6/42	11:20am	3.85											96	
3/9/42	1:20pm	1.90											59	
4/7/42	12:40pm	2.40											48	
5/6/42	12:20pm	2.40											23	
6/4/42	1:00pm	1.60											12	
7/3/42	11:50am	2.30											12	
8/17/42	11:55am	1.10											46	
9/15/42	12:05pm	0.90											88	
10/14/42	12:05pm	0.80											81	
11/12/42	12:25pm	0.60											67	
12/7/42	12:00n	0.57												
1/6/43	3:35pm	3.03											61	
2/9/43	10:45am	2.70											71	
3/5/43	2:15pm	2.70											52	
4/6/43	1:50pm	0.67											30	
5/8/43	3:15pm	-0.60											15	
6/4/43	12:50pm	0.25											15	
7/2/43	2:25pm	0.80											27	
8/3/43	12:40pm	0.10											63	
9/8/43	12:45pm	1.36											91	

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Gage Height	Discharge c.f.s.	Discharge At time # c.f.s.	Discharge Mean Daily* c.f.s.	Parts per Million Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl.	Total Solids
FALSE RIVER AT WEBB PUMP, TWO MILES BELOW OLD RIVER JUNCTION														
10/10/41	10:15am	5.70	SUBJECT TO TIDAL ACTION										68	
11/10/41	11:45am	—											53	
12/8/41	10:30am	6.10											42	
1/7/42	10:30am	6.60											36	
2/6/42	11:00pm	7.50											31	
3/9/42	2:40pm	5.60											29	
4/7/42	11:45am	7.10											33	
5/6/42	11:25am	6.98											14	
6/4/42	2:30pm	5.10											9.6	
7/3/42	10:45am	6.90											13	
8/17/42	1:35pm	4.65											30	
9/15/42	1:30pm	4.60											58	
10/14/42	11:10am												56	
11/12/42	11:15am	6.40											43	
MOKELUMNE RIVER AT WOODBRIDGE														
1/11/39	1:20pm	9.40	584	588	584					0.0	18	2.5	2	40
2/2/39	2:15pm	4.98	613		613					0.0	21	1.9	1.4	41
3/10/39	11:20am	9.91	740	770	740					0.0	24	4.7	2.8	58
10/4/39	12:10pm	7.36	256	274	256					0.0	28	2.9	2.8	54
12/9/41	1:40pm				508					0.0	20	2.6	1.1	41
1/9/42	1:00pm	4.70			2490					0.0	18	2.5	0.7	41
2/9/42	2:05pm	6.80			3130					0.0	20	3.4	0.7	46
3/12/42	12:45pm	1.87			1560					0.0	19	3.7	1.5	50
4/9/42	12:25pm	1.52			1470					0.0	17	1.9	1.1	48
5/12/42	4:00pm	4.06			2190					0.0	20	1.8	1.6	43
6/8/42	12:00m	0.44			1080					0.0	17	2.4	1.1	39
7/9/42	1:30pm	—			845					0.0	15	0.9	0.7	32
8/10/42	1:30pm	—			64					0.0	16	1.2	1.2	33
9/3/42	11:15am	—			268					0.0	16	1.6	1.7	53
10/21/42	1:35pm									0.0	18	1.6	1.7	36
11/13/42	2:00pm									0.0	18	1.0	1.4	37
1/2/43	3:50pm	0.50								0.0	17	2.4	1.1	39
2/8/43	2:20pm	0.77								0.0	22	3.9	1.7	50
3/4/43	11:50am	0.62								0.0	23	3.7	1.1	51
4/5/43	3:20pm	3.10								0.0	25	8.4	1.8	50
5/6/43	3:10pm	5.43								0.0	18	2.1	1.2	52
6/2/43	12:30pm	5.75								0.0	16	1.8	1.2	37
7/3/43	9:20am									0.0	17	1.1	1.4	34
8/2/43	12:35pm									0.0	16	1.1	1.4	37
9/6/43	12:45pm	6.99								0.0	17	0.7	2.4	34

* From Water Supply Papers and unpublished records. # Using indicated gage heights and U. S. Geological Survey rating tables.

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Gage Height	c.f.s.	Discharge		Parts per Million								
				At time c.f.s.	Mean Daily c.f.s.	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl.	Total Solids
MOKELUMNE RIVER AT CENTRAL LANDING														
2/10/38	12:00n												13	120
3/21/38	10:20am	5.85				15	8.2	13	0.5	0.0	50	20	27	150
4/4/38	10:30am	5.15				11	5.6	7.4	1.6	0.0	56	9.9	9.2	100
5/2/38	10:30am	5.20											5.3	74
5/31/38	12:30pm												13	92
7/11/38	1:30pm	4.00											13	110
8/11/38	1:30pm												22	170
9/1/38	10:30am	5.27											31	210
10/12/38	1:40pm	3.90											21	150
11/22/38	12:00n									0.0	84	12	19	140
12/21/38	11:10am									0.0	70	15	44	150
1/27/39	10:45am	5.50								0.0	71	9.5	12	110
2/23/39	9:15am	5.05				14	6.2	11	0.9	0.0	67	10	11	110
3/22/39	8:55am	4.85								0.0	55	13	18	110
6/1/39	2:00pm									0.0	74	11	18	120
1/3/40	12:10pm									0.0	82	15	15	140
2/6/40	11:00am	5.10				15	7.6	12	0.9	0.0	58	21	17	130
3/14/40	9:25am	6.50								0.0	41	17	12	130
4/4/40	9:50am	7.00								0.0	40	14	12	100
5/6/40	10:05am	4.70								0.0	51	7.3	14	120
6/6/40	9:40am	5.45								0.0	41	10	16	130
7/3/40	7:30am	5.45								0.0	59	14	24	120
8/5/40	10:05am	5.45								0.0	90	21	54	260
9/6/40	2:35pm	4.30				24	16	54	2.1	0.0	120	26	83	290
10/5/40	10:00am	6.10								0.0	100	19	57	270
11/4/40	10:50am	5.95								0.0	92	18	48	190
12/6/40	1:35pm	6.07								0.0	80	14	21	150
1/4/41	11:30am									0.0	53	8.7	6.7	94
2/5/41	10:40am	7.64								0.0	66	19	16	130
3/7/41	10:45am	8.45								0.0	50	8.6	6.2	110

SUBJECT TO TIDAL ACTION

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Gage Height	c.f.s.	Discharge		Parts per Million								
				At time c.f.s.	Mean Daily c.f.s.	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl.	Total Solids
MOKELUMNE RIVER AT CENTRAL LANDING (CONTINUED)														
5/8/41	10:30am	5.05								0.0	63	20	32	170
6/6/41	2:30pm	7.20								0.0	47	14	18	110
7/7/41	10:30am	4.65								0.0	63	8.8	17	120
8/4/41	10:40am	3.98								0.0	86	21	31	180
9/4/41	12:00n	0.10								0.0	120	20	37	190
11/5/41	2:30pm	3.24								0.0	90	16	29	170
12/8/41	10:30am									0.0	47	9.5	8.1	88
1/7/42	10:50am									0.0	63	9.2	7.3	100
2/6/42	10:20am									0.0	45	8.3	5.9	84
3/9/42	12:15pm									0.0	70	10	9.0	110
4/7/42	11:50am									0.0	47	5.2	3.9	77
5/6/42	1:00pm									0.0	53	5.7	4.5	84
6/4/42	11:45am									0.0	43	4.1	3.7	69
7/3/42	11:10am									0.0	49	7.0	11	94
8/17/42	11:00am									0.0	93	16	32	160
11/10/41	12:10pm												28	
12/8/41	10:30am												8.1	
1/7/42	10:50am												7.3	
2/6/42	10:20am												5.9	
3/9/42	12:15pm												9.0	
4/7/42	11:50am												3.9	
5/6/42	1:00pm												4.5	
6/4/42	11:45am												3.7	
7/3/42	11:10am												11	
8/17/42	11:00am												32	
9/15/42	11:00am												42	
10/14/42	11:10am												23	
11/12/42	11:05am												35	
			SUBJECT TO TIDAL ACTION											

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Gage Height	c.f.s.	Discharge: At time c.f.s.	Discharge: Mean Daily c.f.s.	Parts per Million: Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl.	Total Solids
					MOKELUMNE RIVER AT NEW HOPE BRIDGE									
6/8/38	2:30pm	6.36											1.1	34
7/28/38	1:45pm	2.75											2.3	73
8/31/38	2:30pm	3.54				4.6	1.8	2.9	1.4	0.0	25	2.1	1.6	45
9/30/38	2:15pm	3.95											2.0	48
11/4/38	2:00pm	5.16								0.0	21	1.3	1.2	50
12/1/38	9:45am	3.76								0.0	20	1.3	2.0	54
1/5/39	3:05pm	6.22								0.0	23	1.4	2.3	48
2/2/39	1:40pm	5.00								0.0	38	1.3	3.0	79
3/3/39	8:55am	3.07								0.0	32	5.6	4.3	54
4/3/39	2:00pm	3.80				6.7	2.6	3.6	0.9	0.0	31	5.9	2.0	68
5/3/39	4:00pm	3.40								0.0	36	3.3	1.8	110
6/1/39	1:15pm	2.10								0.0	35	2.8	2.3	53
9/1/39	12:45pm	2.60								0.0	28	3.0	5.7	55
11/1/39	11:35am	4.26								0.0	27	1.8	1.8	59
1/2/40	1:00pm	5.90								0.0	29	4.7	7.8	66
					SOUTH FORK MOKELUMNE RIVER NEAR HOG SLOUGH									
1/3/40	10:15am									0.0	58	11	80	260
2/26/40	9:40am									0.0	65	12	24	140
3/26/40	1:45pm									0.0	43	8.4	11	82
4/30/40	10:00am					6.3	2.7	3.7	0.6	0.0	32	3.8	4.1	65
5/28/40	10:15am									0.0	16	1.2	3.9	37
6/27/40	3:15pm									0.0	29	3.2	29	97
7/29/40	10:15am									0.0	69	10	70	220
8/26/40	9:55am									0.0	110	15	91	240
9/28/40	9:50am									0.0	32	3.4	21	84
10/28/40	1:45pm									0.0	23	1.6	6.2	44
11/28/40	10:10am									0.0	22	2.2	4.7	46
12/27/40	2:00pm									0.0	29	11	25	130
1/31/41	10:25am									0.0	52	12	45	180
2/27/41	10:00am					15	7.8	12	2.8	0.0	58	11	31	140
3/28/41	9:50am									0.0	50	7.6	21	110
5/1/41	4:05pm									0.0	54	8.5	9.9	110
5/27/41	9:30am									0.0	20	2.7	5.9	55
6/28/41	9:30am									0.0	20	2.7	8.0	48
7/28/41	9:30am					16	9.0	22	0.9	0.0	57	7.5	50	170
8/29/41	9:50am					20	11	29	0.8	0.0	75	10	64	220
9/29/41	10:25am					6.9	3.3	8.3	1.2	0.0	31	3.7	15	78
11/28/41	2:40pm									0.0	45	7.0	31	140
12/19/41	10:45am									0.0	27	4.0	5.5	58
1/6/42	12:50pm									0.0	38	6.7	15	85
2/5/42	1:25pm									0.0	39	8.9	10	100
3/4/42	2:20pm									0.0	52	11	26	130
4/7/42	9:00am									0.0	35	5.2	5.6	63
5/6/42	4:00pm									0.0	26	3.1	2.0	53
6/4/42	11:20am												6.9	
7/3/42	4:00pm												3.2	
8/17/42	10:50am												7.0	

