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STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS

PUBLICATIONS OF THE
DIVISION OF WATER RESOURCES
EDWARD HYATT, State Engineer

SACRAMENTO-SAN JOAQUIN
WATER SUPERVISOR'S REPORT
FOR YEAR
1932

By
HARLOWE M. STAFFORD
Water Supervisor

Under the supervision of
HAROLD CONKLING
Deputy State Engineer

JUNE, 1933

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TABLE OF CONTENTS

Page

ACKNOWLEDGMENT vii

ORGANIZATION viii

ADVISORY COMMITTEE ix

CHAPTER I

INTRODUCTION 1
Origin and History of Work 1
Objectives and Scope 1
Conservation Features 4

CHAPTER II

MEASURESMENTS OF STREAM FLOW 6

CHAPTER III

MEASUREMENTS OF DIVERSIONS 32

CHAPTER IV

MEASUREMENTS OF RETURN WATER 68
Sacramento Return Waters 68
Return Flow from Other than Sacramento River Sources 68
Relation of Sacramento Return Water to Irrigation Draft . . . 68
Draft-Return Water Relation for Particular Sacramento Valley Areas 70
San Joaquin Return Waters 70
Comparative Sacramento and San Joaquin Return Water, 1924 to 1932 71

CHAPTER V

USE OF WATER IN THE SACRAMENTO-SAN JOAQUIN DELTA 97
Cooperative Irrigation Investigations 97
Annual Census of Irrigated Crop Acreages and Water Consuming Areas 98
1932 Consumptive Use of Water in the Sacramento-San Joaquin Delta 99

CHAPTER VI

SALINITY INVESTIGATION 107
Purpose 107
Scope 107

TABLE OF CONTENTS (CONTINUED)

Page

CHAPTER VI (CONTINUED)

SALINITY INVESTIGATION (CONTINUED)
Station Maintenance and Records 109
Drainage and Groundwater Salinity 109
Tide Gages 112

APPENDIX A

COOPERATIVE IRRIGATION INVESTIGATIONS IN THE SACRAMENTO-SAN JOAQUIN DELTA IN 1932 - By O. V. P. Stout 135

SUPPLEMENTARY REPORT

(This is a report giving the 1932 daily diversion records in acre-feet for those diversions for which the monthly data only are tabulated in Chapter III. This supplementary report is not published but is on file and available for reference in the office of the Division of Water Resources.)

LIST OF TABLES

Table

1. Comparative Stream Flow 1924 to 1932 4
2. Discharge of Sacramento River at Kennett 8
3. Discharge of Sacramento River near Red Bluff 9
4. Discharge of Sacramento River at Butte City 10
5. Discharge of Sacramento River at Colusa 11
6. Discharge of Sacramento River below Wilkins Slough 12
7. Discharge of Sacramento River at Knights Landing 13
8. Discharge of Sacramento River at Verona 14
9. Discharge of Sacramento River at Sacramento 15
10. Discharge of Butte Creek near East Side Highway 16
11. Discharge of Feather River at Nicolaus 17
12. Discharge of American River at Sacramento 18
13. Discharge of Mokelumne River at Woodbridge 19
14. Discharge of San Joaquin River near Newman 20
15. Discharge of San Joaquin near Grayson 21
16. Discharge of San Joaquin River near Vernalis 22
17. Discharge of Merced River at Yosemite Valley Railroad Crossing 23
18. Discharge of Merced River near Mouth 24
19. Discharge of Dry Creek near Old Waterford Bridge 25
20. Discharge of Dry Creek near Modesto 26
21. Discharge of Tuolumne River at Roberts Ferry Bridge 27
22. Discharge of Tuolumne River at Hickman Bridge 28
23. Discharge of Tuolumne River at Tuolumne City 29
24. Discharge of Stanislaus River at Orange Blossom Bridge 30

Table		Page
25.	Discharge of Stanislaus River at Hatmark Ranch	31
26.	Diversions, Acreage Irrigated and Gross Seasonal Duty of Water in the Sacramento-San Joaquin Area, 1932	35
27.	Summary of Sacramento River Diversions (Acre-feet)	36
28.	Sacramento River Diversions	37
29.	Colusa Trough Diversions	48
30.	Back Borrow Pit Diversions	49
31.	Lower Butte Creek and Butte Slough Diversions	50
32.	By-Pass and Drainage Channel Diversions	52
33.	Feather River Diversions	54
34.	Yuba River Diversions	56
35.	American River Diversions	57
36.	Delta Uplands Diversions from Cache Slough	58
37.	Delta Uplands Diversions from Old San Joaquin River	58
38.	Delta Uplands Diversions from Tom Paine Slough	59
39.	Delta Uplands Diversions from San Joaquin River	60
40.	San Joaquin River Diversions	62
41.	Merced River Diversions	63
42.	Dry Creek Diversions	65
43.	Tuolumne River Diversions	66
44.	Stanislaus River Diversions	67
45.	Sacramento and San Joaquin Return Water Percentages, 1924-1932	74
46.	Water Discharged to the Sacramento River above Sacramento as Measured at Definite Return Channels	76
47.	Relation between Return Water and Draft, Sacramento River, Red Bluff to Sacramento, June to September, 1932 (Using only Return Water Which Entered Through Definite Measured Channels)	77
48.	Relation between Return Water and Draft, Sacramento River, Red Bluff to Sacramento, June to September, 1932 (Including all Accretions)	78
48a.	Relation between Return Water and Draft, Sacramento River, Red Bluff to Sacramento, July to September, 1932 (Including all Accretions)	79
49.	Relation between the Return Water in Colusa Trough at Colusa-Williams Highway and the Diversions from which the Return Water was Derived	80
50.	Relation between Return Water and Diversions - Reclamation District 108	81
51.	Relation between Return Water and Diversions - Reclamation District 1500	81
52.	Return Flow in San Joaquin Valley Streams - 1932	83
53.	Comparison of Diversions and Return Water, San Joaquin Valley, 1932	84
54.	Discharge of Colusa Trough at Colusa-Williams Highway	85
55.	Discharge of Butte Slough	86
56.	Discharge of Reclamation District 70 Drain	87
57.	Discharge of Reclamation District 108 Drain at Rough and Ready Bend	88
58.	Discharge of Colusa Basin Drainage at Knights Landing	89
59.	Discharge of Sacramento Slough	90
60.	Discharge of Reclamation District 1500 Drain	91

TABLE OF CONTENTS (CONTINUED)

Page

LIST OF TABLES (CONTINUED)

Table

61. Discharge of Sutter By-Pass - East Borrow Pit (Willow Slough at Chandler) 92
62. Discharge of Sutter By-Pass - West Borrow Pit (Opposite Golshauser Slough) 93
63. Discharge of Reclamation District 1000 Drain (2d Bannon Sl.). 94
64. Discharge of Back Borrow Pit Reclamation District 1000 . . . 95
65. Discharge of Yolo By-Pass - East Borrow Pit (Tule Canal) . . 96
66. Detail of Irrigated and Non-Irrigated Crops and Acreages in the Delta, 1932 101
67. Unit Consumptive Use of Water in Sacramento-San Joaquin Delta Acre-feet per Acre 102
68. Consumptive Use of Water in the Sacramento-San Joaquin Delta 1932 - Acre-feet 103
69. Consumptive Use of Water in the Sacramento Delta, 1932-Ac.Ft. 104
70. Consumptive Use of Water in the San Joaquin Delta, 1932-Ac.Ft. 105
71. General Soil Classification of the Irrigated Crop Lands in the Delta, 1932 106
72. Maximum Recorded Salinity at Bay and Delta Stations - 1924 to 1932, Inclusive 116
73. Salinity Stations at which Observations were taken during 1932 117
74. Salinity Observations, Sacramento-San Joaquin Delta and Upper Bays, 1932 119
75. Salinity of Ground and Drainage Water, Sherman Island, 1931, 1932 and 1933 132
76. Salinity of Ground and Drainage Water, Grizzly Island, Suisun Bay, 1931, 1932 and 1933 134
77. Monthly Use of Water by Cat-tails and Tules grown in Tanks at Camp 3, King Island, 1932 137
78. Monthly Use of Water by Tules Grown in Tanks on Simmons Island Near Port Chicago (Bay Point), 1932 137
79. Use of Water by Smartweed Grown in Tanks at King Island, 1932 140
80. Use of Water by Prickly Lettuce Grown in Tanks at King Is.1932 140
81. Use of Water by Cockleburs Grown in Tanks at King Is. - 1932 . 140
82. Use of Water by Nettles Grown in Tanks at King Island, 1932 . 140
83. Use of Water, Weight of Tops and Yield of Spears, Asparagus Tanks, Richmond-Chase Tract, Near Terminous, 1932 142
84. Rainfall at Stations in the Sacramento-San Joaquin Delta-1932 144
85. Monthly Evaporation at Stations in the Sacramento-San Joaquin Delta, 1932 145
86. Monthly Travel of Wind at Stations in the Sacramento-San Joaquin Delta, 1932 145
87. Monthly Average Daily Maximum and Minimum Temperatures at Stations in the Sacramento-San Joaquin Delta, 1932 146

LIST OF PLATES

Plate

1. Draft and Return Flow-Sacramento River-Red Bluff to Sacramento 75

LIST OF PLATES (CONTINUED)

Plate		Page
2.	San Joaquin River Return Flow	82
3.	Maximum Seasonal Salinity Encroachment of 100 parts of Chlorine per 100,000 Parts of Water, Sacramento-San Joaquin Delta, 1920-1932	108
4.	Comparison of River Discharge and Salinity at Bay and Delta Stations, 1932	111
5.	Comparative Salinity of River and Drainage Water	114
6.	Comparative Salinity of River, Drainage and Ground Water - Sherman and Grizzly Islands	115

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Land owners and water users and the 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.

Valuable cooperation extended by Federal agencies has included that of the Water Resources Branch of the Geological Survey, U. S. Department of Interior; the Division of Irrigation of the Bureau of Agricultural Engineering, U. S. Department of Agriculture; and the Second District Engineer Office, Pacific Division, Corps of Army Engineers, U. S. War Department.

The State Division of Highways has cooperated in the expeditious and efficient testing of salinity samples in its testing laboratory.

ORGANIZATION

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ADVISORY COMMITTEE

PERMANENT COMMITTEE OF THE SACRAMENTO-SAN JOAQUIN RIVER PROBLEMS CONFERENCE

The successful prosecution of the work of the Sacramento-San Joaquin Water Supervisor may be attributed in no small measure to the backing, advice, and continued interest and cooperation of the 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, and has continued with particular activity in the succeeding years of low water supply. The present personnel of the Committee is as follows:

Herbert E. White, Chairman, Sacramento

E. L. Adams, Chico
A. E. Anderson, San Francisco
Alden Anderson, Sacramento
G. A. Atherton, Stockton
P. M. Downing, San Francisco
William Durbrow, Grass Valley
Manly S. Harris, San Francisco
W. I. Hechtman, Sherman Island
Warren H. McBryde, San Francisco
R. V. Meikle, Turlock
Jesse Poundstone, Grimes
F. T. Robson, Vina

CHAPTER I

INTRODUCTION

The purpose of this report is to make of record the measurements made and data collected through the office of the Sacramento-San Joaquin Water Supervisor during the year 1932.

Origin and History of Work

This work 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 by the Water Supervisor in the five year period, 1924 to 1928, inclusive. The reports for subsequent individual years are mimeographed as the present report.

Objectives and Scope

The work of this office 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 Up-River 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, when, in nearly every season of the last ten 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 through a provisional administration of stream flow and diversions by the Sacramento-San Joaquin Water Supervisor. There has been no adjudication of the water rights under which a water master might definitely and equitably distribute the existing water supply to those entitled to receive it but it is inevitable that such an adjudication, or a definite schedule of water priorities consummated possibly by mutual agreement, 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, then, the Water Supervisor is, concurrently with the provisional stream administration, conducting the investigations and all measurements necessary to complete the record of basic data.

In the seasons of severe or extreme water shortage such as 1924, 1926, 1929, and 1931, the Water Supervisor working in cooperation with the Permanent Committee of the Sacramento-San Joaquin River Problems Conference, has been able to effect conservation measures and regulation which have been successful to a surprising degree in tiding over the critical situations of these seasons. Up-River areas are patrolled and waste eliminated, close check is kept of river flow, diversions and the advance of salinity into the Delta, and when salinity of dangerous degree threatens, bulletins giving the results of all tests throughout the Delta are given to the water users at weekly or shorter intervals. With deficient stream flow there has been always imminent the threat of conflict between "Up-River" and Delta interests and of drastic action by the War Department to enjoin irrigation diversions

in the maintenance of navigation with which it is charged. But in the evidence by the water users of their desire to cooperate and to work with the Water Supervisor for utmost conservation, the War Department has been constrained to waive severe action and to assume a course taking cognizance of the needs of irrigation; and the fact that actual conflict and disastrous litigation between Up-River and Delta interests have not developed may, in a large measure, be attributed to the part which the State is taking through the Division of Water Resources and the Water Supervisor in bringing the water users together, in making such adjustments and effecting such measures as the situation will permit and in pursuing the investigation of the facts necessary to a permanent solution of the difficulties.

The engineering investigations, measurements, collection of records, etc., have comprised: measurements and records of the diversions of water from the Sacramento, Feather, Yuba, American, Merced, Tuolumne, Stanislaus, and San Joaquin rivers within the valley floor and above the Delta; stream flow measurements throughout the territory, largely 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; studies of the consumptive use of water in the Sacramento-San Joaquin Delta in cooperation with the Division of Irrigation of the Bureau of Agricultural Engineering, U. S. Department of Agriculture; an annual census of irrigated acreages and crops under all diversions recorded and throughout the Delta; and observations and investigation of the advance and retreat of salinity in the Delta channels and Upper Bays.

Conservation Features

A comparison of the run-off and water supply conditions of the 1932 season with those of previous seasons in which the work of the Water Supervisor has been conducted, is indicated in Table 1.

TABLE 1

COMPARATIVE STREAM FLOW 1924 TO 1932

Year	Run-off to San Francisco Bay in per cent of Normal*	Minimum Flow in Second-feet			
		Sacramento River at			San Joaquin River Near Vernalis
		Red Bluff	Colusa	Sacramento	
1924	28	2810	1470	705	391
1925	83	3240	1870	2760	660
1926	57	2980	1030	1330	565
1927	114	3580	1960	3420	1290
1928	80	3400	1960	2510	840
1929	42	3060	1550	2300	565
1930	63	2980	1680	2350	645
1931	29	2480	820	Zero	200
1932	78	2620	1530	1900	965

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

It will be noted that as far as seasonal run-off is concerned, 1932 was very similar to 1925 and 1928. The minimum flow of the Sacramento River at Sacramento in 1932 was lower, and that of the San Joaquin River near Vernalis higher, than in either 1925 or 1928. As the total acreage irrigated by the diversions above Sacramento was not materially different in each of these three years, the lower flow at Sacramento in 1932

can probably be ascribed mainly to the much lower flow of the Sacramento River at Red Bluff. With the succession of subnormal years since 1927, the steady and material decline in the minimum flow at Red Bluff has been very marked. However, minimum flow conditions in 1932 were not critical as in 1924, 1926 and 1931 and no serious navigation difficulties or shortages of water for irrigation purposes were reported. The encroachment in the Delta of salinity to the extent of 100 parts of chlorine per 100,000 corresponded closely with the encroachment of 1928, 1929 and 1930. With the requirements for strict conservation measures and regulation of diversions somewhat modified, therefore, in 1932, the work was confined largely to the engineering investigation embracing the collection of required hydrographic data and records.

CHAPTER II

MEASUREMENTS OF STREAM FLOW

During the irrigation season of 1932, 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 Nicolaus; on the American River at H Street Bridge, Sacramento; on the Mokelumne River at Woodbridge, and on the San Joaquin River near Newman and Vernalis.