SUBJECT TO TIDAL ACTION

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Gage Height	c.f.s.	Discharge: At time c.f.s.	Discharge: Mean Daily c.f.s.	Parts per Million: Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl.	Total Solids
LITTLE POTATO SLOUGH NEAR TERMINOUS														
1/27/39	11:25am									0.0	52	8.3	15	98
2/23/39	9:45am					15	7.6	14	1.0	0.0	59	11	26	130
3/22/39	9:20am									0.0	50	11	16	110
5/4/39	9:55am									0.0	58	6.7	25	130
6/1/39	2:20pm									0.0	76	12	51	190
7/6/39	2:00pm									0.0	110	3.8	61	250
12/4/39	2:05pm					14	7.9	15	3.5	0.0	77	9.6	18	140
1/2/40	1:45pm									0.0	79	18	33	180
2/26/40	9:15am									0.0	62	15	33	160
3/26/40	9:15am									0.0	62	11	25	130
5/28/40	9:30am									0.0	22	1.3	9.1	55
7/29/40	9:35am									0.0	110	18	58	240
8/26/40	9:25am	5.03								0.0	140	20	65	310
9/28/40	9:15am	3.40								0.0	99	14	63	220
10/28/40	2:55pm	6.64								0.0	72	7	45	170
11/28/40	9:25am	4.20								0.0	58	8.3	39	150
12/27/40	2:50pm	9.25				11	5.8	9.5	1.6	0.0	36	13	16	120
1/31/41	9:35am	7.39								0.0	53	19	23	147
3/28/41	9:25am	6.10								0.0	60	10	25	130
LITTLE CONNECTION SLOUGH AT KINGS ISLAND ROAD														
12/21/38	2:30pm	5.86								0.0	66	17	26	190
1/27/39	12:10pm	4.93								0.0	62	21	59	220
SNODGRASS SLOUGH AT COUNTY ROAD BRIDGE EAST OF VORDEN														
11/4/38	3:30pm									0.0	33	3.8	6	61
12/1/38	10:30am									0.0	38	4.6	8.3	71
1/5/39	2.10pm									0.0	35	4.3	8.0	78
2/2/39	12:55pm									0.0	58	12	22	150
3/3/39	9:35am					16	9.3	13	2.2	0.0	66	14	27	150
10/4/39	11:05am									0.0	34	3.8	11	83
12/4/39	1:15pm									0.0	34	3.6	5.5	67

SUBJECT TO TIDAL ACTION

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Gage Height	c.f.s.*	Discharge: At time # c.f.s.	Discharge: Mean Daily* c.f.s.	Parts per million: Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl.	Total Solids
					SACRAMENTO RIVER AT SACRAMENTO									
6/8/38	5:30pm	21.35	59400	60000	58500	7.4	2.7	3.8	1.2	0.0	39	2.5	2.5	59
7/28/38	4:00pm	2.9	5880		7210								11	130
8/31/38	4:30pm	2.35	4330		5190								22	170
9/30/38	4:00pm	3.3	7600		8200								20	180
11/4/38	4:30pm	5.9	22200							0.0	62	9.3	6	100
12/1/38	12:45pm		10300							0.0	75	6.5	7.1	110
1/5/39	12:30pm		10600		10600	13	5.5	9.1	2.6	0.0	77	6.9	5.9	110
2/2/39	10:45am				16200					0.0	72	7.3	4.4	120
3/3/39	10:50am		10600		10600					0.0	71	7.0	7.1	100
4/3/39	12:10pm		26800		26800					0.0	42	4.4	4.8	89
5/3/39	2:15pm		8960		8960					0.0	62	7.0	15	110
6/1/39	11:20am		6400		6400					0.0	79	9.5	15	130
7/6/39	10:20am		1240		1240					0.0	150	20	43	250
8/2/39	12:50pm		598		598					0.0	170	24	49	260
9/1/39	10:10am		2660		2660					0.0	140	20	27	280
10/4/39	9:35am		5680		5680					0.0	93	7.5	14	150
11/1/39	10:00am				5410					0.0	81	7.0	7.5	130
12/4/39	11:40am		5860		5860	13	7.1	11	2.8	0.0	77	8.4	5.9	130
1/2/40	11:05am				20400					0.0	73	8.4	6.4	110
2/13/40	4:00pm	19.4		54100	54800					0.0	52	6.5	3.9	82
3/12/40	5:10pm	20.4		57100	57400					0.0	55	6.6	4.6	99
4/9/40	4:00pm	21.3		59800	60000					0.0	46	4.0	3.2	68
5/10/40	3:30pm	12.6		34000	34200					0.0	50	4.4	8.2	100
6/10/40	3:45pm	5.6			13800					0.0	76	6.6	14	120
7/9/40	3:30pm	1.9			4070					0.0	110	14	20	170
8/9/40	4:10pm	1.4	2500		2530	23	14	30	1.6	0.0	134	18	33	220
9/11/40	4:15pm	3.6			5010					0.0	110	12	16	160
10/11/40	3:45pm	3.4			6140					0.0	85	4.9	8.3	120
11/12/40	3:45pm	5.0			12400					0.0	80	9.8	13	120
12/10/40	3:50pm	4.6			7870					0.0	80	7.0	5.7	110
1/9/41	4:05pm	21.3		59800	60800					0.0	51	5.9	5.1	81
2/10/41	4:40pm	21.7		61000	60500					0.0	55	6.8	6.3	85

* From Water Supervision Reports.
\# Using indicated gage heights and State curve dated 3/10/42.

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Gage Height	c.f.s.*	Discharge		Parts per million								
				At time # c.f.s.	Mean Daily c.f.s.*	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl.	Total Solids
SACRAMENTO RIVER AT SACRAMENTO (CONT'D)														
3/11/41	4:05pm	21.8		61300	62600					0.0	54	5.5	2.7	81
4/10/41	4:05pm	23.1		65700	66600					0.0	47	3.8	4.1	77
5/8/41	2:20pm	21.2		59500	60500					0.0	37	3.3	1.8	66
6/11/41	3:50pm	9.6		25400	26600	9.8	4.8	8.4	2.2	0.0	54	5.6	12	87
7/9/41	11:00am	5.0			10500					0.0	76	8.3	7.6	110
8/8/41	2:30pm	2.8			4720					0.0	110	16	22	170
9/12/41	5:05pm	2.5			4020					0.9	130	17	30	200
10/10/41	1:20pm	3.0			6480					0.0	94	8.3	13	140
11/10/41	2:15pm	4.0			9470					0.0	81	10	11	130
12/8/41	12:50pm	10.2		27100	28000					0.0	56	12	6.5	100
1/7/42	1:00pm	13.5		36700						0.0	62	8.8	6.4	100
2/6/42	12:40pm	26.4		81500						0.0	39	3.9	0.7	52
3/9/42	2:30pm	11.4		30600						0.0	64	7.5	5.3	190
4/7/42	2:05pm	22.2											4.2	
5/6/42	3:00pm	17.0		47000						0.0	48	4.0	4.5	78
6/4/42	2:00pm	16.2		44700						0.0	39	2.6	3.9	66
7/3/42	1:35pm	6.4								0.0	57	7.9	8.3	99
8/17/42	1:35pm	3.0								0.0	120	19	25	190
9/15/42	1:30pm									0.0	120	22	24	190
10/14/42	1:30pm									0.0	110	12	15	150
11/12/42	1:25pm									0.0	79	6.8	7.8	110
12/7/42	8:30am	6.2												
1/6/43	10:00am	13.14:								0.0	59	6.2	7.6	94
2/10/43	9:00am	19.80:								0.0	51	5.8	4.8	81
3/6/43	11:45am	18.51:								0.0	63	6.9	6.5	100
4/6/43	8:35am	20.25:								0.0	55	4.2	3.0	82
5/8/43	9:45am	14.60:								0.0	55	3.7	3.9	83
6/3/43	11:10am	12.00:								0.0	57	7.2	7.8	98
7/5/43	8:30am	**5.00:								0.0	120	14	17	190
8/6/43	12:15pm	**4.00:								0.0	150	22	31	230
9/7/43	8:40am									0.7	180	23	46	280
10/9/43	8:10am	2.90:												

*From Water Supervision Reports.
#Using indicated gage heights and State curve dated 3/10/42.
**approximate

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Gage Height	c.f.s.	Discharge: At time c.f.s.	Discharge: Mean Daily c.f.s.	Parts per million: Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl.	Total Solids
					SACRAMENTO RIVER AT FREEPORT BRIDGE									
11/10/41	1:45pm	6.2								0.0	89	9.9	18	140
12/8/41	11:55am	10.0								0.0	56	9.9	7.4	100
1/7/42	12:20pm	12.5								0.0	65	8.8	5.5	110
2/6/42	11:45am	23.6								0.0	36	3.6	0.7	57
3/9/42	1:35pm	11.1								0.0	72	8.1	8.3	110
4/7/42	1:05pm												6.1	
5/6/42	2:25pm	15.4								0.0	54	4.4	3.6	84
6/4/42	1:00pm	14.6								0.0	46	3.4	3.4	71
7/3/42	1:00pm	7.9								0.0	60	4.8	7.5	94
8/17/42	12:35pm	5.4								0.0	130	19	28	200
9/15/42	12:30pm	5.5								0.0	140	21	35	230
10/14/42	12:35pm	5.71								0.0	110	12	17	150
11/12/42	12:30pm	5.51								0.0	83	6.7	7.8	120
12/7/42	9:10am	7.18												
1/6/43	10:25am	1.88								0.0	50	63	3.9	94
2/10/43	9:40am	17.60								0.0	58	6.8	6.2	92
3/6/43	12:20pm	16.09								0.0	57	6.1	4.9	140
4/6/43	9:05am	17.95								0.0	48	8.0	3.5	83
5/8/43	9:45am	14.60								0.0	48	4.1	3.9	
6/3/43	11:40am	11.10								0.0	44	3.3	5.5	73
7/2/43	5:25pm	5.90	SUBJECT TO TIDAL ACTION							0.0	97	15	20	160
8/6/43	12:05pm	5.02								0.0	140	20	31	220
9/7/43	11:05am	5.21								0.0	180	25	51	290
10/9/43	8:50am	4.90												

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943

DATA COMPILED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Gage Height	c.f.s.*	Discharge		Parts per million								
				At time c.f.s.	Mean Daily c.f.s.	Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	Total Solids
SACRAMENTO RIVER OPPOSITE HEAD OF SNODGRASS SLOUGH														
6/8/38	4:00pm		59400			7.5	2.8	4.2	0.6	0.0	40	3.5	3.2	62
7/28/38	2:45pm	4.3	7210										19	160
8/31/38	3:15pm	4.3	5190										25	180
9/30/38	3:00pm	4.7	8200										16	170
11/4/38	3:45pm									0.0	70	4.2	5.9	100
12/1/38	11:05am	6.1								0.0	79	6.7	12	120
1/5/39	1:30pm	7.0	10600			14	6.4	10	2.6	0.0	79	7.0	8.9	120
2/2/39	11:35am	5.69	16200							0.0	73	6.8	5.5	140
3/3/39	10:05am	4.40	10600							0.0	73	8.2	8.5	100
4/3/39	1:15pm	7.15	26800							0.0	49	5.4	3.7	100
5/3/39	3:15pm	4.85	8960							0.0	65	6.2	14	120
6/1/39	12:30pm		6400							0.0	77	9.1	13	120
7/6/39	1:00pm		1240							0.0	130	14	40	210
8/2/39	1:50pm	3.44	598							0.0	160	23	58	270
9/1/39	11:05am	4.08	2660			25	17	39	3.6	0.0	160	23	46	250
10/4/39	10:30am	5.31	5680							0.0	100	9.1	27	170
11/1/39	10:55am	5.20	5410							0.0	89	11	9.4	130
12/4/39	12:40pm	5.80	5860							0.0	86	7.5	7.3	150
1/2/40	11:50am	7.55	20400							0.0	81	9.8	10	120
2/26/40	10:30am	13.80	55700							0.0	62	8.4	7.5	94
3/26/40	10:10am	10.63	41500							0.0	59	6.3	5.3	73
4/30/40	11:10am	9.20	37100							0.0	59	5.1	5.1	110
5/28/40	11:05am	6.95	21500							0.0	61	7.4	11	98
6/27/40	12:00 n	5.18	6080							0.0	92	9.6	13	130
7/29/40	12:45pm	4.73	2870			21	12	24	5.3	0.0	130	17	28	200
8/26/40	11:40am	5.16	2830							0.0	140	17	34	260
9/28/40	10:40am	3.65	6230							0.0	100	12	15	150
10/28/40	12:45pm	5.78	8860							0.0	85	6.4	8.1	110
11/28/40	11:15am	4.32	8020							0.0	90	8.6	6.7	120
12/27/40	10:40am	17.36	73400			7.4	3.5	3.8	1.6	0.0	38	5.0	3.2	83
1/31/41	11:15am	15.90	62300							0.0	55	4.8	4.0	79
2/27/41	10:55am	15.43	61700							0.0	58	6.2	4.7	120

* See note bottom of page 228.