Supplementing the above cooperative stations, the Water Supervisor has maintained stations on Upper Butte Creek, on Lower Butte Creek and Slough, and in connection with the San Joaquin return water measurements (See Chapter IV), stations as follows: Stanislaus River at Orange Blossom Bridge and Hatmark Ranch, Tuolumne River at Roberts Ferry Bridge, Hickman Bridge and Tuolumne City Bridge, Merced River at Yosemite Valley Railroad Crossing and Hills Ferry Road Bridge (near mouth), Dry Creek at Old Waterford Bridge and Basso Ranch (Near Modesto), and San Joaquin River at Turner Ranch Bridge and Grayson (Laird Slough). Many additional stations maintained on by-pass and drainage channels for the measurement of return water are listed in Chapter IV.

The stations at Kennett, Red Bluff, Verona, Woodbridge, Vernalis, and Newman are maintained throughout the year but the records are given in this report for the irrigation season only.

Sacramento River at Sacramento

The record of the flow of the Sacramento River at Sacramento 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, a gaging station at this point is not feasible. The daily discharge record as given has been computed by using the Verona record and making due allowance for the measured inflow and draft between that station and Sacramento. 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 the 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 what 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 would appear that some return flow might be expected in the Verona-Sacramento section but, as indicated in the tabulation of return water (Table 48), no figure for it has been given (except for the measured drains) because it could not be derived without a record of the actual flow at Sacramento.

TABLE 2

DISCHARGE OF SACRAMENTO RIVER AT KENNETT

Day	Daily Discharge in Second-feet							
	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.
1	7030	9470	9470	5180	3190	2710	2610	2660
2	7030	9680	12200	5180	3190	2710	2610	2610
3	7220	9680	10800	5180	3190	2710	2560	2470
4	7420	9050	10100	5000	3080	2710	2560	2520
5	7030	8420	9470	4830	3080	2710	2560	2560
6	6840	8220	9050	4510	2970	2710	2560	2560
7	7030	7820	9050	4360	2970	2710	2610	2520
8	7220	7620	8630	4360	2970	2710	2560	2610
9	8840	7220	8630	4210	2920	2710	2610	2660
10	10800	6650	8630	4210	2970	2660	2610	2660
11	10600	6840	8220	4070	2920	2660	2610	2660
12	10300	7030	8220	4070	2970	2660	2660	2610
13	9900	7030	8220	4070	2970	2660	2660	2610
14	10100	7030	7820	3930	2970	2660	2560	2610
15	10600	6650	7420	3930	2970	2660	2560	2560
16	10600	7030	7220	3930	2970	2660	2560	2560
17	11000	7220	6840	3800	2970	2660	2610	2560
18	12200	6650	6460	3800	2920	2610	2610	2610
19	20700	6650	6270	3670	2920	2610	2610	2610
20	20100	6650	6650	3540	2860	2560	2610	2610
21	17900	6460	6800	3540	2920	2610	2560	2660
22	15600	6080	6600	3540	2970	2610	2520	2710
23	13000	6460	6000	3420	2860	2610	2560	2660
24	11700	7030	5700	3420	2810	2660	2560	2610
25	11200	6650	5360	3300	2920	2660	2560	2610
26	10300	6270	5180	3300	2860	2660	2560	2610
27	9900	6270	5000	3300	2810	2610	2610	2610
28	9680	6080	5540	3300	2760	2610	2610	2660
29	9470	6080	5720	3190	2710	2610	2560	2660
30	9050	6460	5540	3190	2710	2560	2560	2660
31	8840		5540		2710	2610		2710
Mean	10600	7220	7500	3980	2940	2650	2590	2610
Ac.Ft. for Month	652000	430000	461000	237000	181000	163000	154000	160000

NOTE: This is a permanent station of the Water Resources Branch of the U. S. Geological Survey established at Kennett in 1925. This station is maintained throughout the year, but the record is given here for the period of the irrigation season only.

TABLE 3

DISCHARGE OF SACRAMENTO RIVER NEAR RED BLUFF

Day	Daily Discharge in Second-feet							
	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.
1	9520	10500	8630	6720	3520	2780	2700	2700
2	8920	10800	14300	6340	3440	2780	2700	2780
3	8630	11800	13900	6220	3440	2780	2700	2780
4	8920	10800	12800	5980	3440	2780	2620	2700
5	8340	10100	12100	5860	3350	2780	2620	2700
6	8060	9520	11400	5640	3350	2780	2620	2780
7	8060	8920	11100	5520	3180	2780	2700	2700
8	8340	8630	10800	5300	3180	2780	2700	2780
9	8920	8340	10500	5190	3180	2780	2700	2780
10	11800	8060	10500	4980	3100	2780	2700	2780
11	12500	7780	10500	4760	3180	2700	2700	2860
12	12500	8060	10100	4760	3100	2700	2700	2860
13	11800	8060	9830	4760	3100	2780	2700	2860
14	11400	8630	9830	4660	3100	2780	2700	2860
15	12100	8060	9220	4660	3100	2780	2620	2860
16	12500	7780	8920	4560	3100	2780	2700	2860
17	12500	8340	8630	4560	3180	2780	2700	2860
18	13200	8060	8060	4460	3100	2780	2700	2860
19	19500	7510	7780	4260	3100	2700	2700	2860
20	28500	8060	7780	4160	3020	2700	2700	2860
21	22600	7780	9220	4070	3020	2700	2700	2860
22	20400	7510	8630	3980	3020	2700	2620	2940
23	17000	7240	7780	3880	3020	2700	2620	2940
24	14700	12500	6980	3880	2940	2700	2700	2940
25	14300	10100	6720	3790	2940	2700	2700	2860
26	13200	8630	6340	3700	3020	2700	2700	2940
27	12100	8340	6100	3700	2940	2700	2700	2940
28	11400	8060	6100	3700	2860	2700	2700	2940
29	11400	7510	7510	3610	2860	2700	2700	2940
30	11100	7510	7240	3520	2780	2700	2700	2940
31	10500		6980		2780	2700		2940
Mean	12700	8770	9230	4710	3110	2740	2680	2850
Ac.Ft. for Month	781000	522000	568000	280000	191000	168000	159000	175000

NOTE: This is a permanent station of the Water Resources Branch of the U. S. Geological Survey located near the site of the proposed Iron Canyon Dam: Mile 198.6 above Sacramento. This station is maintained throughout the year, but the record is given here for the period of the irrigation season only.

TABLE 4

DISCHARGE OF SACRAMENTO RIVER AT BUTTE CITY

Day	Daily Discharge in Second-feet					
	May	June	July	Aug.	Sep.	Oct.
1	7800	6640	2460	1600	1540	2460
2	8770	6420	2460	1600	1540	2460
3	12900	6200	2390	1600	1540	2540
4	13200	5980	2320	1540	1540	2540
5	12600	5770	2320	1540	1540	2460
6	12000	5770	2180	1540	1540	2460
7	11800	5350	2180	1530	1600	2540
8	11200	5150	2110	1520	1600	2540
9	10900	4960	2040	1530	1600	2540
10	10600	4780	1980	1540	1660	2610
11	10600	4510	1980	1520	1780	2610
12	10600	4330	1980	1520	1910	2610
13	10400	4240	1910	1530	2040	2680
14	10100	4150	1910	1530	2110	2680
15	9800	3970	1980	1600	2180	2680
16	9280	3880	1910	1600	2180	2680
17	9020	3880	1910	1600	2180	2610
18	8520	3800	1910	1600	2320	2610
19	8280	3710	1910	1600	2390	2680
20	8040	3540	1840	1540	2390	2680
21	7800	3380	1840	1600	2460	2680
22	8770	3220	1780	1600	2460	2760
23	8280	3060	1840	1540	2460	2840
24	7560	2980	1840	1540	2460	2840
25	6870	2910	1780	1540	2460	2840
26	6420	2840	1780	1540	2460	2760
27	6200	2760	1780	1530	2460	2680
28	5980	2680	1720	1520	2460	2760
29	6200	2680	1720	1530	2460	2760
30	7100	2610	1660	1500	2460	2760
31	6870		1600	1500		2760
Mean	9180	4200	1970	1550	2060	2650
Ac.Ft. for Month	564000	250000	121000	95300	123000	163000

NOTE: Gagings taken near Butte City Bridge, Mile 115.8 above Sacramento. Station maintained by Water Resources Branch of the U. S. Geological Survey under cooperative agreement.

TABLE 5

DISCHARGE OF SACRAMENTO RIVER AT COLUSA

Day	Daily Discharge in Second-feet					
	May	Jun.	Jul.	Aug.	Sep.	Oct.
1	7600	6830	2730	1680	1570	2490
2	8100	6530	2650	1640	1600	2490
3	10600	6330	2650	1640	1600	2570
4	13300	6230	2570	1610	1600	2570
5	13100	6130	2490	1610	1600	2490
6	12500	5930	2490	1610	1600	2490
7	12000	5630	2410	1610	1650	2490
8	11600	5430	2330	1570	1680	2570
9	11300	5140	2250	1570	1720	2570
10	11000	4960	2170	1570	1720	2570
11	11000	4690	2130	1570	1830	2650
12	11000	4600	2060	1570	1940	2650
13	10700	4330	2020	1570	2100	2650
14	10400	4240	2020	1570	2170	2730
15	10200	4060	2020	1610	2170	2730
16	9760	3970	2020	1610	2170	2730
17	9210	3880	2020	1610	2250	2730
18	8880	3880	1980	1610	2330	2650
19	8550	3790	1940	1610	2410	2650
20	8220	3700	1940	1570	2490	2730
21	8000	3520	1910	1570	2490	2730
22	8440	3430	1830	1570	2490	2730
23	8660	3250	1830	1530	2570	2810
24	8000	3160	1910	1530	2490	2810
25	7340	3070	1830	1570	2490	2810
26	6830	2980	1800	1530	2490	2730
27	6530	2890	1800	1570	2490	2650
28	6230	2810	1800	1570	2490	2730
29	6130	2810	1760	1570	2490	2650
30	6730	2810	1720	1570	2490	2650
31	7130		1680	1530		2730
Mean	9320	4370	2090	1580	2110	2650
Ac.Ft. for Month	573000	260000	129000	97200	126000	163000

NOTE: Gagings taken near Colusa Bridge, Mile 89.4 above Sacramento. Station maintained by Water Resources Branch of the U. S. Geological Survey under cooperative agreement.

TABLE 6

DISCHARGE OF SACRAMENTO RIVER BELOW WILKINS SLOUGH

Day	Daily Discharge in Second-feet					
	May	Jun.	Jul.	Aug.	Sep.	Oct.
1	7470	6720	2360	1100	1140	2650
2	7400	6480	2220	1060	1160	2650
3	8320	6300	2180	1020	1200	2650
4	11000	6060	2140	982	1240	2700
5	12500	6060	2040	965	1200	2650
6	12000	5940	2000	948	1200	2600
7	11500	5700	1910	965	1200	2600
8	11000	5400	1820	965	1240	2600
9	10600	5100	1680	948	1320	2650
10	10200	4830	1730	948	1360	2700
11	10200	4560	1730	930	1440	2700
12	10400	4390	1560	948	1520	2750
13	10400	4220	1480	982	1640	2750
14	10200	3950	1440	1000	1820	2800
15	10200	3800	1440	1000	1910	2800
16	9850	3550	1440	1040	2000	2800
17	9300	3400	1440	1060	2140	2800
18	8880	3450	1440	1040	2270	2750
19	8560	3450	1400	1080	2450	2700
20	8170	3350	1360	1060	2550	2750
21	7890	3250	1320	1060	2650	2750
22	7890	3100	1320	1080	2750	2750
23	8240	2950	1240	1060	2750	2750
24	7890	2800	1240	1060	2750	2850
25	7400	2750	1320	1100	2700	2850
26	6910	2700	1160	1080	2750	2850
27	6540	2650	1120	1080	2700	2800
28	6300	2550	1160	1100	2650	2750
29	6180	2500	1160	1140	2650	2750
30	6300	2450	1200	1140	2650	2800
31	6780		1120	1140		2850
Mean	8920	4150	1550	1030	1970	2740
Ac.Ft. For Month	548000	247000	95300	63300	117000	168000

NOTE: Gagings taken at Mile 62.9 above Sacramento, a short distance below Wilkins Slough pumping plant of Reclamation District 108. Station maintained by Water Resources Branch of U. S. Geological Survey under cooperative agreement.

TABLE 7

DISCHARGE OF SACRAMENTO RIVER AT KNIGHTS LANDING

Day	Daily Discharge in Second-feet					
	May	Jun.	Jul.	Aug.	Sep.	Oct.
1	7580	7410	2550	1220	1400	2770
2	6980	7320	2430	1500	1400	2770
3	7750	7160	2310	1500	1450	2770
4	10900	6730	2190	1300	1500	2770
5	12200	6640	2070	1220	1500	2710
6	11900	6640	1890	1180	1400	2650
7	11600	6480	1830	1080	1450	2650
8	11000	6240	1710	975	1500	2590
9	10200	5840	1600	950	1550	2650
10	9850	5520	1600	975	1600	2650
11	9760	5280	1650	975	1890	2710
12	9940	5040	1650	1000	2010	2710
13	10000	4800	1550	1000	2070	2770
14	10100	4480	1550	1050	2190	2890
15	10000	4240	1550	1100	2310	3010
16	9760	3890	1500	1150	2370	2950
17	9310	3610	1500	1250	2430	2890
18	8950	3680	1500	1350	2670	2770
19	8600	3750	1450	1350	2770	2650
20	8260	3750	1400	1400	2830	2650
21	8090	3470	1350	1350	2890	2650
22	8090	3330	1350	1350	2950	2710
23	8600	3120	1250	1350	3010	2710
24	8770	3050	1220	1300	2950	2770
25	7920	2850	1300	1300	2950	2770
26	7070	2850	1300	1300	2890	2770
27	6560	2850	1200	1400	2770	2770
28	6320	2730	1180	1400	2710	2710
29	6320	2610	1220	1400	2710	2710
30	6640	2550	1200	1400	2710	2710
31	7160		1150	1450		2770
Mean	8910	4600	1590	1240	2230	2740
Ac.Ft. For Month	548000	274000	97800	76200	133000	168000

NOTE: Gagings are taken at the Railroad Bridge at Knights Landing at Mile 34.0 above Sacramento and therefore include Colusa Basin Drainage entering the river from the Back Borrow Pit of Reclamation Districts 787 and 108. Station maintained by Water Resources Branch of the U. S. Geological Survey under cooperative agreement.

TABLE 8

DISCHARGE OF SACRAMENTO RIVER AT VERONA

Day	Daily Discharge in Second-feet							
	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.
1	17600	27100	18900	18600	5680	2280	1970	3550
2	18600	27100	20200	17600	5380	2670	1970	3550
3	18400	27600	22600	17200	5080	2670	2120	3420
4	17800	28200	23700	17200	4790	2440	2120	3290
5	17200	28200	25300	18200	4510	2220	2120	3290
6	16500	27100	25700	19100	4090	2120	2020	3220
7	16300	24800	25300	18000	3810	2020	2020	3220
8	16500	22600	25300	16100	3680	1830	2120	3100
9	16700	20800	25500	15500	3420	1830	2170	3220
10	17200	19700	26600	15300	3220	1830	2280	3420
11	18400	19300	28200	15100	3160	1880	2610	3420
12	20000	19100	29900	14700	3100	1880	2730	3420
13	21100	19300	30800	14500	2970	1880	2790	3680
14	22200	19500	31200	13700	2790	1880	2910	3950
15	22800	19500	31200	13000	2730	1880	3030	4230
16	23300	19700	30800	11800	2670	1970	3160	4230
17	23500	20000	29600	10900	2670	2070	3290	3950
18	23700	19500	28900	10800	2730	2120	3550	3680
19	24000	19300	28000	10400	2670	2120	3680	3420
20	28000	19500	26200	10000	2550	2120	3680	3420
21	33000	20800	25500	9500	2500	2070	3810	3420
22	36000	20200	25500	9320	2500	2020	3950	3420
23	38400	18900	24600	8960	2380	2020	3950	3420
24	37200	18200	22600	8620	2330	2020	3950	3420
25	35100	21900	21100	8110	2380	1970	3950	3420
26	33400	26000	20400	7600	2440	2020	3810	3290
27	32200	25500	20000	7280	2330	2070	3680	3290
28	31000	23300	19700	6800	2220	2070	3550	3290
29	29900	21100	19500	6480	2280	2020	3420	3220
30	28700	19500	19700	6000	2220	1970	3550	3220
31	27800		19500		2220	2070		3220
Mean	24600	22100	24900	12500	3150	2070	3000	3460
Ac.Ft. For Month	1510000	1320000	1530000	744000	194000	127000	179000	213000

NOTE: This station is located at Mile 19.6 above Sacramento below the junction of the Feather with Sacramento River. It is just above the mouth of "Cross Canal", main drain of Reclamation District 1001, and is only a short distance above the upstream limit of the tide effect. Station maintained by Water Resources Branch of the U. S. Geological Survey under cooperative agreement.

TABLE 9

DISCHARGE OF SACRAMENTO RIVER AT SACRAMENTO

Day	Daily Discharge in Second-feet							
	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.
1	22200	34200	25900	24000	8820	2550	1940	3810
2	22900	35400	31000	23300	8930	2860	1960	3850
3	22300	35200	31200	23600	8320	2900	2060	3670
4	21300	34500	31300	25100	7590	2600	2080	3570
5	20400	33800	32100	27400	6700	2390	2240	3510
6	19700	32100	32400	27600	5990	2300	2030	3490
7	19700	29600	33000	24000	5460	2170	2060	3510
8	20200	27400	34000	22500	5240	1970	2160	3390
9	20600	25800	35600	22800	4820	1900	2280	3580
10	21000	25300	38400	22800	4560	1930	2290	3720
11	22100	25900	41400	22900	4380	1940	2670	3720
12	23600	26400	44300	22400	4170	1940	2780	3690
13	24800	26900	45500	22000	3930	1960	2880	3930
14	26000	26300	44400	21000	3670	1970	2910	4210
15	26900	26600	44800	20100	3530	1960	3090	4560
16	27300	28000	44000	18400	3510	2070	3260	4710
17	27500	27500	43400	16900	3410	2170	3390	4370
18	27900	26600	42600	16400	3430	2160	3630	3970
19	29400	27100	39600	16000	3330	2150	3870	3630
20	39000	28300	37900	15600	3180	2130	3900	3830
21	40200	27400	36900	15600	3060	2130	3940	3830
22	41500	25400	35300	15900	2990	2060	4130	3840
23	43300	23400	32400	15200	2830	2030	4120	3910
24	41900	23700	30400	14000	2700	1970	4140	3900
25	41300	29400	29900	13300	2790	2000	4160	3830
26	39100	31700	30000	12600	2760	1990	4020	3710
27	37500	30600	30300	11900	2660	2010	3890	3650
28	36700	28100	29700	11400	2550	2080	3800	3690
29	35600	25900	27400	10700	2530	1980	3710	3620
30	34000	25500	26000	9460	2410	1940	3760	3590
31	33500		25200		2480	2020		3470
Mean	29300	28500	35000	18800	4280	2140	3100	3800
Ac.Ft. for Month	1800000	1690000	2150000	1120000	263000	131000	185000	234000

NOTE: This represents the flow past Sacramento (below the City of Sacramento intake) to the Delta. The dischargesof this table have been computed by adding to the measured Verona discharges the measured inflow of return water and American River and subtracting therefrom the measured diversions between Verona and Sacramento. A gaging station is not maintained at Sacramento because of tidal action.

TABLE 10

DISCHARGE OF BUTTE CREEK NEAR EAST SIDE HIGHWAY

Day	Daily Discharge in Second-feet				
	Jun.	Jul.	Aug.	Sep.	Oct.
1	*268				0
2	248				0
3	228				0
4	208				0
5	189				0
6	170				1
7	151				1
8	132				6
9	113				11
10	108				16
11	102	NO FLOW	NO FLOW	NO FLOW	21
12	97				25
13	92				26
14	87				28
15	82				29
16	76				31
17	71				32
18	66				34
19	61				35
20	56				35
21	50				35
22	45				35
23	40				35
24	35				35
25	30				34
26	24				34
27	19				34
28	14				34
29	9				34
30	4				34
31					34
Mean	96				23
Ac.Ft. for Month	5700				1410

NOTE: This record is estimated from current meter measurements and occasional staff gage readings. Station is located at bridge one mile west of the East Side Highway.

* Beginning of record for season.

TABLE 11

DISCHARGE OF FEATHER RIVER AT NICOLAUS

Day	Daily Discharge in Second-feet					
	May	Jun.	Jul.	Aug.	Sep.	Oct.
1	10700	10900	2820	783	292	650
2	12900	10100	2520	804	284	584
3	14700	10100	2280	762	288	494
4	14800	10100	2220	685	308	435
5	13800	11200	1980	678	300	435
6	12900	12100	1700	632	284	425
7	12600	10700	1540	596	296	425
8	12900	9460	1430	590	296	465
9	13900	9460	1340	590	284	614
10	16000	9630	1220	590	316	692
11	17500	9800	1170	566	355	706
12	18700	9630	1070	524	400	755
13	19100	9460	1030	488	370	1050
14	19500	8960	978	476	325	1120
15	19300	8480	930	494	316	1200
16	18300	7400	909	590	365	1080
17	17500	6960	916	470	465	874
18	17100	6820	1050	420	560	692
19	16200	6400	978	410	536	664
20	15400	5980	888	390	512	638
21	15400	5560	895	385	548	650
22	16300	5430	888	335	685	678
23	14100	5430	881	325	692	734
24	12200	5300	916	316	706	671
25	11700	4650	930	308	699	560
26	11900	4390	881	300	590	536
27	11900	4020	783	304	584	518
28	11900	3660	741	320	536	494
29	12000	3420	727	325	578	465
30	13100	3060	713	312	685	455
31	12000		769	296		440
Mean	14700	7620	1230	486	448	652
Ac.Ft. for Month	904000	453000	75600	29900	26700	40100
Monthly Diversions Below Nicolaus	30	498	406	884	425	12
Discharge to Sacto. River Acre-feet	904000	453000	75200	29000	26300	40100

NOTE: Gagings taken at Mile 9.3 above mouth of river and 0.1 mile below Nicolaus Bridge. Station maintained by Water Resources Branch of the U. S. Geological Survey under cooperative agreement.

TABLE 12

DISCHARGE OF AMERICAN RIVER AT SACRAMENTO

Day	Daily Discharge in Second-feet					
	May	Jun.	Jul.	Aug.	Sep.	Oct.
1	7140	5680	3440	524	225	308
2	11000	5880	3870	460	225	265
3	8800	6700	3520	460	216	286
4	7800	8200	3040	425	211	276
5	6920	9400	2480	439	220	265
6	6920	8800	2200	432	220	303
7	7800	6280	1970	377	206	320
8	8800	6700	1900	384	206	320
9	10300	7580	1710	298	216	351
10	12000	7800	1640	292	198	338
11	13400	8050	1510	298	159	332
12	14600	8050	1370	298	188	298
13	14900	7800	1260	286	202	286
14	13400	7580	1140	281	180	286
15	13700	7360	1090	276	184	358
16	13400	6920	1110	265	198	453
17	14000	6280	987	281	216	453
18	14000	5880	880	255	184	325
19	11800	5880	890	260	225	254
20	12000	5880	880	245	250	446
21	11600	6480	840	230	175	446
22	10000	6800	770	250	220	453
23	8050	6600	730	260	202	476
24	8050	5680	665	202	220	516
25	9050	5480	692	235	216	453
26	9800	5280	604	220	230	453
27	10600	4880	588	211	220	397
28	10300	4880	588	202	255	432
29	8050	4500	516	216	298	432
30	6480	3780	453	216	255	390
31	5880		508	202		286
Mean	10300	6570	1410	299	214	363
Ac.Ft. For Month	633000	391000	86700	18400	12700	22300
Monthly Diversions Below Gaging Station	14	32	38	28	24	8
Discharge to Sacto. River Acre-Feet	633000	391000	86700	18400	12700	22300

NOTE: Gagings at "H" Street Bridge, 6.0 miles above mouth. Station maintained by Water Resources Branch of the U. S. Geological Survey under cooperative agreement.

TABLE 13

DISCHARGE OF MOKELUMNE RIVER AT WOODBRIDGE

Day	Daily Discharge in Second-feet							
	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.
1	620	543	188	1780	1560	276	247	324
2	616	602	220	2440	986	264	270	329
3	618	510	260	3390	909	259	271	332
4	620	498	255	3360	1050	254	268	337
5	536	475	250	1420	777	247	276	332
6	590	428	322	985	620	480	290	354
7	395	387	648	865	339	150	278	351
8	519	422	1140	808	349	292	292	334
9	548	438	1330	792	379	247	337	334
10	552	436	1650	1130	375	253	365	331
11	552	431	1620	1720	330	258	315	331
12	564	396	1620	2240	315	262	312	344
13	584	373	1650	2920	315	258	292	336
14	598	373	1920	3340	320	272	274	334
15	610	373	1740	3250	288	266	249	331
16	612	377	1760	2940	327	228	284	339
17	608	418	1790	2530	332	282	317	339
18	596	425	1800	2470	326	262	315	337
19	598	414	1810	1690	309	258	322	327
20	604	402	1820	2200	268	256	322	292
21	578	400	1820	2480	264	254	315	287
22	576	398	1800	2710	258	249	312	317
23	580	418	1530	2790	254	255	312	326
24	552	453	984	2930	268	257	332	326
25	536	320	932	2580	286	271	336	331
26	512	378	898	2310	291	351	307	340
27	502	449	868	2030	285	305	336	340
28	468	456	805	2120	256	340	334	346
29	464	458	822	2320	254	320	327	391
30	428	370	1240	2140	250	295	324	382
31	454		1330		255	268		368
Mean	555	427	1190	2220	432	274	304	336
Ac.Ft. For Month	34100	25400	73200	132000	26600	16800	18100	20700

NOTE: Gaging station located just below Woodbridge Irrigation District's Dam at Woodbridge. Station maintained by Water Resources Branch of the U. S. Geological Survey throughout the year, but the record is given here for the period of the irrigation season only.

TABLE 14

DISCHARGE OF SAN JOAQUIN RIVER NEAR NEWMAN

Day	Daily Discharge in Second-feet							
	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.
1	2880	1340	1340	6240	5440	484	274	381
2	2880	1420	1140	6120	5770	481	280	361
3	2880	1390	1040	5770	5770	470	274	388
4	2880	1360	1040	5440	5440	395	268	378
5	2880	1340	1090	5010	5440	357	271	350
6	2880	1440	1220	4910	5330	347	260	347
7	2810	1500	1590	5440	5110	350	257	347
8	2670	1470	1800	5330	4410	374	265	311
9	2600	1470	1860	4910	3860	344	251	333
10	2460	1440	1500	4910	3680	333	268	337
11	2320	1440	1260	5550	3600	324	301	327
12	2250	1360	1190	5770	3440	320	361	327
13	2110	1290	1320	5880	3200	347	388	320
14	2110	1290	1650	6000	2960	371	388	347
15	2110	1340	2110	6120	2740	385	388	350
16	2040	1420	2600	6120	2390	330	398	384
17	2180	1530	3680	6000	1920	330	402	354
18	2390	1590	4610	5770	1440	330	391	361
19	2600	1590	4710	5660	1260	330	405	378
20	2670	1680	5330	5660	1090	330	409	320
21	2530	1920	5550	5550	1020	295	402	295
22	2320	2110	5550	5880	990	308	402	286
23	2040	2320	6000	6240	924	340	340	277
24	2040	2460	6120	6480	924	330	327	280
25	1980	2390	6120	6360	860	311	327	268
26	1860	2180	6360	5770	797	304	340	257
27	1740	1860	6840	5330	716	301	320	248
28	1650	1620	7200	5440	599	301	283	246
29	1620	1500	7200	5660	517	280	317	232
30	1530	1470	6960	5770	492	280	347	235
31	1420		6600		510	280		230
Mean	2300	1620	3630	5700	2670	344	330	318
Ac.Ft. For Month	141000	96400	223000	339000	164000	21200	19600	19600

NOTE: This station is at Mile 47.0 above Durham Ferry Bridge and is below the inflow of the Merced River. It is a permanent station of the Water Resources Branch of the U. S. Geological Survey. This station is maintained throughout the year, but the record is given here for the irrigation season only.

TABLE 15

DISCHARGE OF SAN JOAQUIN RIVER NEAR GRAYSON

Day	Daily Discharge in Second-feet			
	Jul.	Aug.	Sep.	Oct.
1		635	426	420
2		635	429	467
3		620	432	530
4		595	436	537
5		568	458	544
6		555	424	544
7		550	417	552
8		582	406	554
9		608	380	557
10		570	357	547
11		548	376	550
12		520	414	552
13		512	456	554
14		558	480	557
15		555	472	560
16	*2850	580	478	562
17	2510	540	481	572
18	2110	520	496	560
19	1710	462	514	560
20	1310	428	521	557
21	1150	435	530	517
22	1080	438	527	487
23	1040	446	524	467
24	1010	436	497	477
25	966	414	480	436
26	922	414	463	434
27	878	410	446	434
28	815	413	429	439
29	734	416	412	429
30	662	419	412	424
31	645	422		414
Mean	**1270	510	452	509
Ac.Ft. for Month	**40400	31300	26900	31300

NOTE: Recording gage station at Laird Slough Bridge.

* Beginning of record for season, following high water period.

** 16 days.

TABLE 16

DISCHARGE OF SAN JOAQUIN RIVER NEAR VERNALIS

Day	Daily Discharge in Second-feet							
	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.
1	7400	2840	4340	18000	15800	1470	1020	1120
2	7500	2770	4680	16900	13800	1410	1020	1120
3	7910	2770	5130	15300	12200	1380	1020	1190
4	8020	2980	5670	13400	11400	1330	1040	1220
5	8020	3050	5670	12200	10900	1270	1060	1220
6	7200	3330	6210	11700	9840	1240	1060	1220
7	6400	3620	7100	11400	9190	1220	1020	1220
8	5490	3700	7700	11700	8560	1190	1020	1220
9	5130	4180	8460	11500	8440	1220	990	1220
10	5130	4420	9020	11300	7360	1190	965	1240
11	5220	4680	9260	12200	6690	1190	965	1220
12	4950	4950	9260	13800	6060	1160	1040	1220
13	4420	5220	9500	15200	5760	1140	1090	1190
14	4100	5400	10800	16100	5360	1140	1060	1190
15	4180	5310	12200	16900	4960	1190	1060	1220
16	4590	5310	13700	17400	4690	1190	1020	1240
17	4590	5670	14700	17400	4330	1220	1060	1270
18	4340	6030	15400	16600	3910	1160	1120	1270
19	4100	6030	15800	15800	3350	1140	1160	1760
20	4100	6120	15900	15400	3030	1090	1160	2010
21	4020	6400	15800	15600	2800	1060	1140	2010
22	4020	6900	15300	15900	2660	1090	1140	2080
23	4100	6800	15000	16900	2520	1090	1090	2080
24	4020	6210	14700	17700	2450	1090	1090	2200
25	3620	5850	14100	17500	2380	1040	1090	2460
26	3470	5400	14000	15800	2310	1020	1090	2530
27	3330	5040	14200	15300	2170	1020	1120	2600
28	3190	4680	14800	15900	1890	1020	1090	2600
29	2980	4500	15800	16100	1710	1040	1090	2600
30	2980	4260	17200	16100	1590	1040	1120	2600
31	2980		18000		1470	1040		2530
Mean	4890	4810	11600	15100	5790	1160	1070	1670
Ac.Ft. For Month	301000	286000	713000	898000	356000	71300	63700	103000

NOTE: Gaging station located at Durham Ferry Bridge below the junction of Stanislaus and San Joaquin Rivers. Station maintained by Water Resources Branch of the U. S. Geological Survey under cooperative agreement.