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Gage Height	* c.f.s.	Discharge: At time c.f.s.	Discharge: Mean Daily c.f.s.	Parts per million: Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	Total Solids
SACRAMENTO RIVER OPPOSITE HEAD OF SNODGRASS SLOUGH (CONT'D)														
3/28/41	10:40am	10.35	40200							0.0	68	7.6	6.9	130
5/1/41	2:55pm	12.11	49400			10	5	5.8	0.9	0.0	54	6.3	4.4	79
5/27/41	10:30am	12.20	48500							0.0	42	4.1	6.0	84
6/28/41	10:40am	6.35	16300			12	6.4	11	1.6	0.0	76	7.4	11	130
7/28/41	10:30am	5.55	5520							0.0	110	13	23	170
8/29/41	11:20am	5.60	4230			21	13	26	1.0	2.1	130	21	25	210
9/29/41	9:20am	4.25	6910							0.0	120	18	26	210
11/10/41	1:05pm	5.50	9470							0.0	81	9.3	12	130
12/8/41	11:15am		28000							0.0	52	8.3	6.9	93
1/7/42	11:50am	10.0	37300							0.0	69	7.9	7.3	100
2/6/42	11:10am		82100							0.0	36	3.6	1.3	65
3/9/42	1:00pm	9.1	30400							0.0	73	11	9.1	120
4/7/42	12:35pm		63200							0.0	51	5.2	5.0	86
5/6/42	2:00pm	12.10	48000							0.0	55	4.8	3.7	84
6/4/42	12:35pm	11.40	45400							0.0	50	5.4	4.5	110
7/3/42	12:10pm	6.60	15500							0.0	63	11	17	120
8/17/42	12:10pm	5.00	3820							0.0	140	20	30	210
9/15/42	11:55am	5.15	5720							0.0	130	21	29	210
10/14/42	11:55am	5.25	8290							0.0	110	14	18	160
11/12/42	11:50am	5.03	8290							0.0	86	7.3	7.4	120
12/7/42	9:35am	5.72	17000											
1/6/43	10:50am	9.33	36200							0.0	54	6.2	3.9	91
2/10/43	10:05am	13.95	55700							0.0	58	7.3	6.4	100
3/6/43	12:55pm	12.51	50000							0.0	58	6.1	4.8	91
4/6/43	9:40am	14.21	57200							0.0	50	3.9	4.1	76
5/8/43	10:40am	10.25	40500							0.0	54	4.6	4.3	83
6/3/43	12:05pm	8.73	33000							0.0	41	5.2	4.1	69
7/2/43	9:30am	5.95	7330							0.0	97	13	14	160
8/6/43	1:15pm	4.37	2520							0.0	150	21	35	230
9/7/43	11:25am	5.31	3090							0.0	170	25	44	270
10/9/43	9:20am	3.90	7380							0.0	120	16	18	170
11 / 43	9:45am	3.92								0.0	87	7.5	11	130

* Mean daily discharge at Sacramento, about 20 miles upstream. Flows below 25,000 c.f.s. are subject to tidal action causing a cessation of flow and at very low stages a reversal of flow.

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Gage Height	c.f.s.	Discharge: At time c.f.s.	Discharge: Mean Daily c.f.s.	Parts per million: Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl.	Total Solids
SACRAMENTO RIVER AT WALNUT GROVE														
11/4/38	2:30pm									0.0	71	6.8	6.6	110
12/1/38	10:05am									0.0	80	8.7	11	130
1/5/39	2:30pm									0.0	78	7.8	10	130
2/2/39	1:20pm					14	6.1	8.4	2.2	0.0	74	7.9	6.0	99
3/3/39	9:10am									0.0	70	7.8	8.0	98
4/3/39	1:40pm									0.0	48	5.9	3.7	91
5/3/39	3:45pm									0.0	60	6.4	16	110
6/1/39	1:00pm									0.0	72	11	9.4	110
7/6/39	1:25pm									0.0	120	15	36	200
8/2/39	2:15pm									0.0	150	26	74	300
9/1/39	12:30pm									0.0	160	22	44	280
11/1/39	11:25am		TIDAL ACTION							0.0	88	7.5	8.5	160
SACRAMENTO RIVER AT EMMATON, SOUTH BANK, LOWER END OF HORSESHOE BEND														
10/10/41	9:10am												52	
11/10/41	11:05am												21	
12/8/41	9:35am												9.0	
1/7/42	10:00am												11	
2/6/42	9:45am												5.2	
3/9/42	11:20am												14*	
4/7/42	11:00am												9.8*	
5/6/42	10:50am												9.3*	
6/4/42	10:50am												7.3*	
8/17/42	10:10am												110	
9/15/42	9:50am												110	
10/14/42	9:50am												37	
11/12/42	9:30am		SUBJECT TO										25	

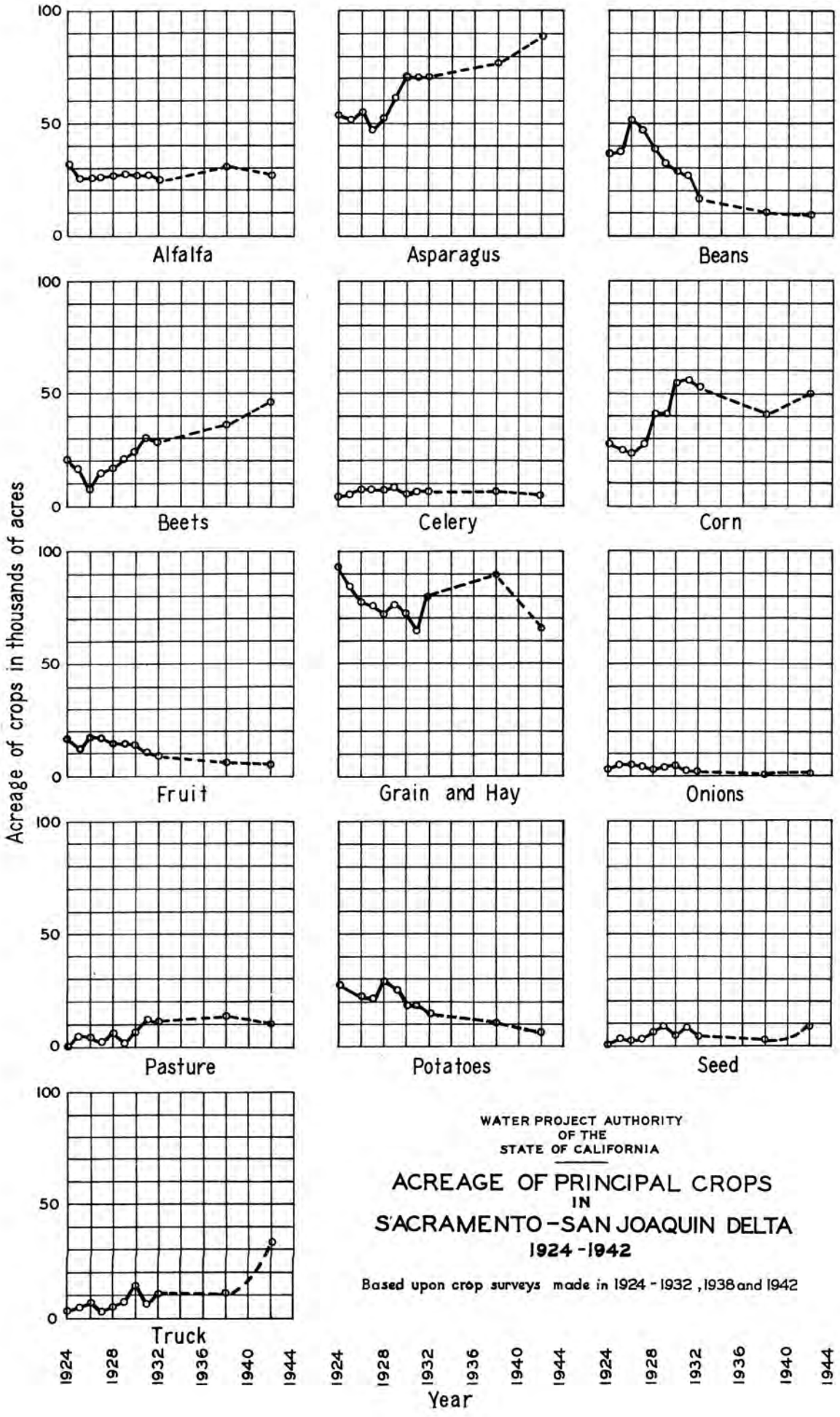
* Sample was taken at second warehouse on levee road, about one-fourth mile distant.

TABLE 139 (CONTINUED)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS, 1934 - 1943

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Gage Height	Discharge c.f.s.	Discharge At time c.f.s.	Discharge Mean Daily c.f.s.	Parts per Million Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	Total Solids
					SACRAMENTO RIVER AT COLLINSVILLE									
2/26/40	12:15pm	3.50				17	13	36	1.9	0.0	76	29	60	240
3/26/40	11:15am	2.70								0.0	80	13	13	120
4/30/40	1:20pm	3.30								0.0	74	9.4	10	150
5/28/40	12:30pm	2.80								0.0	50	7.2	12	87
6/27/40	1:50pm	2.75								0.0	63	10	22	110
7/29/40	2:10pm	3.90								0.0	70	250	1800	3600
8/26/40	2:00pm	3.60				100	280	2200	30	0.0	120	560	3900	8000
9/28/40	12:00pm	5.50								0.0	95	220	1500	3000
10/28/40	10:30am	5.05								0.0	120	100	630	1600
11/28/40	1:30pm	6.75								0.0	88	71	430	940
12/27/40	11:55am	8.50								0.0	52	11	8.3	97
1/31/41	1:10pm	4:35								0.0	65	17	19	130
2/27/41	1:00pm	6.23								0.0	94	18	14	180
3/28/41	12:00m	4.00								0.0	97	19	17	150
5/1/41	2:30pm	2.70								0.0	84	16	9.9	130
5/27/41	12:15pm	2.20								0.0	52	6.7	5.9	81
6/28/41	12:45pm	1.62								0.0	63	8.2	12	130
7/28/41	1:15pm	2.10								0.0	67	17	70	210
8/29/41	1:45pm	3.10								0.0	82	190	1300	2900
9/29/41	11:10am	5.60								0.0	110	190	1200	2700
11/10/41	10:15am	4.9											85	
12/8/41	8:55am	5.1											9.5	
1/7/42	9:00am	5.1											14	
2/6/42	8:55am	6.9											11	
3/9/42	10:40am	5.3											17	
4/7/42	10:10am	5.7											10	
5/6/42	10:10am	5.3											8.9	
6/4/42	10:20am	4.8											6.6	
7/3/42	10:00am	4.6											12	
8/17/42	9:30am	4.3											1300	
9/15/42	9:10am	4.7											1200	
10/14/42	9:35am	4.5											370	
11/12/42	9:30am	4.03											290	
1/6/43	12:15pm	5.36											37	
2/9/43	1:30pm	3.48											13	
3/5/43	10:30am	3.87											13	
4/6/43	11:05am	3.15											64	
5/8/43	10:15am	3.01											10	
6/4/43	10:15am	3.01											61	
7/2/43	11:05am	1.98											33	
8/3/43	10:15am	2.80											1400	
9/8/43	10:10am	4.80											2800	
10/9/43	10:45am	4.70												