TABLE 17

DISCHARGE OF MERCED RIVER AT
YOSEMITE VALLEY RAILROAD CROSSING

Day	Daily Discharge in Second-feet			
	Jul.	Aug.	Sep.	Oct.
1		33	40	33
2		24	40	33
3		16	33	33
4	*79	13	30	33
5	79	21	33	33
6	54	16	33	30
7	61	10	33	27
8	79	11	40	27
9	54	10	36	27
10	61	11	36	34
11	47	47	44	34
12	36	54	47	33
13	40	54	44	21
14	40	36	47	16
15	44	36	40	10
16	40	36	33	13
17	40	40	27	30
18	36	40	33	10
19	33	33	33	6
20	33	27	27	13
21	33	27	27	6
22	33	27	27	6
23	33	28	27	6
24	33	29	27	6
25	33	30	27	2
26	33	31	30	2
27	33	32	33	2
28	33	33	33	2
29	33	33	33	2
30	33	33	33	2
31	33	33		2
Mean	**44	29	34	17
Ac.Ft. For Month	**2420	1790	2040	1060

NOTE: Staff gage station. Daily readings.
* Beginning of record for season, following high water period.
** 28 days.

TABLE 18

DISCHARGE OF MERCED RIVER NEAR MOUTH

Day	Daily Discharge in Second-feet			
	Jul.	Aug.	Sep.	Oct.
1		202	218	259
2		221	212	228
3		224	214	252
4		171	199	236
5		165	209	236
6		168	187	245
7		193	189	229
8		203	176	214
9		190	185	245
10		193	194	245
11		195	227	230
12		182	260	238
13		224	270	238
14		252	279	246
15		254	257	254
16		223	251	271
17		195	268	255
18		168	270	247
19		185	287	231
20		194	285	217
21		205	273	202
22	*250	222	265	187
23	233	224	242	187
24	245	214	226	187
25	258	199	226	188
26	222	217	258	196
27	189	210	243	188
28	192	228	227	174
29	178	222	259	160
30	214	207	259	146
31	217	225		160
Mean	**220	206	237	219
Ac.Ft. For Month	**4360	12600	14100	13500

NOTE: Staff gage station at bridge 1.1 miles above mouth. Daily readings.

* Beginning of record for season, following high water period.
** 10 days.

TABLE 19

DISCHARGE OF DRY CREEK NEAR OLD WATERFORD BRIDGE

Day	Daily Discharge in Second-feet						
	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.
1		19	14	99	24	8	23
2		18	16	100	21	8	28
3		17	19	65	19	9	26
4		16	18	51	14	9	24
5		15	16	46	13	9	22
6		14	15	41	12	10	24
7		13	18	41	11	10	26
8		12	21	42	10	11	27
9		12	24	42	8	11	24
10		13	27	43	7	12	21
11		13	13	43	7	12	19
12		14	14	44	8	13	17
13		16	16	44	8	14	15
14		13	17	44	6	16	14
15		13	18	44	5	18	12
16		13	19	43	4	19	11
17		13	19	43	3	20	18
18		14	19	43	3	21	18
19		14	19	43	2	28	18
20		14	18	42	2	33	18
21		15	17	42	3	32	18
22		15	16	41	4	23	17
23	*13	16	16	40	5	14	15
24	15	16	15	39	7	14	14
25	16	16	15	42	8	13	12
26	17	16	14	46	9	13	11
27	19	15	13	40	8	13	9
28	20	14	15	34	7	13	9
29	21	13	93	32	7	13	9
30	20	13	96	29	7	13	9
31		13		27	7		9
Mean	**17.6	14.4	22.3	45.6	8.4	15.1	17.3
Ac.Ft. for Month	**280	889	1330	2810	514	897	1060

NOTE: Staff gage station. Readings at several day intervals. Discharge at this station includes spill to Dry Creek from Hetch Hetchy Water Supply conduit.

*Beginning of record for season.
**8 days.

TABLE 20

DISCHARGE OF DRY CREEK NEAR MODESTO

Day	Daily Discharge in Second-feet						
	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.
1		104	49	110	59	65	83
2		104	44	110	59	67	90
3		98	44	104	59	67	98
4		104	41	98	59	65	94
5		98	44	76	59	67	90
6		94	59	98	59	65	82
7		88	49	98	59	65	82
8		88	46	93	59	59	82
9		87	44	82	59	54	98
10		76	41	88	54	54	95
11		70	54	88	54	59	93
12		49	49	79	54	62	89
13		44	49	82	54	62	83
14		46	44	82	54	66	83
15		54	43	70	54	66	85
16		44	76	70	49	76	85
17		49	82	76	49	76	85
18		51	65	76	46	93	87
19		44	65	76	46	93	90
20		46	82	76	49	89	89
21		59	76	76	49	93	93
22	*54	70	59	76	54	104	93
23	54	110	65	76	54	98	76
24	70	110	54	76	54	93	60
25	76	111	46	76	54	92	64
26	84	98	54	76	59	90	65
27	82	76	49	76	59	90	98
28	82	56	44	70	62	88	94
29	76	54	85	62	62	88	59
30	70	54	110	59	65	82	49
31		59		59	65		49
Mean	**72	74	57	81	56	76	83
Ac.Ft. For Month	**1290	4550	3400	4990	3430	4540	5080
M.I.D. Spill Below Station Ac.Ft.		1740	1030	720	480	750	230
≠ Disch. to Tuol. River Ac.Ft.		6290	4430	5710	3910	5290	5310
≠ Disch. to Tuol. R.-Mean c.f.s.		102	74	93	64	89	86

NOTE: Staff gage station about two miles above mouth. Daily readings.

* Beginning of record for season.

** 9 days.

≠ Neglecting seepage return below station.

TABLE 21

DISCHARGE OF TUOLUMNE RIVER AT ROBERTS FERRY BRIDGE

Day	Daily Discharge in Second-feet			
	Jul.	Aug.	Sep.	Oct.
1		62	41	50
2		64	41	50
3		64	41	50
4		62	41	50
5		60	41	50
6		60	41	50
7		58	41	50
8		56	41	50
9		54	41	50
10		54	41	50
11		52	41	50
12		52	41	50
13		50	41	50
14		50	41	50
15		50	41	50
16		48	41	50
17	*527	48	41	729
18	536	48	41	1120
19	535	46	41	1080
20	534	46	41	1080
21	537	45	41	1110
22	536	43	41	1160
23	514	39	43	1640
24	523	39	43	1660
25	520	39	46	1660
26	226	37	48	1690
27	74	41	50	1680
28	66	41	52	1670
29	66	41	52	1640
30	66	41	52	1620
31	64	41		1610
Mean	**355	49	43	708
Ac.Ft. for Month	**10600	3040	2560	43500

NOTE: Recording gage station

*Beginning of record for season, following high water period.

** 15 days.

TABLE 22

DISCHARGE OF TUOLUMNE RIVER AT HICKMAN BRIDGE

Day	Daily Discharge in Second-feet			
	Jul.	Aug.	Sep.	Oct.
1		119	108	119
2		119	108	119
3		123	108	123
4		119	108	123
5		123	108	123
6		119	111	116
7		119	111	111
8		123	108	106
9		123	108	106
10		123	108	106
11		119	108	106
12		123	111	108
13		116	111	108
14		113	111	108
15		116	111	108
16		113	111	106
17		113	111	790
18		111	111	1180
19		111	111	1140
20		111	111	1140
21		108	111	1170
22		106	111	1220
23		106	111	1700
24		106	113	1720
25	*652	103	113	1720
26	477	103	116	1750
27	161	106	116	1740
28	136	106	116	1730
29	130	106	119	1700
30	123	106	119	1680
31	119	106		1670
Mean	**257	113	111	769
Ac.Ft. For Month	**3570	6980	6620	47300

NOTE: Recording gage station. Established 1932.
* Beginning of record for season, following high water period.
** 7 days.

TABLE 23

DISCHARGE OF TUOLUMNE RIVER AT TUOLUMNE CITY

Day	Daily Discharge in Second-feet Jul.	Aug.	Sep.	Oct.
1		422	348	387
2		414	363	381
3		400	360	393
4		396	369	390
5		391	366	381
6		371	357	378
7		390	363	372
8		392	360	369
9		383	360	384
10		388	363	394
11		393	375	390
12		384	389	390
13		389	386	385
14		383	383	380
15		381	374	380
16		393	374	379
17		395	388	376
18		391	397	734
19		377	406	1280
20	*910	372	400	1300
21	905	372	400	1320
22	880	366	410	1340
23	870	367	407	1350
24	875	361	413	2010
25	875	361	410	2050
26	860	358	410	2090
27	757	349	400	2100
28	492	363	400	2130
29	434	366	395	2100
30	419	360	386	2100
31	426	351		2050
Mean	**725	380	384	983
Ac.Ft. for Month	**17300	23400	22800	60400
Diversions Below Station-Ac.Ft.		67	36	32
M.I.D.Spill Below Station-Ac.Ft.		270	650	410
≠Discharge to San Joaquin River Acre-feet		23600	23400	60800

NOTE: Recording gage station, 3.35 miles above mouth.

*Beginning of record for season, following high water period.

**12 days.

≠Neglecting seepage return below station

TABLE 24

DISCHARGE OF STANISLAUS RIVER AT
ORANGE BLOSSOM BRIDGE

Day	Daily Discharge in Second-feet			
	Jul.	Aug.	Sep.	Oct.
1		35	38	35
2		35	38	35
3		35	38	35
4		38	38	33
5		38	35	35
6		40	38	35
7		40	38	35
8		35	35	35
9		35	35	35
10		35	35	35
11		35	35	35
12		35	40	35
13		35	40	35
14	*125	38	42	35
15	125	40	42	35
16	125	38	40	35
17	90	35	35	35
18	60	35	35	35
19	125	35	40	35
20	125	35	35	35
21	75	35	35	35
22	48	35	35	35
23	45	42	35	35
24	42	40	35	40
25	38	40	35	35
26	38	40	35	35
27	35	42	35	35
28	35	38	35	35
29	40	38	35	35
30	35	35	35	35
31	35	35		35
Mean	**69	37	37	35
Ac.Ft. for Month	**2460	2280	2190	2160

NOTE: Recording gage station.
* Beginning of record for season, following high water period.
** 18 days.

TABLE 25

DISCHARGE OF STANISLAUS RIVER AT HATMARK RANCH*

Day	Daily Discharge in Second-feet			
	Jul.	Aug.	Sep.	Oct.
1		270	264	279
2		272	260	284
3		256	279	285
4		262	278	266
5		264	284	266
6		247	259	271
7		235	258	274
8		241	259	278
9		226	250	268
10		223	260	258
11		246	268	248
12		249	304	238
13		245	276	257
14		251	282	275
15		250	256	273
16		247	278	263
17		251	293	276
18		237	316	285
19		242	342	285
20		249	315	249
21	**378	256	304	274
22	401	277	297	267
23	361	280	290	254
24	321	254	288	251
25	314	248	268	248
26	307	256	279	272
27	267	250	282	265
28	245	282	277	239
29	255	274	272	229
30	252	275	279	231
31	262	277		229
Mean	***306	255	281	262
Ac.Ft. for Month	***6670	15700	16700	16100
M.I.D.Spill Below Station-Ac.Ft.		500	600	440
≠Discharge to San Joaquin River Acre-feet		16200	17300	16500

NOTE: Recording gage station, 5.2 miles above mouth.
* Formerly Elliot Ranch
** Beginning of record for season, following high water period.
*** 11 days.
≠ Neglecting seepage return below station.

CHAPTER III

MEASUREMENTS OF DIVERSIONS

Measurements and records of diversions in 1932 have included those from the Sacramento River and its tributaries within the valley floor, those to the Delta Uplands from Cache Slough, Old San Joaquin River, Tom Paine Slough, and San Joaquin River, and those on the Stanislaus, Tuolumne, Merced, and San Joaquin Rivers and Dry Creek as obtained in connection with the return water measurements (See Chapter IV). This report records a total of 562 diversions, segregated to the various sources as follows: Sacramento River 262, Colusa Trough 14, Back Borrow Pit (carrying drainage water from Colusa Basin along the back levees of Reclamation Districts 108 and 787) 12, Lower Butte Creek and Butte Slough 20, By-pass and Drainage Channels 27, Feather River 41, Yuba River 8, American River 30, diversions to Delta Uplands from Cache Slough 1, from Old San Joaquin River 12, from Tom Paine Slough 8, and from San Joaquin River (below Vernalis gaging station) 33, San Joaquin River (above Vernalis Gage) 19, Stanislaus River 14, Tuolumne River 11, Dry Creek 8, and Merced River 42.

All of these diversions except five are accomplished by pumping. The five exceptions are gravity diversions, two on the Yuba River, two on the Feather River and one on the Sacramento River, and the records for these 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 the relation established between electric power consumption and pump discharge. This is possible due to the fact that practically all of the pumping plants are

electrically operated. All pump operators keep daily operation records on blanks furnished by the Water Supervisor. These records are collected monthly by the field engineers at the same time that the readings of the electric meters are recorded. The relation between power input and water pumped is determined from current meter measurements of the discharge. At the larger pumping plants several measurements are made during each season. At the smaller plants a sufficient number of measurements are made initially to determine the rating and thereafter at intervals sufficient to show any changes which may occur in the rating. With the daily operation records available it has been possible to compile from the monthly diversions as computed from the power record, a daily diversion record for each plant. In this report and the tables of this chapter, the records of monthly diversions only are given. The daily diversion records have been compiled as a supplemental report, however, and this is on file and available for reference in the office of the Division of Water Resources.

A summary of the 1932 diversions throughout the Sacramento-San Joaquin territory is shown in Table 26. 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. The total diversions above Sacramento from the Sacramento River and its tributaries on the valley floor, March to October, inclusive, 1932, amounted to 1,653,700 acre-feet. This water was diverted for 90,600 acres of rice and 171,200 acres of general crops or for a total of 261,800 acres, giving a seasonal gross unit diversion of 6.3 acre-feet per acre. The diversions under the higher lifts to the Delta Uplands and the pumping diversions of the San Joaquin River and

its tributaries amounted to 233,300 acre-feet. These were for 102,200 acres including only 80 acres of rice, giving a seasonal gross unit diversion of 2.3 acre-feet per acre. It should be noted that the total figures for the San Joaquin River and tributaries do not include the major gravity diversions by the canals of Miller and Lux nor those of Oakdale, South San Joaquin, Modesto, Turlock, Waterford and Merced Irrigation Districts, as these diversions are not within the scope of the measurements. Table 26 shows the data also for the Sacramento-San Joaquin Delta but it is to be noted that the Delta figures represent the consumptive use of water (see derivation, Chapter V). They are, therefore, not comparable to the figures for the up-river areas which are for gross diversions and take no account of return water.

TABLE 26

DIVERSIONS, ACREAGE IRRIGATED AND GROSS SEASONAL DUTY OF WATER IN THE SACRAMENTO-SAN JOAQUIN AREA, 1932

Source	Seasonal Diversions Acre-feet	Acreage Irrigated			Gross Seasonal Duty of Water Acre-feet per Acre
		Rice	General	Total	
Sacramento River, Redding to Sacramento	1020000	53823	130747	184570	5.5
Feather River below Oroville	496700	28108	24115	52223	9.5
Yuba River on Valley Floor	58200	2615	4950	7565	7.7
American River below Fairoaks	5500		3165	3165	1.7
By-Pass and Drainage Channels (Including Lower Butte Creek and Slough)	73300	6110	8204*	14314	5.1
Total above Sacramento	1653700	90656	171181	261837	6.3
Delta Uplands from Cache Slough, Old River, Tom Paine Slough and San Joaquin River	117700		55785	55785	2.1
San Joaquin River from Merced River to Vernalis Gaging Station	90100	80	39813	39893	2.3
Merced River below Snelling	13300		3299	3299	4.0
Tuolumne River below Roberts Ferry Bridge, and Dry Creek	2000		742	742	2.7
Stanislaus River below Orange Blossom Bridge	10200		2522	2522	4.0
Total Delta Uplands and Pumping Diversions of San Joaquin River and Tributaries **	233300	80	102161	102241	2.3
Sacramento-San Joaquin Delta ***	*** 1181000		*** 447430	*** 447430	*** 2.6

* Includes 560 Gun Club Acreage.

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

*** The figures for the Delta represent the consumptive use of water (See Chapter V) and are not comparable to the Gross Diversion figures of the Up-River areas which take no account of return water. The Delta acreage given is the total consumptive area including water surfaces, aquatic growths, weeds, etc. The total irrigated crop acreage was 338,025.

TABLE 27

SUMMARY OF SACRAMENTO RIVER DIVERSIONS (ACRE-FEET)

River Section	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Totals
Redding to Red Bluff	225	5214	18543	21150	22478	22076	20979	21370	132035
Red Bluff to Butte City	359	64468	79772	81181	88683	83225	41380	21394	460462
Butte City to Colusa	0	5999	5029	6285	7968	4452	1051	1062	31846
Colusa to Wilkins Slough	174	32171	48913	52614	48305	40450	23452	3644	249723
Wilkins Sl. to Knights Ldg.	671	3042	7915	10508	8755	3774	2292	834	37791
Knights Landing to Verona	0	2158	2612	4553	4290	2307	1899	754	18573
Verona to Sacramento	3232	10921	13883	18209	17370	14838	8604	2513	89570
Totals	4661	123973	176667	194500	197849	171122	99657	51571	1020000

TABLE 28

SACRAMENTO 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	JUN.	JUL.	AUG.	SEP.	OCT.		GENERAL	RICE
CITY OF SACRAMENTO	0.8 L	3-20" 1-18"	1736	1944	2347	2811	2894	2733	2324	1938	18727	MUNICIPAL	
— AMERICAN RIVER — MILE 1.1 LEFT				SEE TABLE 12									
— BACK BORROW PIT RECL. DISTRICT 1000 —		MILE 1.3 LEFT			SEE TABLE 64								
E. FOURNESS	1.45 R	1-8"	2	12	13	44	41	17	9	6	144	96	
C. W. JONES	2.05 L	1-8"					20	15	11	11	57	50	
— RECLAMATION DISTRICT 1000 DRAIN —		MILE 2.1 LEFT		SEE TABLE 63									
FRANK CHRISTOPHEL	2.4 L	1-5"		4	6	17	14	10	20	1	72	34	
H. M. SWALLEY	2.45 L	1-5"		7	13	7	16	3	11		57	37	
ALBERT ELKUS	2.9 L	1-5"			5	12		1	1		19	22	
HAYWARD REED	3.55 R	1-16"		622	44	541					1207	350	
W. E. M. BEARDSLEE	3.75 R	1-5"		6	37	32	10				85	44	
W. I. ELLIOTT	4.0 R	1-10"(1)				90	45	25	22		182	81	
REESE AND GREER	4.65 R	1-7"		35	41	88					164	125	
HARBINSON BROTHERS	5.05 R	1-14"				26	94	17	5		142	85	
R. S. SEYDEL (2)	5.25 R	1-8"			85	137	27	26	14	22	311	(3)164	
C. H. MERKELEY ESTATE (MERKELEY BROTHERS)	5.3 R	1-8"				24	8				32	60	
A. CASSELMAN	5.5 R	1-6"				8	5				13	22	
A. A. CASSELMAN (4)	5.55 R	1-6"					8				8	35	
K. L. LOVDAL	5.7 R	1-10"			NO	DIVERSION							
J. E. BANDY	6.0 R	1-6"		18	18	25	32	29	21	19	162	50	
RIVERSIDE MUTUAL WATER COMPANY	6.10 L	2-18"		688	1597	2187	1678	1398	935		8483	1738	127
O. A. WHITE	6.4 R	1-6"			NO	DIVERSION							
A. MARTY	7.0 R	1-4"			NO	DIVERSION							
CALIFORNIA BANK AND TRUST COMPANY	7.5 L	1-8"					74	20	11		105	90	
F. L. MARTIN AND A. B. CARTER (F. J. STAHL)	7.8 L	1-10"			29	14	65	69	12		189	76	
A. MARTY	7.9 R	1-8"	7	23	22	20	16	8	30	23	149	70	
M. E. AND R. F. BENNETT	7.9 L	1-10"		52	30	13	6	19	31		151	90	
M. MARTY	8.3 R	1-10"	50	50	42	14	35	46	41	37	315	60	
MARTIN MARTY (4)	8.3 R	1-10"			8	33	48	60	28	26	203	60	
JULIUS BLAUTH	8.5 R	1-6"				37	30				67	85	
H. WALDECK	8.7 R	1-6"		13	26	26	19	27	21	18	150	40	
T. T. C. GREGORY	8.95 R	1-18"		42	109	295	193	480	279	184	1582	735	
A. A. SOUSA	9.15 R			PLANT		DISMANTLED							
A. A. SOUSA	9.20 R			PLANT		DISMANTLED							
A. A. SOUSA	9.35 R	1-14"			226	249	434	366	457	14	1746	550	
R. G. PEARSON AND P. S. DRIVER	9.80 L	1-14"		50	157	120	153	35			515	173	
CARL CASSELMAN	9.9 R	1-12"			53	66	53	5	26		203	100	
F. W. KIESEL	10.25 L	1-14"		91	104	73	200	177	49		694	489	
REESE ESTATE (LOUIS ASHWANDAN)	10.75 R	1-12"			64	105	105	96	83	3	456	80	

* MILEAGE ALONG RIVER ABOVE SACRAMENTO.
(1) OLD PLANT DISMANTLED AND NEW ONE INSTALLED IN 1932.
(2) J. W. RODDAN AND SONS, 1930 AND 1931.
(3) INCLUDES 56 ACRES ON ADJOINING SCHMIDT PROPERTY.
(4) NEW INSTALLATION 1932.

TABLE 28 (CONTINUED)

SACRAMENTO 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	JUN.	JUL.	AUG.	SEP.	OCT.		GENERAL	RICE
R. F. FIDDYMENT AND E. J. CAHILL	10.75 L	1-12"				42	78	13			133	(1) 210	
A. L. WHITE	11.6 L	1-10"				29	53	23	29		134	60	
CONAWAY RANCH	12.0 R	4-36"			NO	DIVERSION							
THOMAS O'CONNOR	12.5 R	1-12"			56	89		3			(2) 148	60	
GERTRUDE BROWN (3)	12.7 R	1-6"	5	6	5	3	5	1		12	37	40	
JULIUS HAUSER	13.1 R	1-12"			NO	DIVERSION							
J. KEFFER (4)	13.25 R	1-10"		11	4	20	25	15	10	2	87	30	
ELKHORN MUTUAL WATER COMPANY	14.1 L	1-24"											
		1-20"			1801	2954	3003	3019	1508		12285	2094	
CALIFORNIA LANDS, INCORPORATED	15.15 R	1-10"		48	113	123	73	139	121	18	635	205	
HARRY W. HALL	15.7 L	1-6"			NO	DIVERSION							
CENTRAL MUTUAL WATER COMPANY (5)	16.0 L	2-38"		2977	2937	3924	3693	3056	1494		18081	1015	2707
FRANK FISHER AND HENRY RICH (HERSHEY PLANT)	16.27 R	1-20"		135	238	80	611	53	79	172	(6) 1368	(7) 90	
H. T. SILVIUS	16.4 R	1-6"			NO	DIVERSION (8)						(8)	
W. B. BEACH	16.62 R				PLANT	DISMANTLED							
THOS. J. COX ESTATE	16.7 R	1-16"			NO	DIVERSION							
FRANK FISHER AND HENRY RICH (MULL PLANT)	17.75 R	1-20"		189	151	247	18	44			649	200	
MORRIS AND JOHN SCHEIBER (9)	18.45 L	1-12"				31	40	49	25	7	152	62	
G. H. LYALL (F.S.MACHADO) (10)	18.7 L	1-8"					27	11	4		42	25	
HOOVER RANCH (11)	18.95 R	1-18"			NO	DIVERSION							
NORTHERN MUTUAL WATER COMPANY	19.6 L	1-36"	1432	3898	3502	3553	3421	2730	893		(12) 19429		2134
— VERONA GAGING STATION —	MILE 19.65		SEE TABLE 8										
— FEATHER RIVER —	MILE 20.9 LEFT		SEE TABLE 11										
— SACRAMENTO SLOUGH —	MILE 21.2 LEFT		SEE TABLE 59										

* MILEAGE ALONG RIVER ABOVE SACRAMENTO.

(1) FIDDYMENT 95 ACRES AND CAHILL 115 ACRES.

(2) 39 ACRE-FEET DIVERTED IN MAY FOR DREDGE FLOTATION IN YOLO BY-PASS.

(3) NEW INSTALLATION 1932.

(4) FORMERLY H. E. FRANKS.

(5) THIS PLANT PUMPS WATER TO THE IRRIGATION CANAL BOTH FROM A DRAIN CANAL OF DISTRICT 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 519, MAY 1000, JUNE 566, JULY 750, AUGUST 1215, SEPTEMBER 1116, TOTAL 5166.

(6) MOST OF THE DIVERSION BY THIS PLANT WAS USED FOR DREDGE FLOTATION IN YOLO BY-PASS, AS FOLLOWS: (ACRE-FEET) APRIL 135, MAY 238, JUNE 50, JULY 400, SEPTEMBER 79, OCTOBER 172, TOTAL 1074.

(7) INCLUDES 70 ACRES ON SILVIUS PROPERTY MILE 16.4 R.

(8) 70 ACRES IRRIGATED FROM PLANT AT MILE 16.27 R.

(9) FORMERLY A. LINGGI.

(10) PREVIOUSLY LISTED AS RICKENBACKER BROS.

(11) PREVIOUSLY LISTED AS FRANK FISHER AND HENRY RICH (HOOVER PLANT).

(12) CROSS CANAL, THE MAIN DRAIN BETWEEN R.D. 1000 AND 1001 JOINS THE RIVER AT MILE 19.6 L. AT THE MOUTH OF THIS DRAIN NATOMAS NORTHERN MUTUAL WATER CO. MAINTAINS, DURING THE IRRIGATION SEASON, A BOOSTER PUMP SUPPLYING WATER FROM THE RIVER TO THE DRAIN. THE WATER IS RETAINED IN THE DRAIN BY A DAM AT ITS MOUTH. WHEN THE RIVER FALLS LOWER THAN THE CREST OF THIS DAM THE GATES ARE CLOSED AND THE BOOSTER PUMP STARTED. THERE ARE PUMPING PLANTS ALONG THE SOUTH BANK OF CROSS CANAL, BUT ONLY ONE, AT MILE 4.0 FROM THE MOUTH, WAS OPERATED IN 1932, AND THE ACREAGE SHOWN WAS IRRIGATED FROM THIS PLANT. FROM MARCH 21ST UNTIL JUNE 26TH, INCLUSIVE, WATER WAS AVAILABLE IN CROSS CANAL WITHOUT PUMPING AT BOOSTER PLANT. THE DIVERSIONS HERE SHOWN ARE THOSE FOR THE PLANT AT MILE 4.0 ON CROSS CANAL FROM MARCH 21ST TO JUNE 26TH AND FOR THE BOOSTER PLANT FOR THE REMAINDER OF THE SEASON. THE WATER PUMPED THROUGH THE PLANT AT MILE 4.0 WAS AS FOLLOWS: (ACRE-FEET) MARCH 1432, APRIL 3898, MAY 3502, JUNE 3417, JULY 3360, AUGUST 3308, SEPT. 1100, TOTAL 20017.

TABLE 28 (CONTINUED)

SACRAMENTO 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	JUN.	JUL.	AUG.	SEP.	OCT.		GEN-ERAL	RICE
WEST COAST LIFE INSURANCE CO. (1)	21.7 R	1-15"			NO	DIVERSION							
FRANK FISHER AND HENRY RICH (KELLER PLANT)	22.5 R	1-22"		46	420	1209	1384	177	25	657	(2)3918	1350	270
HERSHEY ESTATE (3)	26.95 R	1-18"				14					(3) 14	372	
E. J. BRAUN (4)	OPP. 26.95R	1-10"									(5)	(5)	
MORSE INGLIN	28.2 R	1-6"		2	12	16	19	14	6		69	30	
RUSSELL BROTHERS (6)	29.2 R	1-12"					71	33	32	27	163	(7) 111	
KENDALL ESTATE	29.7 R	1-8"			11	66	27				104	67	
P. L. TRAGANZA AND K. RUSSELL	29.75 R	1-8"		5	4	3	5	4	6	3	30	16	
LAURA FREITAS	29.9 L	1-12"			34	68	50				152	95	
LEO GIOVANETTI	30.2 L	1-3"			4.9	5.1	3.6	1.0	0.5	0.4	15.5	19	
RECLAMATION DISTRICT 1500 (8)	30.45 L	1-2"			1.1	2.5					3.6	6	
KENDALL ESTATE	30.6 R	(9) 1-12"			18	77	36				131	109	
FLOYD ANDERSON	30.7 R	1-6"		0.3	6.4	4.2	7.1	9.2		3.7	30.9	30	
RECLAMATION DISTRICT 1500 (8)	30.75 L			PLANT		DISMANTLED							
J. G. GOULART	30.9 L	1-8"			17	67	49				133	80	
A. C. HUSTON (J. A. SIMMONS)	31.5 R	1-12"		4	13	26	22	4	4	3	76	51	
M. ALONSO	31.8 L	1-6"			0.7	4.8	3.6	2.7			11.8	30	
KENDALL ESTATE	32.0 R	1-10"			59	511	157			7	734	448	
		1-18"											
SUTTER MUTUAL WATER COMPANY (PORTUGUESE BEND)	32.0 L	2-24"		2090	1880	2271	2354	2039	1748	41	12423	1546	297
COLLIER BROTHERS	32.5 R	1-10"		4	3	9	11	20	10	12	69	40	
GEORGE STAM	33.2 L	1-20"			NO	DIVERSION							
SNOWBALL ESTATE (LEO WETZEL)	33.5 R	1-12"			73	108	69				250	125	
J. G. KNOX AND FRED LEISER	33.75 L	1-12"		7	55	91	22	3	67		245	(10) 182	
— KNIGHTS LANDING GAGING STATION —	MILE 34.0		SEE TABLE 7										

* MILEAGE ALONG RIVER ABOVE SACRAMENTO.

(1) FORMERLY J. H. BERGHAUSER.

(2) A PORTION OF THE DIVERSION BY THIS PLANT WAS BY-PASSED TO THE EAST BORROW PIT OF YOLO BY-PASS FOR DREDGE FLOTATION AS FOLLOWS: (ACRE-FEET) APRIL 46, MAY 420, JUNE 805, JULY 921, SEPTEMBER 25, OCTOBER 657, TOTAL 2874. ADDITIONAL WATER FOR THE ACREAGE UNDER THIS PLANT WAS OBTAINED FROM R.D. 1600 DRAINAGE AND BY GRAVITY DIVERSION OF COLUSA BASIN DRAINAGE DIVERTED TO EAST BORROW PIT OF YOLO BY-PASS VIA KNIGHTS LANDING RIDGE CUT AND CHECKED UP IN THE BORROW PIT. (SEE YOLO BY-PASS DIVERSIONS-FISHER AND RICH).