WATER PROJECT AUTHORITY
OF THE
STATE OF CALIFORNIA

ACREAGE OF PRINCIPAL CROPS IN SACRAMENTO-SAN JOAQUIN DELTA 1924-1942

Based upon crop surveys made in 1924-1932, 1938 and 1942

TABLE 140

MINIMUM TEN-DAY STREAM FLOW TO DELTAS OF SACRAMENTO AND SAN JOAQUIN RIVERS AND AREA OF EACH AFFECTED BY SALINITY ENCROACHMENT GREATER THAN 100 PARTS OF CHLORINE PER 100,000 PARTS OF WATER

Year	Flow for Minimum 10-day period (1)					Runoff in % of Normal*			Area Affected by Salinity					
	Sacramento River at Sacramento		San Joaquin River at Vernalis		Sacramento and San Joaquin to Delta	Sacramento and San Joaquin to Delta	At Sacramento	At Vernalis	All Deltas		Sacramento and Mokelumne		San Joaquin	
	Date	c.f.s.	Date	c.f.s.	c.f.s.				% of Total	Acres (2)	% of Total	Acres (3)	% of Total	Acres
1920		(4) 540		(4) 450		52	48	66	15.1	65800	7.7	33500	7.4	32300
1921						118	126	95	2.1	9150	2.0	8715	0.1	435
1922						103	95	123	2.9	12600	2.4	10420	0.5	2180
1923						76	70	88	2.1	9150	2.0	8715	0.1	435
1924	7/14	858	7/26	407	1280	28	30	24	50.0	217500	18.4	80100	31.6	137400
1925	8/7	2860	8/29	743	3730	86	84	88	3.6	15630	3.1	13450	0.5	2180
1926	7/28	1460	8/21	586	2080	60	63	56	18.5	80500	8.5	37000	10.0	43500
1927	8/23	3560	8/23	1300	4850	121	127	104	2.9	12600	2.4	10420	0.5	2180
1928	8/15	2690	8/22	866	3550	84	89	70	5.7	24800	3.7	16100	2.0	8700
1929	7/18	2460	8/12	590	3090	44	44	46	7.1	30900	4.2	18300	2.9	12600
1930	8/5	2500	8/9	735	3230	65	71	53	5.4	23500	3.8	16500	1.6	7000
1931	7/20	-79	7/21	211	131	30	32	27	73.8	321000	30.2	131000	43.6	190000
1932	8/11	1980	9/10	1030	3030	78	69	106	5.7	24800	3.4	14800	2.3	10000
1933	8/21	1450	8/14	607	2070	48	46	54	9.8	42600	5.2	22600	4.6	20000
1934	7/20	1150	8/14	346	1530	43	45	37	37.5	163000	17.8	77500	19.7	85500
1935	8/12	2920	8/12	922	3940	91	87	103	2.9	12600	2.4	10420	0.5	2180
1936	8/20	2540	8/17	1040	3600	96	92	104	2.6	11600	2.2	9840	0.4	1760
1937	8/16	1720	8/24	1020	2820	80	70	105	3.5	15200	2.6	11280	0.9	3920
1938	8/12	5190	8/27	2130	7365	170	167	189	0	0	0	0	0	0
1939	8/5	630	7/25	610	1315	43	43	46	29.0	126000	17.0	74000	12.0	52000
1940	8/12	2550	8/9	1080	3620	115	118	105	4.2	18300	3.0	13000	1.2	5300
1941	8/24	4190	9/14	1480	5800	137	143	127	1.2	5100	1.2	5100	0	0
1942	8/22	3740	8/20	1520	5300	129	133	118	1.2	5100	1.2	5100	0	0
1943	8/17	2600	8/4	1480	4140	114	111	117	2.8	12200	2.2	9600	0.6	2600

* Normal = 50 year mean (1889 - 1939). For comparison of 40 and 50 year means, see Tables 1, 3 and 5.
(1) For minimum daily flow see Tables 1 and 3. For minimum 10-day flow see Tables 2 and 4.
(2) Delta area taken at 435,000 acres which includes all lands, levees, water surfaces, etc., within delta boundary.
(3) Sacramento and Mokelumne deltas combined as the Sacramento River contributes a large flow to Mokelumne River delta through Georgiana and Three Mile Sloughs.
(4) No continuous record. Lowest discharge measured.

CHAPTER VII

ESTIMATED LOSSES DUE TO SALINITY IN THE SACRAMENTO-SAN JOAQUIN DELTA 1924 - 1942

The purpose of this chapter is to bring up to date Table 95, Water Supervisor's Report for 1931, "Acreage irrigated, estimated value of actual production and estimated losses due to salinity, Sacramento-San Joaquin Delta Crops, 1924-1931".

Information Available

Crop surveys by Division of Water Resources for years 1924 to 1932, inclusive, and 1938 by the U. S. Bureau of Reclamation for 1942.

Survey of crop losses in 1931 due to salinity.

Complete records of salinity encroachment in Delta for period 1924 to July, 1941. Partial record for period July, 1941 to date.

Reports of Federal-State crop reporting service giving state-wide and county figures on acreages, yields and market value of crops.

Assumptions Made

That the distribution of plantings for any particular crop has remained substantially the same as in 1931.

That loss of each crop due to salinity is evenly distributed throughout area affected.

That intrusion of equal degrees of salinity will cause equal loss of production and that loss of value is in direct ratio to state-wide market value of crops.

That the ratio of annual acreage of each crop in Delta to total annual acreage of that crop in State, as determined by detailed crop surveys made by the State and the Federal-State crop reporting service, respectively, is applicable in determining the acreage of the crops in the Delta in years when no detailed crop surveys were made in that area.

That per acre yield for any particular crop in Delta was the same as the average yield for State.

That unit crop values for Delta crops were the same as the average unit price for State.

Agricultural Limits of Salt Water Concentration

The question has been asked many times as to the limit of the concentration of salt in irrigation water which may be safely used. It is found that there is considerable difference of opinion as to such limit. In January, 1924, at the first Sacramento-San Joaquin River Problems Conference, Mr. Thomas L. Means, Consulting Engineer of San Francisco, and a well-known authority on saline conditions, presented a paper from which the following is quoted:

> "The question is often asked as to what are the limits of salt in irrigation water. No exact answer can be given, for the allowable amount will depend on crop, soil and drainage conditions, and whether or not the use is occasional or permanent. Under average conditions such as exist over the Delta and upper Bay region generally, water containing less than 100 parts saline matter per 100,000 parts of water is safe for use, between 100 and 200 parts the water must be used with precautions and above 200 parts its use is unsafe. Variations from this rule may be made for crops resistant to salt, such as asparagus or pears, or where the use is only occasional and can be followed by a heavy irrigation of fresh water. I have seen water carrying 400 parts of salt used on grain and have seen over 800 parts salt water used on date palms."

Since this conference, it has been arbitrarily assumed that water having more than 100 parts of chlorine per 100,000 parts of water is unsafe for most irrigation uses.

PROCEDURE FOLLOWED TO DETERMINE DAMAGE

Acreage of Each Crop in Delta

For the years in which crop surveys were made by the Division of Water Resources, the acreage of each of the principal crops is known. In order to estimate the individual crop acreages for the years when crop surveys

were lacking, Plate 4 and Table 141 were prepared. Plate 4 shows by small circles the acreage of each of the principal crops in the Delta for the years in which surveys were made.

Table 141 shows the acreages of the principal crops in the Delta in each year. It also shows the relationship between the Delta acreage of most of the principal crops and the total acreages of those crops in California as reported by the Federal-State crop reporting service. Data obtained from actual surveys in the Delta are indicated.

In order to estimate the areas of crops in the Delta in years for which no surveys are available, several methods were followed. For crops showing a definite trend in the Delta from year to year, and for crops for which the relationship between Delta and State acreages fluctuates widely, the acreages for the intervening years between those in which surveys were made were interpolated from survey data. These interpolated values are indicated in the table by an asterisk. For the crops showing a more or less constant percentage relationship of Delta to state-wide plantings, the acreages in the Delta were determined by obtaining the percentages for years having no Delta survey by interpolation and applying these to the state-wide average. To indicate the acreages determined thus the percentage figures are enclosed in parenthesis. The acreages of asparagus in the Delta in years when there were no surveys were obtained by comparison with the total acreages of this crop in the counties in which the Delta lies by the percentage method just described. These acreages were obtained from the Federal-State crop reports. It may be noted that the acreages of asparagus shown for the entire counties are smaller than those shown for the Delta alone as obtained by the Division of Water Resources crop surveys. This can be explained by the fact that the Federal-State figure includes only acreages from which canning and shipping "grass" was obtained, whereas the Division of Water

TABLE 141

ACREAGES OF PRINCIPAL CROPS IN THE SACRAMENTO-SAN JOAQUIN DELTA, 1929-1942

Year	Alfalfa			Asparagus			Beans		
	Acreage (1)	Acreage Delta	% (2)	Acreage (3)	Acreage Delta	% (2)	Acreage	Acreage Delta	% (2)
1929	795,000	(27,158)	3.4	50,500	(62,044)	123	339,000	(32,315)	9.5
30	874,000	(26,930)	3.1	53,700	(70,269)	131	363,000	(29,166)	8.0
31	848,000	(26,882)	3.2	57,700	(70,580)	122	334,000	(26,992)	8.1
32	814,000	(25,378)	3.1	64,000	(71,709)	112	225,000	(16,147)	7.2
33	790,000	26,100	(3.3)	69,900	79,000	(113)	275,000	*15,300	
34	727,000	25,400	(3.5)	63,400	72,900	(115)	299,000	*14,500	
35	705,000	24,700	(3.5)	63,400	72,900	(115)	339,000	*13,500	
36	733,000	27,100	(3.7)	60,300	69,900	(116)	347,000	*12,700	
37	748,000	29,200	(3.9)	61,000	71,400	(117)	386,000	*12,000	
38	770,000	(31,342)	4.1	65,600	(77,311)	118	349,000	(10,997)	3.1
39	808,000	31,500	(3.9)	71,600	84,500	(118)	340,000	10,500	
40	848,000	31,400	(3.7)	74,600	88,000	(118)	391,000	10,200	
41	780,000	28,100	(3.6)	69,800	82,400	(118)	389,000	* 9,800	
42	819,000	(27,642)	3.4	68,400	80,700	(118)	386,000	(9,427)	2.4

Year	Beets			Celery			Corn		
	(1)			(1)			(1)		
1929	46,000	(21,553)	57	8,800	(8,721)	99	82,000	(40,855)	50
30	65,000	(24,058)	37	9,600	(5,969)	62	82,000	(54,533)	67
31	89,000	(30,915)	35	10,600	(6,303)	59	86,000	(55,798)	65
32	104,000	(28,621)	28	10,300	(7,418)	72	93,000	(52,807)	57
33	108,000	*30,000		7,800	*7,300		78,000	44,500	(57)
34	110,000	*31,200		9,200	*7,200		70,000	39,200	(56)
35	116,000	*32,500		11,300	*7,200		74,000	40,700	(55)
36	139,000	*33,300		13,600	*7,000		74,000	40,000	(54)
37	134,000	*35,000		15,000	*7,000		78,000	41,300	(53)
38	162,000	(36,311)	22	15,000	(6,914)	46	78,000	(40,457)	52
39	166,000	*39,000		13,500	*6,600		77,000	42,400	(55)
40	173,000	*41,800		13,800	*6,000		75,000	43,500	(58)
41	125,000	*44,200		12,700	*5,500		82,000	50,000	(61)
42	172,000	(46,810)	27	13,200	(5,049)	38	78,000	(50,032)	64

NOTE: For footnotes see page 236.

TABLE 141 (CONTINUED)

ACREAGES OF PRINCIPAL CROPS IN THE
SACRAMENTO--SAN JOAQUIN DELTA, 1929-1942

Year	Fruit			Grain and Hay			Onions		
	Acreage	Acreage Delta	% (2)	Acreage	Acreage Delta	% (2)	Acreage	Acreage Delta	% (2)
				(1)			(1)		
1929	No detailed figures for State readily available	(14,935)		3,557,000	(76,100)	2.1	6,880	(4,159)	60
30		(14,504)		3,622,000	(72,932)	2.0	7,620	(4,341)	57
31		(10,775)		3,386,000	(65,086)	2.0	6,400	(3,769)	59
32		(9,480)		3,949,000	(79,996)	2.0	7,640	(3,299)	43
33		*9,000		3,633,000	72,700	(2.0)	5,680	*3,000	
34		*8,300		3,474,000	69,500	(2.0)	5,400	*2,600	
35		*8,000		3,838,000	76,800	(2.0)	7,450	*2,300	
36		*7,300		3,741,000	74,800	(2.0)	7,400	*2,000	
37		*6,800		3,698,000	74,000	(2.0)	6,170	*1,600	
38		(6,196)		3,737,000	(89,823)	2.4	4,940	(1,304)	26
39		*5,900		3,722,000	74,400	(2.0)	6,080	*1,500	
40		*5,400		3,868,000	77,400	(2.0)	4,550	1,700	
41		*5,300		3,576,000	71,500	(2.0)	4,400	*1,800	
42		(5,216)		3,873,000	(66,570)	1.7	8,250	(1,879)	23

Year	Pasture			Potatoes			Seed		
	(1)			(1)					
1929	36,000	(2,746)	8	36,000	(18,046)	50	No detailed figures for State readily available	(9,515)	
30	38,000	(7,686)	20	38,000	(18,839)	49		(5,352)	
31	40,000	(12,748)	32	40,000	(18,042)	45		(8,967)	
32	36,000	(12,052)	34	36,000	(14,558)	41		(5,844)	
33	36,000	*12,000		36,000	*13,900			*5,300	
34	46,000	*12,000		46,000	*13,300			*4,900	
35	48,000	*12,000		48,000	*12,600			*4,500	
36	48,000	*12,000		48,000	*12,000			*4,000	
37	66,000	*12,000		66,000	*11,300			*3,700	
38	68,000	(12,386)	18	68,000	(10,650)	16		(3,235)	
39	68,000	12,000		68,000	* 9,500			*3,200	
40	70,000	*12,000		70,000	* 8,600			*3,200	
41	No record	*12,000		71,000	* 7,500			*6,000	
42	No record	*12,000		69,000	(6,578)	10		(8,876)	

Year	Truck	
1929	No detailed figures for State readily available	(7,678)
30		(15,334)
31		(6,498)
32		(10,716)
33		*10,800
34		*11,000
35		*11,300
36		*11,500
37		*11,800
38		(11,999)
39		*13,800
40		*16,500
41		*21,200
42		(34,221)

Acreage figures in ( ) are basic data from crop surveys.

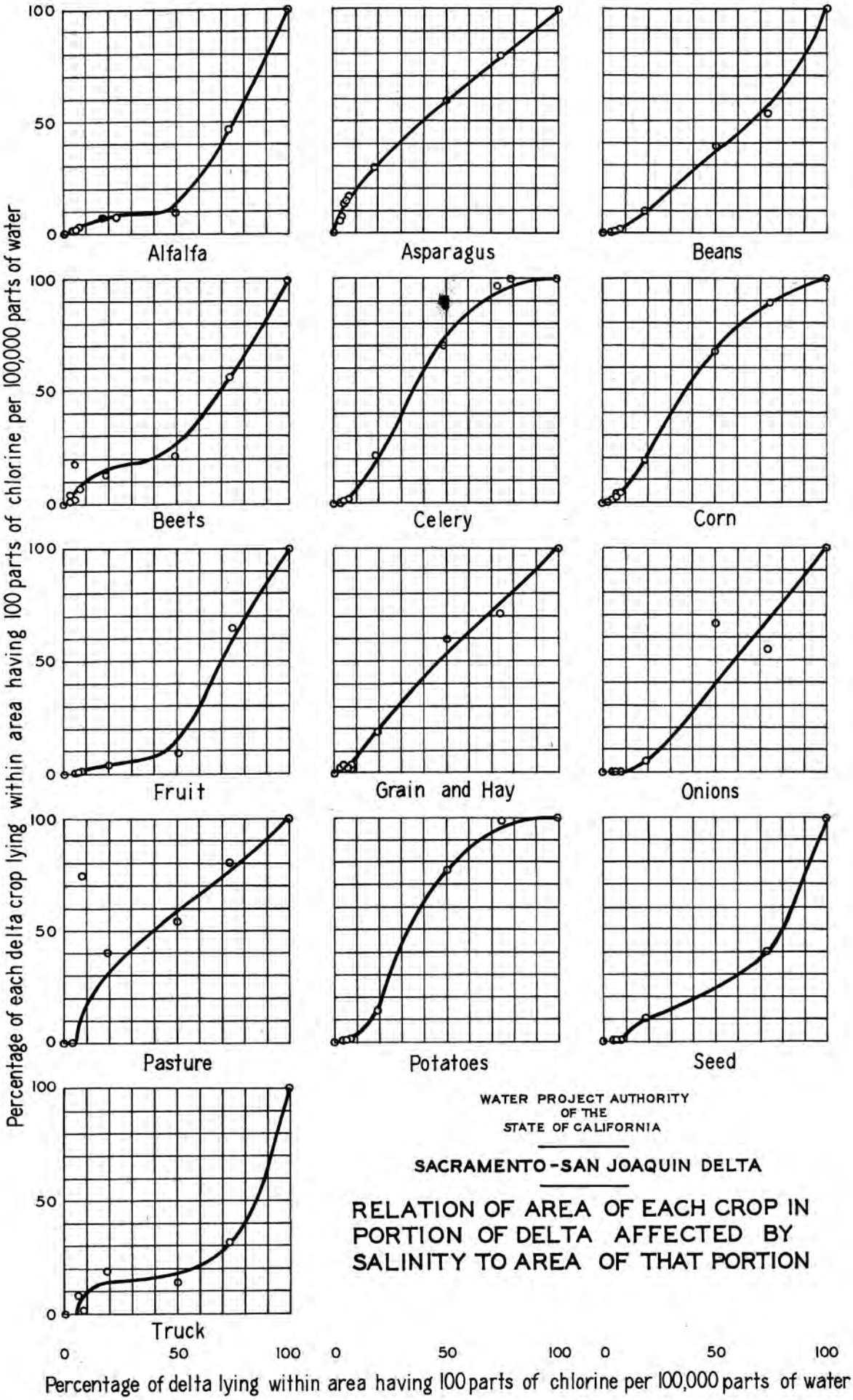
Percentage figures in ( ) are interpolated.

* Interpolated acreages.

(1) Acreage in California from Federal-State crop reports.

(2) Delta acreage in percent of State acreage.

(3) Acreage in Delta counties only. From Federal-State crop reports.



WATER PROJECT AUTHORITY
OF THE
STATE OF CALIFORNIA

SACRAMENTO-SAN JOAQUIN DELTA

RELATION OF AREA OF EACH CROP IN PORTION OF DELTA AFFECTED BY SALINITY TO AREA OF THAT PORTION

Resources figure includes all acreages. In estimating the onion acreage in the Delta, the acreage of Bermuda onions was omitted from the total state area because most of the acreage of Bermuda onions lies outside of the Delta area. The acreages of each of the principal crops as determined by the foregoing methods are shown in Table 141 and in Table 144, Column A.

Acreages of Principal Crops Affected by Salinity

From salinity records at key stations, and special stations established in dry years, it is possible to plot the position of the maximum encroachment into the Delta each year of a salinity of 100 parts of chlorine per 100,000 parts of water, and thereby outline the area affected by salinity of that degree. By drawing the line showing the limit of water having 100 parts of chlorine per 100,000 parts of water on the individual plot maps of the Delta, it was possible to determine the acreage each year of each crop within that portion of each tract, and the entire Delta, affected by Salinity.

Curves showing the relationship of the area of each crop in that portion of the Delta affected by salinity to the total area of that portion, are shown in Plate 5. The data for this plate were obtained by actual crop surveys in which the locations and acreages of individual crops on each of the 114 tracts or islands in the Delta were determined. It appears that the locations of plantings of various crops in the Delta may be influenced by the experience of the growers with salinity intrusion. The curve for each crop was drawn by plotting for each year of crop record a point whose vertical ordinate is the percentage which the total acreage of the crop within the "100 part area" is of the total Delta acreage of that particular crop, and whose horizontal ordinate is the percentage which the area of the Delta within the "100 part area" is of the total area of the Delta, and then drawing a curve averaging the points.

The records of salinity encroachment are available for each year up to and including 1941. By measuring the area of the Delta affected by a "100 part salinity" in any year for which crop surveys are not available, and computing its percentage of the total area, it is possible to estimate from the curves on Plate 5 the acreage of each crop lying within the "100 part area" in the same year. These acreages are tabulated in Table 144, Column A_s. Details of the computations are shown in Table 142.

Crop Yields and Values of Delta Crops

In estimating the value of the production of each crop in the Delta, with no loss due to the encroachment of salinity, statistics of crop yields and values as determined by the Federal-State crop reporting service were used as a basis. The crop yields and values as reported by this agency are on a state-wide basis and are not broken down to give amounts for any particular area. It was necessary, therefore, to assume that the per acre yields and values in the Delta region are the same as the state-wide averages. The crop values given in the Federal-State crop reporting service report, reduced to an acreage basis, are given in Table 143. The total value of the production of each crop in the Delta, with no loss due to salinity encroachment, was estimated by multiplying the total area of that crop in the Delta in each year by the corresponding unit value for the crop and year in Table 143. These values are tabulated in the column headed V_p in Table 144.

TABLE 142

DETERMINATION OF ACREAGE OF EACH CROP IN PORTION OF DELTA AFFECTED BY SALINITY*

Year		1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942
Maximum Area of Delta Affected by Salinity in Per Cent **		5.7	9.8	37.5	2.9	2.6	3.5	0	29.0	4.2	1.2	1.2
Alfalfa	(1)	25400	26100	25400	24700	27100	29200	31300	31500	31400	28100	27600
	(2)	2.2	3.8	9.0	1.1	1.0	1.5	0.0	8.2	2.0	0.4	0.4
	(3)	560	990	2290	270	270	440	0	2580	630	110	110
Asparagus	(1)	71700	79000	75100	72900	69900	71400	77300	84500	88000	82400	80700
	(2)	12.0	18.7	46.9	5.0	4.5	6.5	0.0	39.0	9.5	3.3	3.3
	(3)	8600	14800	35200	3650	3150	4640	0	33000	8400	2720	2660
Beans	(1)	16100	15300	14500	13500	12700	12000	11000	10500	10200	9800	9400
	(2)	0.5	2.5	27.1	0.0	0.0	0.0	0.0	19.5	0.2	0.0	0.0
	(3)	80	380	3930	0	0	0	0	2050	20	0	0
Beets	(1)	28600	30000	31200	32500	33300	35000	36300	39000	41800	44200	46800
	(2)	6.0	8.9	21.1	0.0	0.0	0.0	0.0	19.2	2.0	0.0	0.0
	(3)	1720	2670	6580	0	0	0	0	7490	840	0	0
Celery	(1)	7400	7300	7200	7200	7000	7000	6900	6600	6000	5500	5000
	(2)	0.7	5.8	53.0	0.0	0.0	0.0	0.0	38.5	0.0	0.0	0.0
	(3)	50	420	3820	0	0	0	0	2540	0	0	0
Corn	(1)	52800	44500	39200	40700	40000	41300	40500	42400	43500	50000	50000
	(2)	4.0	8.4	49.0	1.0	1.0	1.8	0.0	36.0	2.6	0.0	0.0
	(3)	2110	3740	19200	410	400	740	0	15260	1130	0	0
Fruit	(1)	9500	9000	8300	8000	7300	6800	6200	5900	5400	5300	5200
	(2)	0.5	1.5	7.4	0.0	0.0	0.0	0.0	6.0	0.3	0.0	0.0
	(3)	50	140	610	0	0	0	0	350	20	0	0

NOTE: For footnotes see bottom of page 240.