(3) DIVERSION FROM THE RIVER TO GRAYS BEND (OLD CHANNEL NOW CUT OFF). BY MEANS OF A BOOSTER PLANT THIS WATER PLUS SEEPAGE AND STORAGE IN GRAYS BEND WAS DIVERTED TO THE AREA IRRIGATED, AS FOLLOWS: (ACRE-FEET) MARCH 0, APRIL 0, MAY 123, JUNE 257, JULY 172, TOTAL 552.

(4) PLANT IS ON GRAYS BEND (OLD CHANNEL NOW CUT OFF FROM RIVER). IN 1930 A SMALL GASOLINE OPERATED PUMP WAS INSTALLED AND A SMALL AMOUNT OF WATER DIVERTED. NEW UNIT INSTALLED IN 1932.

(5) NO DIRECT DIVERSION FROM RIVER: DIVERSION FROM GRAYS BEND (ACRE-FEET) MAY 2, JUNE 8, AUGUST 4, SEPTEMBER 3, TOTAL 17. ACREAGE IRRIGATED 14.

(6) NEW INSTALLATION 1932.

(7) INCLUDES 36 ACRES IRRIGATED FROM KNIGHTS LANDING RIDGE CUT IN MAY AND JUNE.

(8) FORMERLY M. S. LESLIE.

(9) REPLACES FORMER 7" UNIT.

(10) LEISER 126 ACRES (INCLUDING 80 ACRES ON ADJACENT BOTTIMORE PROPERTY); KNOX 56 ACRES.

TABLE 28 (CONTINUED)

SACRAMENTO 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	JUN.	JUL.	AUG.	SEP.	OCT.		GENERAL	RICE
— COLUSA BASIN DRAINAGE —	MILE 34.15 R				SEE TABLE 58								
MEEK ESTATE	34.2 R	1-10"										(1)	
		2-16"			252	944	975	109	34		2314	599	
RIVER FARMS COMPANY (TOWNSITE PLANT)	34.25 R	1-24"											
		1-26"	126	377	737	1462	1686	509	547	531	5975	2060	
		1-20"											
COMMERCIAL INVESTMENT COMPANY (R. B. BAILEY)	34.85 L	1-12"			121	104	101	2			328	(2)147	
FRED VAN LEW	35.2 L	1-12"			NO	DIVERSION	(3)					(3)	
J. H. SCOTT	35.6 L	1-7"			25	20	13	2		10	70	(4) 43	
A. COSTA (A. MORCONI)	35.8 L	1-10"			40	19	17	4	2		82	(5)100	
AMEDEO MORONI	36.7 L	1-5"			NO	DIVERSION							
RIVER FARMS COMPANY (GARDEN PUMP)	36.95 R	1-2"								4.3	4.3	5	
W. W. BOTTIMORE	37.2 L	1-14"			NO	DIVERSION							
L. W. BUNDOCK	37.75 L	1-8"			17	38	31	5			91	68	
ADDIE REEL	38.4 L	1-10"			31	52	16				99	82	
CALIFORNIA LANDS INC. (H.A.KRAMER)	38.8 L	1-10"			46	66	8				120	96	
SUTTER BASIN CORP. (F.O.EASTMAN)	39.4 L	1-12"			40	39	35				114	80	
COMMERCIAL INVESTMENT COMPANY (R. B. BAILEY) (6)	39.8 L	1-10"			31	57	63				151	85	
WM. DUFFY, JR.	39.9 L	1-6"			12	19	9	1			41	25	
SUTTER MUTUAL WATER COMPANY (STATE RANCH BEND)	40.6 L	1-24"	15	1681	892	1429	2471	2344	1297	88	10217	(7)	(7)
BUELL RANCH (M.K.DEAN)	42.2 L	1-6"			NO	DIVERSION							
SUTTER BASIN CORPORATION (E.BOZZI)	42.3 L	1-8"			NO	DIVERSION							
A. KRAMER	43.1 L	1-12"		8	33	19	13	13	2	10	98	89	
EL DORADO RANCH	43.1 R	1-18"	61	99	398	528	373	139	261	62	1921	599	
RIVER FARMS COMPANY (RECLAMATION DISTRICT 2047 PLANT)	43.1 R	2-50"			NO	DIVERSION							
— RECLAMATION DISTRICT 108 DRAIN —	MILE 44.0 R		SEE TABLE 57										
JOHN CLAUSS (G. GUISTI)	47.3 L	1-14"											
		1-24"			68	37	20	135	50		310	50	
P. J. HIATT	48.7 L	1-20"	316	147	481	595	422	134		48	(8)2143	380	
P. J. HIATT	49.7 L	1-14"			25	17	29				71	50	
RECLAMATION DISTRICT 108 (TYNDALL MOUND PLANT)	51.1 R	2-24"											
		1-36"		16	986	986	360				2348	700	
G. J. STAM	51.2 L	1-24"			NO	DIVERSION							

* MILEAGE ALONG RIVER ABOVE SACRAMENTO.
(1) INCLUDES ACREAGES ON ADJOINING LANDS AS FOLLOWS: PRAETHER 28, FISTELORIA 25, DIXON 5, ROBINSON 5.
(2) INCLUDES 31 ACRES IRRIGATED FOR VAN LEW, MILE 35.2 LEFT.
(3) SEE FOOTNOTES FOR PLANTS AT MILE 34.85 L AND 35.6 L.
(4) INCLUDES 14 ACRES IRRIGATED FOR VAN LEW, MILE 35.2 LEFT.
(5) INCLUDES 14 AC. ON ADJOINING LAND OF J. GOFFITZER.
(6) FORMER LESSEE O. BUSHAW.
(7) SEE PLANT AT MILE 63.75 LEFT.
(8) A PORTION OF THIS DIVERSION WAS BY-PASSED INTO A LAKE AND USED TO HOLD THE WATER TABLE HIGHER ON ADJOINING LANDS.

TABLE 28 (CONTINUED)

SACRAMENTO 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	JUN.	JUL.	AUG.	SEP.	OCT.		GEN-ERAL	RICE
J. F. WHITE	51.5 L	1-8"					68		9		77	14	
T. J. CUMMINS RANCH COMPANY	52.0 L	1-16"	16		146	462	359	48			1031	320	
G. W. STRETTER (A. R. WAYBUR)	55.1 L	1-20"			142	254	106				502	179	
RECLAMATION DISTRICT 108 (BOYER BEND PLANT)	56.4 R	1-18" 1-30"		188	2304	2305	993	69	22	79	5960	2144	
J. M. MILLER	56.65 R	1-12"					78	24	18		120	53	
G. W. STRETTER (WAYBUR AND VAIL)	56.95 L	1-20"		209	517	376	228	170			1500	(1) 300	
J. M. KIRKUP	57.5 L	1-16"		9		85	42	30	26		192	112	
H. S. FASIG	58.2 L	1-15"	137	261	98	250	163				909	249	
J. R. YOUNG	58.9 L	1-16"			NO	DIVERSION							
LAMB BROTHERS	59.8 L	(2) 1-14"				10	16	5	3		34	20	
RECLAMATION DISTRICT 108 (STEINER BEND PLANT)	59.85 R	1-16"		34	445	303					782	371	
BLANCHE COULTER BROWN	60.5 L	1-12"		13	19	3	31	19			85	70	
SUTTER BASIN CORP. (COLES LANDING)	61.3 L	1-12"			NO	DIVERSION							
JOHN KOLPIEN	61.3 R	1-12"					8		14	2	24	20	
HINES RANCH	62.3 R	1-10"				20	20	12	7		59	23	
WILLIAM BAKER	62.6 R	1-8"			9	9	1				19	26	
— WILKINS SLOUGH GAGING STATION —		MILE 62.9		SEE TABLE 6									
RECLAMATION DISTRICT 108 (WILKINS SLOUGH PLANT)	63.2 R	5-42"		7686	7457	8760	10480	7572	588		42543	891	5775
SUTTER MUTUAL WATER COMPANY (TISDALE) AND IMPROVEMENT MUTUAL WATER COMPANY	63.75 L	6-42"		23110	31516	33187	28608	26572	19400	3139	165532 (3)	19331 (4)	9754 (4)
LA ROCA MONTE RANCHO COMPANY	64.3 R	1-12"			14	5	16	31			66	35	
TISDALE IRRIGATION & DRAINAGE CO.	64.4 L	1-12"	62	62	68	67	344	58	86		747	242	
COLUSA DEVELOPMENT COMPANY (SPRECKLES SUGAR COMPANY)	64.9 R	1-24"			236	278	204				718	371	
M. BETTENCOURT	65.1 R	1-10"					33	26			59	25	
D. L. W. HOFFMAN	65.7 L	1-12"				31	23	31	35	22	142	80	
J. L. BROWNING	66.4 R	(5) 1-18"		21	562	572	323				1478	820	
TISDALE IRRIGATION AND DRAINAGE COMPANY (WINSHIP PLANT)	67.1 L	1-20"				116	171	84	74	20	465	368 (6)	
DESMOND A WINSHIP, ET AL	67.2 L	1-10"					8.6				8.6	(7) 19	
MERIDIAN FARMS WATER CO. #6	67.4 L	1-12"		2	80	119	67	100	114	22	504	(8) 126	

* MILEAGE ALONG RIVER ABOVE SACRAMENTO.

(1) WAYBUR 233, VAIL 67.

(2) PREVIOUSLY LISTED AS 12" PUMP.

(3) INCLUDES WATER DELIVERED TO IMPROVEMENT MUTUAL WATER COMPANY AS FOLLOWS (ACRE-FEET) APRIL 490, MAY 1758, JUNE 1634, JULY 1453, AUGUST 1317, SPETEMBER 1316, OCTOBER 544, TOTAL 8701. THE IMPROVEMENT M.W.CO. PUMPED 781 ACRE-FEET FROM A DRAIN CANAL IN JUNE AND JULY.

(4) THESE FIGURES GIVE THE TOTAL ACREAGE IRRIGATED FOR THE STATE RANCH BEND AND TISDALE PLANTS AT MILES 40.6 LEFT AND 63.75 LEFT, RESPECTIVELY. THEY INCLUDE 307 RICE AND 1341 GENERAL CROPS IRRIGATED BY IMPROVEMENT MUTUAL WATER CO. (IN RECL. DIST. 1600) ENTIRELY FROM TISDALE PLANT.

(5) PREVIOUSLY LISTED AS 20" PUMP.

(6) INCLUDES 95 ACRES ON WINSHIP LAND. SEE MILE 67.2 LEFT.

(7) 95 ACRES ADDITIONAL SERVED THROUGH TISDALE IRR. & DRAINAGE CO. PLANT. SEE MILE 67.1 LEFT.

(8) 44 ACRES ADDITIONAL WERE IRRIGATED FROM PLANT AT MILE 67.5 LEFT.

TABLE 28 (CONTINUED)

SACRAMENTO RIVER DIVERSION

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	JUN.	JUL.	AUG.	SEP.	OCT.		GENERAL	RICE
ENNIS-BROWN COMPANY	67.5 L	2-24"		414	1326	1361	1332	1296	762		6491	(1) 2376	
— RECLAMATION DISTRICT 70 DRAIN — MILE 68.8 LEFT				SEE TABLE 56									
MERIDIAN FARMS WATER COMPANY #5	68.81 L	1-12"		31	273	337	166	321	195		1323	300	
J. L. BROWNING	69.0 R	1-24"		14	671	584	343	88	9		1709	762	
FAXON RANCH	69.2 R	1-18"			242	288	284	201	69	65	1149	283	
— EDDY'S FERRY (GRIMES) — MILE 69.45													
WILBUR JENSEN AND MARY CECIL, ET AL	70.35 R	1-24"			NO	DIVERSION							
HOUCHINS, HOFFMAN, BECKLEY AND RITCHIE (J. M. RITCHIE)	70.4 R	1-20"			102	77	147				326	118 (2)	
MERIDIAN FARMS WATER CO. #4 (GRIMES)	71.1 L	1-24"		37	588	695	1030	890	421		3661	847	
J. W. BROWNING	71.9 R	1-12"			200	282	174	45			701	280	
ANTONE STEIDELMEYER	71.9 R	1-12"			NO	DIVERSION							
E. E. VANN (COFFMAN BROTHERS)	73.6 R	1-12"			NO	DIVERSION							
MERIDIAN FARMS WATER CO. #3 (HEADQUARTERS)	74.8 L	1-18" (3)		11	412	617	440	402	304	43	2229	508	
L. B. WESTFALL (4)	75.3 R	1-10"			33	88	40	32	26		219	79	
J. H. YATES	76.1 L	1-12"		4	72	77	34	18			205	(5) 88	
E. V. JACOBS	77.9 L	1-12"			35	244	98				377	241	
SEBIA DAVIS	78.8 R	1-36"			NO	DIVERSION							
C. E. REISCHE	79.0 L	1-10"	7	46	58	101	58	56	20		346	(6) 136	
E. V. JACOBS (7)	79.5 L	1-8"			38						38	35	
G. W. WOOD	79.7 L	1-10"		19	29	14	31	27	10	6	136	(8) 104	
— MERIDIAN BRIDGE — MILE 79.85													
MERIDIAN FARMS WATER COMPANY #1 AND #2 (MERIDIAN)	80.0 L	1-24" 1-18"		172	3271	2782	2163	1798	1113	98	11397	3491 (9)	
GEO. P. AHLF	80.3 R	1-8"				10	8				18	15	
M. S. DAVIS	80.9 L	1-5"		5	5	11	12	3			36	17	
WONDERLY AND LILIANTHALL (10)	81.5 L	1-16"	11	42	263	235	21	23	14	2	611	(11) 232	
STEIDELMEYER BROTHERS	81.9 R	1-16"	82		683	452	396	369	137	3	2122	(12) 640	
F. T. REISCHE AND L. J. WOOD	82.5 L	1-12"			14	35	40	16	23		128	68	
GEO. W. KIRKPATRICK	83.3 L	1-14"		18	14	22					54	(13) 63	
P. E. GARMIRE	83.6 L	1-10"			NO	DIVERSION							

* MILEAGE ALONG RIVER ABOVE SACRAMENTO.

(1) INCLUDES 44 ACRES SERVED FOR MERIDIAN FARMS WATER COMPANY. SEE PLANT AT MILE 67.4 LEFT.
(2) RITCHIE 34, BECKLEY 44, HOFFMAN 40.
(3) PREVIOUSLY LISTED AS 20 INCH.
(4) THIS PLANT IS REPORTED TO HAVE BEEN INSTALLED IN 1924 BUT NO RECORD OF OPERATION HAS BEEN REPORTED PRIOR TO 1932.
(5) INCLUDES 23 ACRES ON ADJOINING LANDS TO THE NORTH.
(6) INCLUDES NEIGHBORING ACREAGE. SEGREGATION AS FOLLOWS: REISCHE 64, ROCKHOLT 18, KILGORE 29, STAAS 25.
(7) NEW INSTALLATION 1932.
(8) INCLUDES 52 ACRES ON ADJOINING LANDS OF S. M. BURTIS.
(9) AN ADDITIONAL GENERAL CROP ACREAGE OF 562 ACRES WAS IRRIGATED FROM PLANT #7 PUMPING FROM AN INTERIOR LAKE SUPPLIED BY DRAINAGE AND SURPLUS WATER FROM UNITS #1 AND #2 AT MERIDIAN.
(10) FORMERLY WONDERLY AND SPRINGER.
(11) WONDERLY 32, LILIANTHALL 200.
(12) INCLUDES 40 ACRES ON ADJOINING TUBBS PROPERTY.
(13) INCLUDES 36 ACRES ON ADJOINING TURNER PROPERTY.