TABLE 142 (CONTINUED)

DETERMINATION OF ACREAGE OF EACH CROP IN PORTION OF DELTA AFFECTED BY SALINITY*

Year		1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942
Maximum Area of Delta Affected by Salinity in Per Cent**		5.7	9.8	37.5	2.9	2.6	3.5	0	29.0	4.2	1.2	1.2
Grain & Hay	(1)	80000	72700	69500	76800	74800	74000	89800	74400	77400	71500	66600
	(2)	3.5	7.0	43.5	1.4	2.3	2.0	0.0	31.8	2.3	0.6	0.6
	(3)	2800	5090	30230	1080	1720	1480	0	23660	1780	430	400
Onions	(1)	3300	3000	2600	2300	2000	1600	1300	1500	1700	1800	1900
	(2)	0.0	0.5	25.9	0.0	0.0	0.0	0.0	16.0	0.0	0.0	0.0
	(3)	0	20	670	0	0	0	0	240	0	0	0
Pasture	(1)	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000
	(2)	11.0	26.0	50.0	0.0	0.0	0.0	0.0	44.8	0.0	0.0	0.0
	(3)	1320	3120	6000	0	0	0	0	5380	0	0	0
Potatoes	(1)	14600	13900	13300	12600	12000	11300	10600	9500	8600	7500	6600
	(2)	0.5	4.0	52.0	0.0	0.0	0.0	0.0	32.0	0.0	0.0	0.0
	(3)	70	560	6920	0	0	0	0	3040	0	0	0
Seed	(1)	5800	5300	4900	4500	4000	3700	3235	3200	3200	6000	8876
	(2)	0.0	2.8	20.5	0.0	0.0	0.0	0.0	16.7	0.0	0.0	0.0
	(3)	0	150	1000	0	0	0	0	530	0	0	0
Truck	(1)	10700	10800	11000	11300	11500	11800	11999	13800	16500	21200	34220
	(2)	5.0	11.5	17.4	0.0	0.0	0.0	0.0	17.3	0.0	0.0	0.0
	(3)	540	1240	1910	0	0	0	0	2390	0	0	0

* Within that portion of Delta having a salinity greater than 100 parts of chlorine per 100,000 parts of water.
** Per cent of total Delta area.
(1) Total acreage of crop in Delta - from Table 141.
(2) Percentage of crop area affected by salinity from Plate 5.
(3) Acreage of crop affected by salinity (2) x (1).

TABLE 143

UNIT CROP VALUES USED IN ESTIMATING LOSSES DUE TO SALINITY IN DELTA - 1932-1942

Crop	Average value per acre in dollars (1)										
	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942
Alfalfa*	26.25	28.80	36.65	36.95	54.60	55.45	36.55	35.25	31.50	49.60	69.30
Asparagus**	84.34	68.75	83.65	96.30	124.15	119.35	75.80	83.20	121.55	127.30	147.50
Beans*	34.20	44.15	52.35	46.80	63.50	47.95	41.15	45.20	49.15	70.95	77.30
Beets*	82.10	85.05	76.75	72.04	92.00	76.50	63.65	80.35	83.35	100.15	97.65
Celery**	287.35	235.70	211.20	316.80	351.40	296.40	350.50	293.40	347.95	379.95	540.00
Corn*	17.00	18.90	33.00	24.55	36.50	24.40	22.70	25.10	28.25	32.00	41.25
Fruit	60.20	90.35	169.30	126.15	181.85	177.65	104.50	212.80	191.10	326.80	535.00
Grain & Hay*	8.05	9.90	11.40	12.45	16.75	16.75	11.55	11.00	11.65	16.85	21.30
Onions**	114.90	244.35	196.50	162.30	120.95	157.05	232.00	164.80	256.70	418.40	364.60
Pasture	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Potatoes**	111.95	199.90	132.00	149.85	370.75	156.60	141.80	181.85	224.65	220.00	475.70
Seed*	90.00	85.00	90.00	100.00	100.00	120.00	110.00	115.00	90.00	110.00	125.00
Truck**	125.90	107.90	151.65	145.15	150.10	163.35	165.85	163.20	184.65	207.00	280.40

(1) Values from report of Federal-State crop reporting service converted to an acreage basis.
* Classified as field crops.
** Classified as vegetable crops.

TABLE 144

DETAIL, BY CROPS, OF IRRIGATED ACREAGE, ESTIMATED VALUE OF ACTUAL PRODUCTION AND ESTIMATED LOSS DUE TO SALINITY, SACRAMENTO-SAN JOAQUIN DELTA, 1932-1942.

Crop	Irrigated Acreage: Entire Delta	Irrigated Acreage: In area having salinity of more than 100 parts chlorine per 100,000 parts water	Production in entire Delta
	A	As	Vp
1932			
Alfalfa	25,400	560	666,500
Asparagus	71,700	8,600	6,047,200
Beans	16,100	80	550,900
Beets	28,600	1,720	2,347,800
Celery	4,400	50	2,126,400
Corn	52,800	2,110	898,100
Fruit	9,500	50	571,900
Grain and Hay	80,000	2,800	645,600
Onions	3,300	0	379,200
Pasture	12,000	1,320	60,000
Potatoes	14,600	70	1,634,300
Seed	5,800	0	522,000
Truck	10,700	540	1,347,000
Totals	337,900	17,900	17,797,000
1933			
Alfalfa	26,100	390	751,700
Asparagus	79,000	14,800	5,432,800
Beans	15,300	380	675,600
Beets	30,000	2,670	2,551,500
Celery	7,300	420	1,720,700
Corn	44,500	3,740	841,100
Fruit	9,000	140	813,200
Grain and Hay	72,700	5,090	719,700
Onions	3,000	20	733,100
Pasture	12,000	3,120	60,000
Potatoes	13,900	560	2,778,900
Seed	5,300	150	450,500
Truck	10,800	1,240	1,165,500
Totals	328,900	33,320	18,694,000
1934			
Alfalfa	25,400	2,290	931,200
Asparagus	75,100	35,200	6,282,900
Beans	14,500	3,930	759,200
Beets	31,200	6,580	2,394,000
Celery	7,200	3,820	1,520,700
Corn	39,200	19,200	1,293,600
Fruit	8,300	610	1,405,000
Grain and Hay	69,500	30,230	793,000
Onions	2,600	670	707,300
Pasture	12,000	6,000	60,000
Potatoes	13,300	6,920	1,755,600
Seed	4,900	1,000	441,000
Truck	11,000	1,910	1,668,000
Totals	314,200	118,360	20,012,000

TABLE 144 (CONTINUED)

DETAIL, BY CROPS, OF IRRIGATED ACREAGE, ESTIMATED VALUE OF ACTUAL PRODUCTION AND ESTIMATED LOSS DUE TO SALINITY, SACRAMENTO-SAN JOAQUIN DELTA, 1932-1942.

Crop	Irrigated Acreage: Entire Delta (A)	Irrigated Acreage: In area having salinity of more than 100 parts chlorine per 100,000 parts water (As)	Production in entire Delta (Vp)
1935			
Alfalfa	24,700	270	912,900
Asparagus	72,900	3,650	7,021,700
Beans	13,500	0	631,800
Beets	32,500	0	2,247,600
Celery	7,200	0	2,281,000
Corn	40,700	410	1,000,000
Fruit	8,000	0	1,009,100
Grain and Hay	76,800	1,080	957,700
Onions	2,300	0	373,200
Pasture	12,000	0	60,000
Potatoes	12,600	0	1,888,200
Seed	4,500	0	550,000
Truck	11,300	0	1,639,900
Totals	319,000	5,410	20,573,000
1936			
Alfalfa	27,100	270	1,479,900
Asparagus	69,900	3,150	8,678,800
Beans	12,700	0	806,500
Beets	33,300	0	3,064,300
Celery	7,000	0	2,459,700
Corn	40,000	400	1,459,200
Fruit	7,300	0	1,327,600
Grain and Hay	74,800	1,720	1,253,600
Onions	2,000	0	241,900
Pasture	12,000	0	60.000
Potatoes	12,000	0	4,448,800
Seeds	4,000	0	400,000
Truck	11,500	0	1,725,900
Totals	312,700	5,540	27,406,000
1937			
Alfalfa	29,200	440	1,618,800
Asparagus	71,400	4,640	8,521,600
Beans	12,000	0	575,500
Beets	35,000	0	2,677,500
Celery	7,000	0	2,074,800
Corn	41,300	740	1,011,000
Fruit	6,800	0	1,208,100
Grain and Hay	74,000	1,480	1,239,500
Onions	1,600	0	251,300
Pasture	12,000	0	60,000
Potatoes	11,300	0	1,769,600
Seed	3,700	0	444,000
Truck	11,800	0	1,927,500
Totals	317,100	7,300	23,379,000
1938			
Alfalfa	31,300	0	1,144,000
Asparagus	77,300	0	5,860,100
Beans	11,000	0	452,900
Beets	36,300	0	2,311,200
Celery	6,900	0	2,418,400
Corn	40,500	0	920,200
Fruit	6,200	0	647,800
Grain and Hay	89,800	0	1,035,400
Onions	1,300	0	301,600
Pasture	12,000	0	60,000
Potatoes	10,600	0	1,502,800
Seed	3,235	0	355,900
Truck	11,999	0	1,989,800
Totals	338,400	0	19,100,000

TABLE 144 (CONTINUED)

DETAIL, BY CROPS, OF IRRIGATED ACREAGE, ESTIMATED VALUE OF ACTUAL PRODUCTION AND ESTIMATED LOSS DUE TO SALINITY, SACRAMENTO-SAN JOAQUIN DELTA, 1932-1942.

Crop	Irrigated Acreage: Entire Delta (A)	Irrigated Acreage: In area having salinity of more than 100 parts chlorine per 100,000 parts water (As)	Production in entire Delta (Vp)
1939			
Alfalfa	31,500	2,580	1,110,700
Asparagus	84,500	33,000	7,032,100
Beans	10,500	2,050	474,600
Beets	39,000	7,490	3,134,000
Celery	6,600	2,540	1,930,500
Corn	42,400	15,260	1,064,700
Fruit	5,900	350	1,255,400
Grain and Hay	74,400	23,660	816,900
Onions	1,500	240	247,200
Pasture	12,000	5,380	60,000
Potatoes	9,500	3,040	1,727,400
Seed	3,200	530	368,000
Truck	13,800	2,390	2,252,300
Totals	334,800	98,510	21,480,000
1940			
Alfalfa	31,400	630	989,100
Asparagus	88,000	8,400	10,698,160
Beans	10,200	20	501,200
Beets	41,800	840	3,483,200
Celery	6,000	0	2,087,800
Corn	43,500	1,130	1,229,700
Fruit	5,400	20	1,032,000
Grain and Hay	77,400	1,780	900,900
Onions	1,700	0	436,400
Pasture	12,000	0	60,000
Potatoes	8,600	0	1,931,900
Seed	3,200	0	288,000
Truck	16,500	0	3,046,900
Total	345,700	12,820	26,685,000
1941			
Alfalfa	28,100	110	1,394,000
Asparagus	82,400	2,720	10,489,600
Beans	9,800	0	695,400
Beets	44,200	0	4,427,100
Celery	5,500	0	2,089,700
Corn	50,000	0	1,600,000
Fruit	5,300	0	1,732,000
Grain and Hay	71,500	430	1,205,500
Onions	1,800	0	753,100
Pasture	12,000	0	60,000
Potatoes	7,500	0	1,650,000
Seed	6,000	0	660,000
Truck	21,200	0	4,388,800
Totals	345,300	3,260	31,145,000
1942			
Alfalfa	27,600	110	1,912,700
Asparagus	80,700	2,660	11,902,400
Beans	9,400	0	726,500
Beets	46,800	0	4,570,000
Celery	5,000	0	2,700,000
Corn	50,000	0	2,062,500
Fruit	5,200	0	2,782,000
Grain and Hay	66,600	400	1,417,200
Onions	1,900	0	692,700
Pasture	12,000	0	60,000
Potatoes	6,578	0	3,139,600
Seed	8,876	0	1,109,500
Truck	34,221	0	9,595,200
Totals	354,900	3,170	42,670,000

Distribution of Loss Due to Salinity

No information is available, other than for 1931, to determine the relative damage to each crop due to its location in the area affected by salinity and it is assumed, therefore, that the damage to each crop will be equally distributed over the entire area affected.

Loss Due to Salinity of Water in Sacramento-San Joaquin Delta

It is assumed that the per acre crop damage observed in 1931 in each tract will be repeated each time the water surrounding the tract has the same degree of salinity as in that year, and that the amount of the loss per acre in dollars in other years will be equal to the loss per acre in 1931 multiplied by the ratio of the value per acre of the crop, without loss due to salinity, in that year, to the similar value in 1931, or

$$L_{a1} = L_a \times \frac{V_{a1}}{V_a} \quad \text{in which}$$

L_a = Loss on crop in dollars per acre in 1931.
L_{a1} = Loss on crop in dollars per acre in year other than 1931
V_a = Value per acre of crop in entire Delta in 1931 with no loss due to salinity.
V_{ai} = Value per acre of crop in entire Delta in any year other than 1931 with no loss due to salinity.

By multiplying annual loss per acre for each crop by the area of that crop within the area affected by salinity in the year being considered, the total loss within the Delta for each crop can be determined for each year as follows:

$$V_s = L_{a1} \times A_s, \text{ or } V_s = L_a \frac{V_{a1}}{V_a} \times A_s, \text{ in which}$$

V_s = Total value lost for year on crop due to salinity.
A_s = Acreage of crop in portions of Delta affected by salinity in same year.

Detailed computations of Delta crop losses are given in Table 145 and the results of the study are given in Table 146 which brings up to date Table 95 in the 1931 Water Supervisor's Report.

TABLE 145

DETERMINATION OF ANNUAL CROP LOSSES DUE TO SALINITY IN SACRAMENTO AND SAN JOAQUIN DELTA, 1932-1942

(1)	Alfalfa	Asparagus	Beans	Beets	Celery	Corn	Fruit	Grain & Hay	Onions	Pasture	Potatoes	Seed	Truck
						1931							
L_s	99860	19615	172586	157070	336571	118165	10200	3560	29710	3140	275321	13730	24188
A_s	12651	55549	14296	17362	6125	50081	7075	46126	2068	10254	17747	3547	2119
L_a	7.89	0.37	12.07	9.05	54.95	2.36	1.44	0.08	14.37	0.31	15.51	3.87	11.46
P_a	1352621	7254899	775794	3128314	1640043	1360921	1364724	900034	982244	66284	2802585	499188	530012
L_s	99860	19615	172586	157070	336571	118165	10200	3560	29710	3140	275321	13730	24188
V_p	1452481	7274514	948380	3285384	1976614	1479086	1374924	903594	1011954	69424	3077906	512918	554200
A	26882	70580	26992	30915	6393	55793	10775	65086	3769	12748	18042	8967	6498
V_a	54.03	103.07	35.14	106.27	313.60	26.51	127.60	13.88	268.50	5.45	170.60	57.20	85.29
						1932							
V_p	666500	6047200	550900	2347800	2126400	898100	571900	645600	379200	60000	1634300	522000	1347000
A	25400	71700	16100	28600	7400	52800	9500	80000	3300	12000	14600	5800	10700
V_{a1}	26.24	84.34	34.22	82.09	287.35	17.01	60.20	8.07	114.92	5.00	111.94	90.00	125.89
A_s	560	8600	80	1720	50	2110	50	2800	0	1320	70	0	540
V_{a1}/V_a	0.486	0.818	0.974	0.77	0.92	0.64	0.47	0.58	0.43	0.92	0.66	1.57	1.476
V_s	2150	2600	940	12000	2530	3190	30	130	0	380	720	0	9130
						1933							
V_p	751700	5432800	675600	2551500	1720700	841100	813200	719700	733100	60000	2778900	450500	1165500
A	26100	79000	15300	30000	7300	44500	9000	72700	3000	12000	13900	5300	10800
V_{a1}	28.80	68.77	44.16	85.05	235.71	18.90	90.35	9.90	244.36	5.30	199.02	85.00	107.92
A_s	990	14800	380	2670	420	3740	140	5090	20	3120	500	150	1240
V_{a1}/V_a	0.533	0.667	1.26	0.80	0.75	0.71	0.71	0.71	0.91	0.92	1.17	0.95	1.265
V_s	4160	3650	5780	19330	17310	6270	140	290	260	890	10160	550	18000
						1934							
V_p	931200	6282900	759200	2394000	1520700	1293600	1405000	793000	707300	60000	1755600	441000	1668000
A	25400	75100	14500	31200	7200	39200	8300	69500	2600	12000	13300	4900	11000
V_{a1}	36.66	83.66	52.36	76.73	211.21	33.00	169.38	11.41	196.38	5.00	132.00	90.00	151.64
A_s	2290	35200	3930	6580	3820	19200	610	30230	670	6000	6920	1000	1910
V_{a1}/V_a	.679	0.811	1.49	.72	.67	1.24	1.33	.82	.73	.92	.77	1.57	1.778
V_s	12300	10500	70700	42900	140600	56200	1170	1980	7030	1710	82640	6080	38900

(1) See footnotes bottom of page 248.

TABLE 145 (CONTINUED)

DETERMINATION OF ANNUAL CROP LOSSES DUE TO SALINITY IN SACRAMENTO AND SAN JOAQUIN DELTA, 1932-1942.

(1)	Alfalfa	Asparagus	Beans	Beets	Celery	Corn	Fruit	Grain & Hay	Onions	Pasture	Potatoes	Seed	Truck
						1935							
V_p	912900	7021700	631800	2247600	2281000	1000000	1009100	957700	373200	60000	1888200	550000	1639900
A	24700	72900	13500	32500	7200	40700	8000	76800	2300	12000	12600	4500	11300
V_{ai}	36.96	96.32	46.80	72.04	316.80	24.57	126.14	12.47	162.28	5.00	149.86	100.00	145.12
A_s	270	3650	0	0	0	410	0	1080	0	0	0	0	0
V_{ai}/V_a	0.684	0.934	1.33	.68	1.01	.93	.99	.90	.60	.92	.88	1.75	1.701
V_s	1460	1260	0	0	0	900	0	80	0	0	0	0	0
						1936							
V_p	1479900	8678800	806500	3064300	2459700	1459200	1327600	1253600	241900	60000	4448800	400000	1725900
A	27100	69900	12700	33300	7000	40000	7300	74800	2000	12000	12000	4000	11500
V_{ai}	54.61	124.16	63.50	92.02	351.38	36.48	181.86	16.76	120.95	5.00	370.73	100.00	150.08
A_s	270	3150	0	0	0	400	0	1720	0	0	0	0	0
V_{ai}/V_a	1.011	1.204	1.81	.87	1.12	1.38	1.43	1.21	.45	.92	2.17	1.75	1.76
V_s	2150	1400	0	0	0	1300	0	170	0	0	0	0	0
						1937							
V_p	1618800	8521600	574500	2677500	2074800	1011000	1208100	1239500	251300	60000	1769600	444000	1927500
A	29200	71400	12000	35000	7000	41300	6800	74000	1600	12000	11300	3700	11800
V_{ai}	55.44	119.35	47.96	76.50	296.40	24.38	177.66	16.75	157.05	5.00	156.60	120.00	163.35
A_s	440	4640	0	0	0	740	0	1480	0	0	0	0	0
V_{ai}/V_a	1.026	1.158	1.36	.72	.95	.92	1.39	1.21	.58	.92	.92	2.10	1.915
V_s	3560	1980	0	0	0	1610	0	140	0	0	0	0	0
						1938							
V_p	1144000	5860100	452900	2311200	2418400	920200	647800	1035400	301600	60000	1502800	355900	1989800
A	31300	77300	11000	36300	6900	40500	6200	89800	1300	12000	10600	3235	11999
V_{ai}	36.55	75.81	41.17	63.67	350.49	22.72	104.48	11.53	231.98	5.00	141.78	110.00	165.83
A_s	0	0	0	0	0	0	0	0	0	0	0	0	0
V_{ai}/V_a	0.68	0.736	1.17	0.60	1.12	0.86	0.82	0.83	0.86	0.92	0.83	1.92	1.944
V_s	0	0	0	0	0	0	0	0	0	0	0	0	0

(1) See footnote bottom of page 248.

TABLE 145 (CONTINUED)

DETERMINATION OF ANNUAL CROP LOSSES DUE TO SALINITY IN SACRAMENTO AND SAN JOAQUIN DELTA, 1932-1942

(1)	Alfalfa	Asparagus	Beans	Beets	Celery	Corn	Fruit	Grain & Hay	Onions	Pasture	Potatoes	Seed	Truck
						1939							
V_p	1110700	7032100	474600	3134000	1936500	1064700	1255400	816900	247200	60000	1727400	368000	2252300
A	31500	84500	10500	39000	6600	42400	5900	74400	1500	12000	9500	3200	13800
V_{a1}	35.26	83.22	45.20	80.36	293.41	25.11	212.78	10.98	164.80	5.00	181.83	115.00	163.21
A_s	2580	33000	2050	7490	2540	15260	350	23660	240	5380	3040	530	2390
V_{a1}/V_a	.653	.807	1.29	0.76	.94	.95	1.608	.79	.61	.92	1.07	2.01	1.914
V_s	13290	9800	31920	51520	131200	34200	840	1500	2100	1540	50450	4120	52400
						1940							
V_p	989100	10698200	501200	3483200	2087800	1229700	1032000	900900	436400	60000	1931900	288000	3046900
A	31400	88000	10200	41800	6000	43500	5400	77490	1700	12000	8600	3200	16500
V_{a1}	31.50	121.57	49.14	83.33	347.96	28.27	191.12	11.64	256.70	5.00	224.64	90.00	1184.66
A_s	630	8400	20	840	0	1130	20	1780	0	0	0	0	0
V_{a1}/V_a	.583	1.179	1.40	0.78	1.11	1.07	1.50	.84	.96	.92	1.32	1.57	2.165
V_s	2900	3670	340	5930	0	2850	40	120	0	0	0	0	0
						1941							
V_p	1394000	10489600	695400	4427100	2089700	1600000	1732000	1205500	753100	60000	1650000	660000	4388800
A	28100	82400	9800	44200	5500	50000	5300	71500	1800	12000	7500	6000	21200
V_{a1}	49.61	127.30	70.96	100.16	379.94	32.00	326.80	16.86	418.41	5.00	220.00	110.00	207.02
A_s	110	2720	0	0	0	0	0	430	0	0	0	0	0
V_{a1}/V_a	.918	1.235	2.02	0.94	1.21	1.21	2.56	1.21	1.56	0.92	1.29	1.92	2.427
V_s	800	1240	0	0	0	0	0	40	0	0	0	0	0
						1942							
V_p	1912700	11902400	726500	4570000	2700000	2062500	2782000	1417200	692700	60000	3139600	1109500	9595200
A	27600	80700	9400	46800	5000	50000	5200	66600	1900	12000	6600	8876	34221
V_{a1}	69.30	147.49	77.29	97.65	540.00	41.25	535.02	21.28	364.60	5.00	475.70	125.00	280.39
A_s	110	2660	0	0	0	0	0	400	0	0	0	0	0
V_{a1}/V_a	1.283	1.431	2.20	.92	1.72	1.56	4.19	1.53	1.36	.92	2.79	2.19	3.287
V_s	1110	1410	0	0	0	0	0	50	0	0	0	0	0

FOOTNOTES:

A = Total acreage of crop in Delta.
A_s = Acreage of crop in portion of Delta affected by salinity.
P_a = Total value of actual production of crop in Delta in 1931.
L_a = Loss on crop in dollars per acre in 1931. $\left[L_s \div A_s \text{ (for 1931)} \right]$.
L_s = Total loss in dollars for each crop in Delta in 1931 due to salinity.
V_a = Value per acre of crop in entire Delta in 1931 with no loss due to salinity = $(V_p \div A)$ for 1931.
V_{a1} = Value per acre of crop in entire delta in any year other than 1931 with no loss due to salinity = $(V_p \div A)$.
V_p = Total value for year of crop in entire Delta with no loss due to salinity.
V_s = Total value lost for year on crop due to salinity.