TABLE 28 (CONTINUED)

SACRAMENTO 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	JUN.	JUL.	AUG.	SEP.	OCT.		GENERAL	RICE
— BUTTE SLOUGH — MILE 84.0 LEFT			SEE TABLE 55											
OAKLAND PRUNE COMPANY	86.1	R	1-12"		69		45	28	28			170	105	
J. F. PECK	86.6	L	1-18"				261	42				303	(1)120	
LLOYD SCOGGINS	86.8	L	1-8"			49		49	41			139	52	
W. P. DWYER (LOWER) (2)	86.9	R	1-16"			90	27	108	38		6	269	(3)163	
W. P. DWYER (UPPER) (2)	87.4	R	1-15"			28	30	54	23			135	(4) 54	
JACOBSEN AND O'ROURKE	87.6	L	1-10"			NO	DIVERSION							
SWINFORD TRACT IRRIGATION COMPANY	87.7	R	1-12"	12	115	54	98	130	6	25	81	521	132	
EDWARD K. LANGE	88.0	R	1-6"		16		20					36	24	
W. D. DE JARNETT (NAGLE & LOCOVITCH)	88.2	L	1-10"			19	63	60	8			150	(5) 70	
W. D. DE JARNETT	88.7	L	1-14"			16	12	90	48	27		193	100	
COLUSA IRRIGATION COMPANY	89.2	R	1-20"		277	136	395	414	199		137	1558	912	
PHIL B. ARNOLD	89.25	L	1-8"			105	14	110				229	80	
P. V. BERKEY ESTATE	89.3	L	1-12"			154	202	125				481	80	
— COLUSA GAGING STATION — MILE 89.4			SEE TABLE 5											
T. H. BOGGS AND SISTERS	89.7	L	1-6"		5	6	3	12				26	30	
T. H. BOGGS AND SISTERS	89.8	L	1-12"			NO	DIVERSION							
ROBERTS DITCH COMPANY	90.7	R	2-20"		247	404	451	368	239	162	63	1934	770	
GEO. P. AHLF	92.5	L	(6)1-10"			7	140	98	7			252	(7) 125	
U. W. BROWN	93.0	R	1-12"			119	20	94				233	(8) 95	
GEO. P. AHLF	93.0	L	1-6"			12	10	7	5		12	46	30	
I. G. ZUMWALT	93.2	R	1-36"			NO	DIVERSION							
			1-18"											
TUTTLE LAND COMPANY	94.3	R	1-15"											
			1-20"		140	153	311	448	106	82	135	1375	(9)303	
W. E. PINNEY	94.8	R	1-12"		27	31	72	55	20			205	(10) 98	
J. W. BROWNING	95.2	L	1-14"			NO	DIVERSION							
			1-20"											
M. E. HICOK	95.5	L	1-5"		6	6		11				23	16	
A. N. LEWIS	95.6	L	1-20"											
			1-16"		196		416	330	211	62	93	1308	(11)465	
I. G. ZUMWALT	95.7	R	1-12"		271	264	304	250		129	123	1341	269	

* MILEAGE ALONG RIVER ABOVE SACRAMENTO.
(1) INCLUDES 30 ACRES ON ADJOINING REICHEL PROPERTY.
(2) FORMERLY CAMPBELL AND DWYER.
(3) INCLUDES 58 ACRES OF PRUNES SERVED JOINTLY BY THIS PLANT AND THAT AT MILE 87.4 RIGHT.
(4) SEE ACREAGE NOTE FOR PLANT AT MILE 86.9 RIGHT.
(5) ACREAGE SEGREGATED AS FOLLOWS: DE JARNETT 30; NAGLE 22; LOCOVITCH 18.
(6) REPLACES FORMER 14" UNIT.
(7) INCLUDES ACREAGE ON ADJOINING LANDS AS FOLLOWS: COLUSA COUNTY BANK 45 AND A. G. LAUX 40.
(8) INCLUDES 40 ACRES ON ADJOINING ARNOLD PROPERTY.
(9) INCLUDES ACREAGE ON ADJOINING PROPERTY AS FOLLOWS: YERXA 28 AND MARSH 3.
(10) INCLUDES ACREAGE ON ADJOINING PROPERTY AS FOLLOWS: MARSH 46 AND DIXON 7.
(11) INCLUDES 70 ACRES ON ADJOINING PROPERTY OF COLUSA DEVELOPMENT COMPANY IN SECTIONS 9 AND 10, T 16 N, R 1 W.

TABLE 28 (CONTINUED)

SACRAMENTO 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	JUN.	JUL.	AUG.	SEP.	OCT.		GENERAL	RICE
			1-20"											
BRIDGET GRAHAM ESTATE	95.8	L	1-16"		28	9	12	296	11		2	358	(1) 258	
H. HEITMAN (2)	97.7	R	1-12"			25	10	32	22			89	35	
FRANK BECKLEY	98.0	L	1-6"			23	8	18	24			73	77	
J. L. ERISEY	98.3	R	1-10"		52	45	61	61	65		39	323	50	
R. A. SPERRY (JOE BOGGS) AND COLUSA DEVELOPMENT COMPANY	98.6	L	1-15"			NO	DIVERSION							
WM. AND D. BOGGS	98.8	L	1-18"		18	17	35	14	53	22	8	167	120	
CHENEY SLOUGH IRRIGATION COMPANY	99.0	R	1-36"		303	183	555	70		44	25	1180	222	
			2-26"											
TERRILL AND SARTAIN	99.2	L	1-20"				2		11			13	(3)	
DAVE GEORGE	99.8	L	1-16"			165	188	191	127		2	673	(4) 235	
J. W. BROWNING (C. MEYERS)	100.8	L	1-20"			NO	DIVERSION							
A. F. AND R. C. WOHLFROM	101.1	R	1-20"		172	80	262	82			95	691	173	
MAXWELL IRRIGATION DISTRICT (5)	102.8	R	2-30"											
			2-18"		1384	936	985	1164	1005			5474	4	300
			1-36"											
NATIONAL PACIFIC LAND COMPANY (6)	103.7	R	1-16"		138	192	276	327	233	117	213	1496	410	
COMPTON-DELEVAN IRRIGATION DISTRICT	103.8	R	2-24"			NO	DIVERSION(7)						(7)	(7)
			1-36"											
E. M. GORDON	103.9	R	1-16"											
			1-20"		544	783	598	820	838	326		3909	(8) 683	
B. F. GOULD	104.8	L	1-26"		107	305	296	292	63	49	17	1129	(9) 304	
THOUSAND ACRE RANCH (H.W.KELLER)	106.0	R	1-14"		104	45	95	132	68		8	452	143	
CALIFORNIA LANDS, INCORPORATED	110.0	R	1-12"		181	5	184	80	62		122	634	180	
CALIFORNIA LANDS, INCORPORATED (10)	111.2	R	1-6"			15	11					26	29	
— PRINCETON FERRY — MILE 112														
RECLAMATION DISTRICT 1004	112.1	L	1-24"											
			1-30"			NO	DIVERSION							
			1-50"											
PRINCETON-CODORA-GLENN IRR. DIST. (11)	112.4	R	3-24"		2055	1147	961	2667	1264	58	105	(11) 8257	2866 (12)	2103 (12)

* MILEAGE ALONG RIVER ABOVE SACRAMENTO.

(1) INCLUDES 170 ACRES FLOODED ONCE PREPARATORY TO PLANTING.

(2) FORMERLY J. P. AND J. T. O'SULLIVAN.

(3) NO IRRIGATION FROM THIS PLANT. PUMP OPERATED TO KEEP SUCTION PIPE FREE FROM SILT. SEE PLANT AT MILE 99.8 LEFT FOR ACREAGE IRRIGATED.

(4) INCLUDES ACREAGES ON ADJOINING PROPERTY AS FOLLOWS: J. BOGGS 40, TERRILL AND SARTAIN 125.

(5) SEE PLANT AT MILE 154.8 RIGHT FOR ADDITIONAL WATER DIVERTED AND ACREAGE IRRIGATED. THE DIVERSION AT THIS POINT WAS ALL USED ON THE ACREAGE HERE GIVEN.

(6) FORMERLY AMERICAN TRUST COMPANY.

(7) SEE PLANT AT MILE 154.8 RIGHT.

(8) INCLUDES 140 ACRES SERVED JOINTLY BY THIS PLANT AND THAT AT MILE 12.1 RIGHT ON COLUSA TROUGH (SEE COLUSA TROUGH DIVERSIONS).

(9) DUNHAM AND GOULD 67, J. S. GOULD 22, A. REUSSER 50, AND ADJOINING LANDS OF COLUSA DEVELOPMENT COMPANY 165.

(10) NEW INSTALLATION 1932.

(11) SEE PLANT AT MILE 154.8 RIGHT FOR ADDITIONAL DIVERSION FOR ACREAGE HERE GIVEN.

(12) SERVED JOINTLY BY THIS PLANT AND THAT AT MILE 154.8 RIGHT. GENERAL CROP FIGURE INCLUDES 140 ACRES OUTSIDE THE DISTRICT. AN ADDITIONAL DISTRICT ACREAGE OF 838 RICE WAS SERVED BY PROVIDENT IRRIGATION DISTRICT UNDER THE LATTER'S DIVERSION AT MILE 154.8 RIGHT.

TABLE 28 (CONTINUED)

SACRAMENTO 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	JUN.	JUL.	AUG.	SEP.	OCT.		GENERAL	RICE
A. J. STONE (STONE AND FAULKNER)	112.6 L	1-10"			34		31	3			68	40	
BUTTE CITY RANCH (E.E.LENVILLE)	(1)114.7 R	1-6"			NO	DIVERSION							
EDWARD L. STEELE (G.D.HANSEN)	115.5 L	1-12"		21	18	19	18	15			91	40	
— BUTTE CITY GAGING STATION — MILE 115.8		SEE TABLE 4											
— BUTTE CITY BRIDGE — MILE 115.9													
BUTTE CITY RANCH (E.E.LENVILLE)	115.95R	1-12"			1	19					20	20	
ANTHONY RADEMACHER	116.1 L	1-3"			1.2	1.3	1.0	0.2	1.7	0.1	5.5	3	
CALIFORNIA LANDS, INCORPORATED	117.8 R	1-10"				147	142			162	451	150	
TOM BALCH (2)	(3)117.9 R	1-7"				5	6		3	2	16	8	
E. E. DOTY	(3)117.9 R	1-6"		7	11	5	15	17	6	6	67	30	
J. F. HARBOUR AND E. H. WILEY	118.4 R	1-4"			NO	DIVERSION							
TOM CROUCH	119.0 L	1-10"			NO	DIVERSION							
LOVELACE BROWN	123.7 R	1-6"				6					6	(4)21	
S. TAYLOR (5)	123.8 R	1-3"				0.3	1.9	1.1	0.1	0.7	4.1	(6) 3	
PRINCETON-CODORA-GLENN IRR. DIST.	123.9 R	3-24"			NO	DIVERSION (7)						(7)	(7)
PROVIDENT IRRIGATION DISTRICT	124.2 R	4-42"											
		1-36"			NO	DIVERSION (8)						(8)	(8)
CALIFORNIA LANDS, INCORPORATED	124.4 R	1-16"		191	36	282	232	206	233	215	1395	377	
C. L. LEONARD	126.3 R	1-12"			NO	DIVERSION (8)						(8)	(8)
E. E. CRAMER	129.0 L	1-5"			NO	DIVERSION							
— ORD FERRY — MILE 130.8													
J. E. SCHARSCH	130.8 R				PLANT DISMANTLED								
PARROT-PHELAN ESTATE	141.5 L	5-24"			NO	DIVERSION							
— OLD CHICO LANDING RAILROAD BRIDGE SITE—MILE 142.1													
P. M. ROONEY	146.9 L	1-5"			NO	DIVERSION							
M. F. ROSE	148.7 R	1-6"						2	4		6	(9)25	
M. F. ROSE	148.9 R	1-6"					10	8	2		20	(10)	
— GIANELLA BRIDGE — MILE 149.5													
HENRY GIANELLA	150.0 L	1-10"			NO	DIVERSION							
JOSEPH GIANELLA	(11)150.0 L	1-10"			NO	DIVERSION							
SACRAMENTO RIVER FARMS, LTD.(12)	151.0 R	1-12"		108	539	696	709	906	622	481	4061	1600	
		1-18"											
A. HOLECEK	152.2 R	1-6"			3	17	16	13			49	30	
MAAS BROTHERS	154.6 R	1-5"						4.4	0.2		4.6	6	

* MILEAGE ALONG RIVER ABOVE SACRAMENTO.
(1) MILEAGE CORRECTION. PREVIOUSLY LISTED AS 115.4 RIGHT.
(2) THIS PLANT WAS FIRST REPORTED IN 1931. IT WAS INSTALLED IN 1924. IRRIGATED 12 ACRES GENERAL CROPS 1924-29, INCLUSIVE, AND 22 ACRES GENERAL CROPS IN 1930.
(3) PLANT IS ON BEEHIVE BEND AND OPPOSITE THIS MILEAGE ON MAIN CHANNEL OF RIVER.
(4) INCLUDES ONE ACRE ON ADJOINING TAYLOR PROPERTY. SEE MILE 123.8 RIGHT.
(5) PLANT REINSTALLED JUNE 28, 1932. FORMERLY STAATS, KLEWE AND KILLEBREW.
(6) ONE ACRE ADDITIONAL IRRIGATED FROM PLANT AT MILE 123.7 RIGHT.
(7) SEE PLANTS AT MILES 112.4 RIGHT AND 154.8 RIGHT.
(8) SEE PLANT AT MILE 154.8 RIGHT.
(9) IRRIGATED JOINTLY FROM THIS PLANT AND THAT AT MILE 148.9 RIGHT.
(10) SEE PLANT AT MILE 148.7 RIGHT.
(11) PUMP ON NORD SLOUGH OR PINE CREEK LAGOON WHICH JOINS SACRAMENTO RIVER AT MILE 147.0 LEFT. PLANT IS LOCATED THREE MILES UP SLOUGH ON RIGHT BANK OR OPPOSITE MILE 150.0 LEFT, SACRAMENTO RIVER.
(12) FORMERLY SACRAMENTO VALLEY SUGAR COMPANY.