TABLE 146 (1)

ACREAGE IRRIGATED, ESTIMATED VALUE OF ACTUAL PRODUCTION AND ESTIMATED LOSSES DUE TO SALINITY, SACRAMENTO-SAN JOAQUIN DELTA CROPS, 1924 - 1942.

Year	Acreage Irrigated	Estimated Value of Actual Production in Dollars	Estimated Crop Loss Due to Salinity	
			Dollars	Per Cent of Total Value of Crop Production*
1924	320740	29781600	1085800	3.52
1925	300227	30108700	12200	0.04
1926	308712	26295000	346700	1.30
1927	306931	29967200	5500	0.02
1928	317015	27041500	62800	0.23
1929	325825	31361700	55100	0.18
1930	349913	27230600	21500	0.08
1931	343355	22657700	1263700	5.28
1932	357900	17763000	34250	0.19
1933	328900	18607000	86790	0.46
1934	314200	19539000	472700	2.36
1935	319000	20569000	3700	0.02
1936	312700	27401000	5020	0.02
1937	317100	23372000	7290	0.03
1938	338400	19100000	0	0.00
1939	334800	21095000	384900	1.79
1940	345700	26669000	15850	0.06
1941	345300	31143000	2080	0.01
1942	354900	42667000	2570	0.01
Average	327500	25910000	203600	0.82

(1) Brings up to date Table 95, page 216 of the 1931 Water Supervisor's Report.

* Including value of lost production.

CHAPTER VIII

TIDE GAGES

In order to determine the behavior of the tides in the Sacramento-San Joaquin Delta and Upper Bay, 27 recording tide gages are being operated, 17 by the Division of Water Resources, 4 by the U. S. Army Engineers, and 6 by the U. S. Bureau of Reclamation. These gages are scattered throughout the area and the location and description of each station are given in Table 147. The table also shows when the gage was first installed. The gages have been operated continuously since their installation, with the exception of minor breaks in the record due to stoppages, etc. Only one gage has been out of commission for any length of time, this one being at the San Joaquin end of Three Mile Slough. It was out of operation from September 1935 until July 1938.

The chart from the State-owned and operated gages are on file and the data for some of them have been tabulated.

During 1929, 1930 and 1931 gages were operated at many other points for short periods. Bulletin 27 of the Division of Water Resources gives the data obtained from these gage operations.

During the fall of 1939 the United States Coast and Geodetic Survey ran a line of first order levels between Galt-Fairfield and Stockton and ultimately all of these gages will be tied to sea level datum, thus bringing all gages in the delta area to one datum plane.

Plate 6 shows the location of all the recording gages now in operation.

TABLE 147

LOCATION AND DATE OF INSTALLATION OF RECORDING TIDE GAGES IN SACRAMENTO-SAN JOAQUIN DELTA AND SUISUN BAY

Name of Station	Operated by*	Location	Date Installed
		SACRAMENTO DELTA	
Sacramento	D.W.R.	Left bank of Sacramento River at Southern Pacific Railroad Bridge.	1920
Snodgrass Slough	D.W.R.	Left Bank, Sacramento River; about 0.1 mile above Hollister landing about $\frac{1}{4}$ mile above head of Snodgrass Slough (now leveed off).	Aug. 1939
Walnut Grove	D.W.R.	Left bank of Sacramento River at head of Georgiana Slough; lower end of town of Walnut Grove.	Feb. 1929
Rio Vista	U.S.E.D.	Right bank of Sacramento River at U.S. Engineers depot below Rio Vista; about $1\frac{1}{2}$ miles below Rio Vista Bridge	Apr. 1908
Three Mile Slough (Sac.)	D.W.R.	On Brannon Island side of Slough. Pile dolphin about 0.1 mile from Three Mile Slough Bridge.	Apr. 1929
Mayberry Slough	U.S.E.D.	Right bank of Sacramento River about four miles above Collinsville.	Prior to 1929
Collinsville	D.W.R.	Right bank of Sacramento River. On pile dolphin about 0.1 mile upstream from junction of mainstreet and river.	June 1929
		MOKELUMNE DELTA	
New Hope Bridge	D.W.R.	Right bank of the south fork of Mokelumne River; just below New Hope Bridge.	Aug. 1920
Terminous	U.S.B.R.	On highway bridge over Potato Slough between Terminous Tract and Bouldin Island	July 1940
Georgiana Slough	D.W.R.	On Andrus Island near junction of Georgiana Slough and Mokelumne River. At former location of Golden State Asparagus Company plant.	June 1929
		SAN JOAQUIN DELTA	
Mossdale Bridge	D.W.R.	Right bank of San Joaquin River just below U.S. 40 crossing.	1920
Grant Line	U.S.B.R.	Right bank of Grant Line canal at Tracy road crossing.	Oct. 1940
Brandts Bridge	U.S.B.R.	Right bank of San Joaquin River at Brandts Bridge between Roberts Island and mainland.	July 1940
Stockton	U.S.E.D.	At head of McLeod Lake, El Dorado Street.	Dec. 1927

* D.W.R. - Division of Water Resources; U.S.E.D. - United States Army Engineers; U.S.B.R. - United States Bureau of Reclamation.

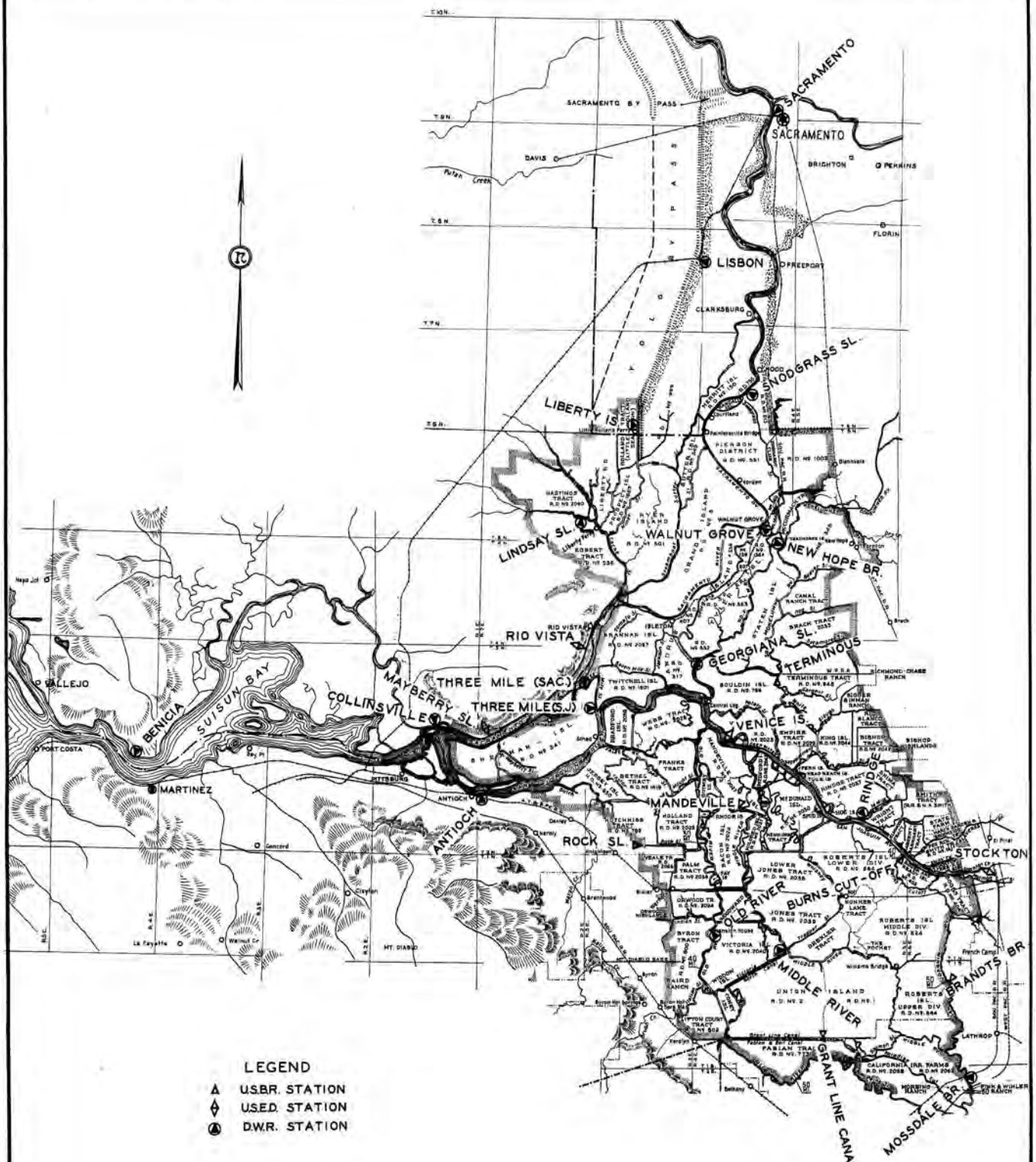
TABLE 147 (CONTINUED)

LOCATION AND DATE OF INSTALLATION OF RECORDING TIDE GAGES IN SACRAMENTO-SAN JOAQUIN DELTA AND SUISUN BAY

Name of Station	Operated by*	Location	Date Installed
		SAN JOAQUIN DELTA (Continued)	
Burns Cut-off	U.S.B.R.	On Stockton ship canal at East Bay Municipal Untility District Crossing. Northwest corner of Rough and Ready Island.	May 1940
Rindge	D.W.R.	At southeast corner of Rindge Tract, on Fourteen Mile Slough at Junction with Ship Canal.	July 1939
Middle River (Borden)	D.W.R.	Left bank of Middle River just below Borden Highway Bridge. On Victoria Island.	July 1939
Old River(Mansion House)	D.W.R.	Right bank of Old River at Mansion House. On Victoria Island. On timber dolphin.	Aug. 1939
Mandeville	U.S.B.R.	South side of Mandeville Island. On Mandeville cut at beet dump about one mile west of Bacon-Mandeville ferry.	July 1940
Rock Slough	U.S.B.R.	North bank of Rock Slough near head of slough. About 1½ miles east of Knightsen	May 1936
Venice Island	U.S.E.D.	On Stockton ship canal near Venice Island headquarters of Blakes Landing	Jan. 1928
Three Mile Slough(S.J.)	D.W.R.	On Sherman Island at R. D. 341 drainage plant. Near junction of slough with San Joaquin River. On pile dolphin.	June 1929
Antioch	D.W.R.	On wharf of Antioch Water Works.	June 1929
		SUISUN BAY	
Benicia	D.W.R.	North side of Suisun Bay. On Benicia Arsenal wharf.	Apr. 1940 (1)
		YOLO BY-PASS	
Lisbon	D.W.R.	Left bank of Yolo By-pass below north end of San Francisco and Sacramento Railroad trestle.	1920
Liberty Island	D.W.R.	Right bank dredger cut separating Little Holland and Liberty Island. ½ mile north of Yolo - Solano County Line.	1930
Lindsay Slough	D.W.R.	South bank Lindsay Slough. ½ mile west of Wright Cut. At Montezuma Ranch headquarters of California Packing Corporation.	Jan. 1942

* D.W.R. - Division of Water Resources; U.S.E.D. - United States Army Engineers; U.S.B.R. - United States Bureau of Reclamation.

(1) Gage originally installed June 1929 and operated until October 1931 by Division of Water Resources. In interim 1931 to April 1940 recorders have been operated here at intervals by U.S. Engineers and U. S. Coast and Geodetic Survey.



SACRAMENTO – SAN JOAQUIN WATER SUPERVISION

LOCATIONS OF RECORDING TIDE GAGE STATIONS

SACRAMENTO-SAN JOAQUIN DELTA AND SUISUN BAY

SCALE OF MILES

2 0 2 4 6 8 10