TABLE 28 (CONTINUED)

SACRAMENTO 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	JUN.	JUL.	AUG.	SEP.	OCT.		GEN-ERAL	RICE
GLENN-COLUSA IRRIGATION DISTRICT	154.8 R (1)	1-100" 4-72" 2-50" 1-42" 2-30"	350	51090	51134	53477	59364	55073	28052	16211	314751 (2)	42976	19875
JACINTO IRRIGATION DISTRICT	(1) 154.8 R	(3)		1731	1580	2586	3234	2514	2050	1454	15149	3804	
COMPTON-DELEVAN IRRIGATION DISTRICT	(1) 154.8 R	(3)		3324	3128	3236	2850	2444		161	15163	(4) 180	1908
PROVIDENT IRRIGATION DISTRICT	(1) 154.8 R	(3)		1414	12672	10907	11538	11319	4364	207	52421	(5) 340	(6) 835
PRINCETON-CODORA-GLENN IRR. DIST.	(1) 154.8 R	(3)		5299	8775	8317	8357	8943	5898	865	46454	(7)	(7)
MAXWELL IRRIGATION DISTRICT (8)	(1) 154.8 R	(3)		1262	1764	1250	2030	1668		1300	(9) 9274	2110 (10)	1555
C. L. LEONARD	(1) 154.8 R	(3)		14	52	35	6		79	293	479	137	
— CORNING-VINA BRIDGE — MILE 166.5													
A. F. LANDIS	166.7 R	1-3"			2	2	4	4	4	2	18	5	
H. F. JACOBS (11)	166.8 R	1-2"				0.6	1.3	0.5	0.8	0.3	3.5	3	
R. A. FOSTER	169.1 R	1-8"			NO	DIVERSION							
HAMMON STOCK RANCHES	169.8 R			PLANT		DISMANTLED							
HAMMON STOCK RANCHES	170.7 R			PLANT		DISMANTLED							
HAMMON STOCK RANCHES	171.2 R	1-8"			NO	DIVERSION							
HAMMON STOCK RANCHES	174.2 R			PLANT		DISMANTLED							
— TEHAMA BRIDGE — MILE 177.5													
TEHAMA RANCH (12)	178.3 R	1-6"			46	108	50				204	80	
E. B. NOBLE	184.5 R	1-14"		25	27	53	68	69	55	12	309	90	
— RED BLUFF BRIDGE — MILE 193.45													
R. R. HOWELL	193.5 L			PLANT		DISMANTLED							
S. E. AYER	194.1 R	1-6"			NO	DIVERSION							
G. E. SUTTON	196.2 R	1-6"	2.0	0.2	0.6	2.6	4.9	5.0	0.7	0.3	16.3	15	
J. A. EDWARDS	196.2 L	1-6"						21			21	10	
A. W. GIBSON (T. A. CROOK)	196.4 L	1-8"				1	10	5	3		19	8	
R. RISLEY (13)	196.5 L	1-4"			NO	DIVERSION							

* MILEAGE ALONG RIVER ABOVE SACRAMENTO.
(1) THIS IS A COMMON POINT OF DIVERSION FOR THE GLENN-COLUSA, JACINTO, COMPTON-DELEVAN, PROVIDENT, PRINCETON-CODORA-GLENN (PARTIAL), AND MAXWELL (PARTIAL) IRRIGATION DISTRICTS AND C. L. LEONARD.
(2) INCLUDES GRAVITY DIVERSION: (ACRE-FEET) MARCH 350 AND APRIL 600. DIVERSION IN NOVEMBER WAS 14336 ACRE-FEET. ADDITIONAL WATER WAS OBTAINED BY GRAVITY FROM STONEY CREEK AS FOLLOWS: (ACREFEET) MARCH 900, APRIL 150, MAY 1130, TOTAL 2180.
(3) SAME PLANT AS THAT OF GLENN-COLUSA IRRIGATION DISTRICT.
(4) INCLUDES 100 ACRES DUCK CLUBS.
(5) INCLUDES 300 ACRES DUCK CLUBS.
(6) INCLUDES 838 ACRES IRRIGATED IN PRINCETON-CODORA-GLENN IRRIGATION DISTRICT.
(7) SEE PLANT AT MILE 112.4 RIGHT.
(8) SEE PLANT AT MILE 102.8 RIGHT.
(9) ADDITIONAL WATER WAS DIVERTED FROM DRAINS AND USED ON DUCK CLUB ACREAGE.
(10) ALL DUCK CLUB ACREAGE.
(11) FORMERLY W. H. HALL.
(12) PLANT RE-INSTALLED IN 1932.
(13) FORMERLY W. E. JOHNSON.

TABLE 28 (CONTINUED)

SACRAMENTO 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	JUN.	JUL.	AUG.	SEP.	OCT.		GEN-ERAL	RICE
J. ERICKSON	196.6 L	(1) 1-5"	7	3		24	27	1	2	2	66	28	
H. P. STICE	197.0 L	1-8"			NO	DIVERSION							
FREEMEYER BROTHERS	197.65L	1-3"				2.2	4.3				6.5	20	
J. PINE (CARL STENBERG) (2)	197.73L	(3) 1-2"			0.1	0.6	1.2	0.4			2.3	5	
— RED BLUFF GAGING STATION (IRON CANYON) —		MILE 198.6		SEE TABLE 3									
— BEND FERRY — MILE 207													
T. L. BONNETT	209.0 L	1-2½"					8	7	4	1	20	8	
J. F. NUNES	215.5 R	1-7"			NO	DIVERSION							
— JELLEY'S FERRY — MILE 215.6													
J. F. NUNES	216.0 R	1-3"			NO	DIVERSION							
W. A. HUNAEUS	216.4 L	1-3"			NO	DIVERSION							
HASKINS BROTHERS	218.0 L	1-5"				10	26	12	7	6	61	55	
H. W. JOHNSON, JR.	221.0 R	1-10"					359	126			485	250	
— BALL'S FERRY BRIDGE — MILE 224.5													
— ANDERSON BRIDGE — MILE 232.9													
L. C. SMITH AND G. W. GEORGE	233.0 L	1-6" 1-4"					3.3				3.3	8	
WM. MENZEL MEAT COMPANY	240.2 L	1-12"			117	212	116	143	141	91	820	(4) 120	
FITZPATRICK-DEMPSTER AND J. L. HENDERSON	240.5 L	1-10"			NO	DIVERSION (5)						(5)	
GRAF AND GRAF (6)	241.5 L	1-8"				60	70	46	32		208	45	
ADAMS BROTHERS	242.0 R	1-6"				91	71	39	31	6	238	70	
— REDDING ALTURAS BRIDGE — MILE 242.0													
ANDERSON-COTTONWOOD IRRIGATION DISTRICT	246.0 R	GRAVITY	225	5185	18384	20706	21742	21620	20704	21225	129791 (7)	12159 (8)	
JOHN DIESTELHORST	246.3 R	1-10"		29	42	71	83	83	60	41	409	30	
TOTALS			4661	123973	176667	194500	197849	171122	99657	51571	1020000	130747	53823

* MILEAGE ALONG RIVER ABOVE SACRAMENTO.
(1) 3" UNIT HAS BEEN REMOVED.
(2) FORMERLY PEARL EDWARDS.
(3) REPLACES FORMER 6 INCH UNIT.
(4) INCLUDES 30 ACRES ON ADJOINING HENDERSON PROPERTY. SEE MILE 240.5 LEFT.
(5) SEE PLANT AT MILE 240.2 LEFT.
(6) FORMERLY M. LEONARDINI ESTATE.
(7) RETURN WATER FROM THIS DIVERSION REACHES THE SACRAMENTO RIVER AS SEEPAGE OR DIRECT SPILL IN THE DRAINS AND CREEK CHANNELS BETWEEN REDDING AND SOUTH OF COTTONWOOD.
(8) ACCORDING TO A DETAILED SURVEY MADE BY THE DISTRICT IN 1932 THIS INCLUDES 11859 ACRES ACTUALLY CROPPED AND SURFACE IRRIGATED AND 300 ACRES WHICH RECEIVED BENEFIT THROUGH SUB-IRRIGATION.

TABLE 29

*COLUSA TROUGH 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	JUN.	JUL.	AUG.	SEP.	OCT.		GEN-ERAL	RICE
HATTIE O'HAIR	1.1 L(1)	32" BOX			NO	DIVERSION							
I. G. ZUMWALT	2.2 R	1-14" 1-36"		264	799	538	625	115	100		(2) 2441		1200
SACRAMENTO SHOOTING CLUB	3.0 R	36" BOX			NO	DIVERSION							
A. D. J. LAND COMPANY	3.0 L	28" BOX			NO	DIVERSION							
SACRAMENTO SHOOTING CLUB	3.1 R(3)	36" BOX			NO	DIVERSION							
MAXWELL IRRIGATION DIST., PLANT NO. 6	3.1 R(3)	1-20"			NO	DIVERSION						(4)	(4)
LOUIS BYINGTON	4.3 L	1-8"			NO	DIVERSION							
SHARKEY GUN CLUB	5.0 L				PLANT REMOVED								
MAXWELL IRRIGATION DIST., PLANT NO. 2A	7.0 R	1-15" 1-26" 1-36"			NO	DIVERSION						(4)	(4)
BEARRUP & FESSIGM & MARY E. ROUKE	11.5 L	2-32" BOX			NO	DIVERSION							
GUN CLUBS AT COMPTON WEIR	11.8 R	GRAVITY					147	424	73	32	(5) 676	(6)35	
E. M. GORDON (YOUNG AND SOUTHAM)(7)	12.1 R	32" BOX			43		109	52	42		246		(8)
— LATERAL HIGHWAY — BUTTE CITY TO WEST SIDE —		MILE	20.5										
RAZOR RANCH (GEO. ANTHONY)	20.7 R	1-6"			NO	DIVERSION							
RAZOR RANCH (GEO. ANTHONY)	21.1 R	1-15"			NO	DIVERSION							
HENRY JAMESON	22.0 R	1-16"			NO	DIVERSION							
TOTALS			0	264	842	538	881	591	215	32	3363	35	1200

* MAIN DRAIN OF RECLAMATION DISTRICT 2047.
** MILEAGE ALONG TROUGH ABOVE COLUSA WILLIAMS HIGHWAY.
(1) BELOW COLUSA-WILLIAMS HIGHWAY.
(2) THIS DIVERSION USED ONLY TO SUPPLEMENT GRAVITY SUPPLY FROM LATERAL "G" OF RECLAMATION DISTRICT 2047 SYSTEM.
(3) PLANT DIVERTS WATER FROM A DRAIN CANAL CALLED LATERAL F. DRAIN ENTERS TROUGH AT MILE 3.1 RIGHT.
(4) SEE SACRAMENTO RIVER DIVERSION OF MAXWELL IRRIGATION DISTRICT AT MILE 154.8 RIGHT.
(5) CONSIDERABLE OF THIS DIVERSION WASTED BACK TO TROUGH.
(6) PASTURE USED AS DUCK CLUB ACREAGE IN LATTER PART OF SEASON.
(7) NEW INSTALLATION 1932.
(8) 140 ACRES RICE SERVED JOINTLY BY THIS PLANT AND SACRAMENTO RIVER PLANT AT MILE 103.9 RIGHT. ACREAGE LISTED UNDER LATTER PLANT.

TABLE 30

**BACK BORROW PIT 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	JUN.	JUL.	AUG.	SEP.	OCT.		GENERAL	RICE
RIVER FARMS COMPANY (ASA KALFSBEEK) (1)	1.45 R	1-20"		1026	1097	921	1064	1104	167		5379		465
W. P. DWYER (C.J.KALFSBEEK) (2)	4.35 R	1-20"		1055	1928	1144	1698	1583	672		8080		1260 (3)
RECLAMATION DISTRICT 108	8.8 R	1-14"			NO	DIVERSION							
HERSHEY ESTATE (GEORGE E. YOUNGMARK)	11.15 R	1-16" 1-14"		912	657	619	974	794	147		4103		400
HERSHEY ESTATE	13.25 L	1-14"			NO	DIVERSION							
HERSHEY ESTATE (4)	13.75 R	1-6"				48	24		18	54	144	190	
B. F. MUMMA	14.75 R	1-10"		90	246	171	249	226	54		1036	1	160
— COUNTY LINE BRIDGE —	MILE 15.25												
M. T. EMMERT (5)	15.75 R	1-15"			62	53	44	19	123	70	371	160	
KATHERINE WEST (V. MC CULLOGH AND T. H. MUMMA) (6)	18.1 R	2-15"	52	1279	1263	1189	1734	1046			6563		925
C. R. SUGGET & GREGORY ESTATE	20.0 R	2-15"			NO	DIVERSION							
GREGORY-BROWNING-KINDERY & BRINDENBURG	22.15 R	1-16" 1-12"			NO	DIVERSION							
J. W. BROWNING	22.5 L	2-12"			NO	DIVERSION							
— HANNUM BRIDGE —	MILE 22.8												
TOTALS			52	4362	5253	4145	5787	4772	1181	124	25676	351	3210

* MILEAGE ALONG BORROW PIT FROM OUTFALL GATE JUST ABOVE JUNCTION OF BORROW PIT WITH SACRAMENTO RIVER AT KNIGHTS LANDING.
** 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.
(1) NEW INSTALLATION AT LOCATION USED PREVIOUSLY IN 1924, 1925 AND 1929.
(2) PLANT REINSTALLED AT LOCATION USED PREVIOUSLY IN 1926.
(3) INCLUDES 130 ACRES EACH ON ADJOINING MC CULLOUGH AND BROWNING PROPERTIES.
(4) PLANT REINSTALLED WITH 6 INCH UNIT AT 1930 LOCATION OF 14 INCH UNIT.
(5) FORMERLY COUNTY LINE GUN CLUB.
(6) NEW INSTALLATION 1932.

TABLE 31

LOWER BUTTE CREEK AND BUTTE SLOUGH 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	JUN.	JUL.	AUG.	SEP.	OCT.		GEN-ERAL	GUN(1) CLUBS
LOWER BUTTE CREEK													
RECLAMATION DISTRICT 1004 (2)	1.9 R	1-8"				57	21				78	75	
RECLAMATION DISTRICT 833 (R. C. INGRAM)	2.9 L	36" BOX					288	473	139		900	550	
EL ANZAR GUN CLUB	3.0 L			PLANT		DISMANTLED							
RECLAMATION DISTRICT 1004 (COLUSA DELTA FARMS)	3.9 R	1-12"					417	480	279	377	1553	586	100
		1-15"									(3)	(3)	(3)
		1-20"											
BUTTE LODGE GUN CLUB	4.0 R	1-22"							169	988	1157		300
SOUTH BUTTE GUN CLUB	5.5 L	1-10"								271	271		80
WINCHESTER GUN CLUB	5.5 L	1-12"			44				47	129	220		80
RECLAMATION DISTRICT 1004	9.3 R	GRAVITY			1203	507					1710	(4)	
BUTTE BASIN GUN CLUBS (5)	10	GRAVITY											5000
— BIGGS-AFTON ROAD — MILE 19.4													
GLENN RICE FARMS	19.8 R(6)	1-12"			NO	DIVERSION							
JOHN HANNAH	20.2 R	1-20"			NO	DIVERSION							
JOHN HANNAH	21.2 R	1-36"			NO	DIVERSION							

* APPROXIMATE MILEAGE FROM JUNCTION WITH SACRAMENTO RIVER.

(1) ONLY DIVERSIONS WHICH OCCURRED PRIOR TO NOVEMBER 1ST ARE GIVEN FOR GUN CLUB ACREAGE. IN MOST INSTANCES THE DIVERSIONS FOR THIS PURPOSE EXTENDED INTO NOVEMBER AND DECEMBER.

(2) TEMPORARY INSTALLATION 1932.

(3) ADDITIONAL DIVERSION BY GRAVITY AT MILE 9.3 RIGHT WAS USED ON THIS ACREAGE.

(4) SEE MILE 3.9 RIGHT.

(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 FOR THE CLUBS BY WESTERN CANAL. THESE DIVERSIONS ARE PRINCIPALLY IN THE FALL MONTHS AND THOSE FROM BUTTE CREEK HAVE NOT BEEN MEASURED. FOR DIVERSIONS VIA WESTERN CANAL SEE TABLE OF FEATHER RIVER DIVERSIONS MILE 59.7 R. THE AREA FLOODED BY THIS GROUP IS ESTIMATED TO BE APPROXIMATELY 5000 ACRES. THE CLUBS INCLUDED ARE WHITE MALLARD, 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) PLANT IS ON HOWARD SLOUGH BUT OPPOSITE THIS MILEAGE ON BUTTE CREEK.

TABLE 31 (CONTINUED)

LOWER BUTTE CREEK AND BUTTE SLOUGH 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	JUN.	JUL.	AUG.	SEP.	OCT.		GENERAL	(1) GUN CLUB
BUTTE SLOUGH													
BUTTE SLOUGH IRRIGATION COMPANY, LTD. (DIVERSION TO SUTTER BY-PASS) (2)	0.3 WEST	GRAVITY		1601	2131	2409	1631	5208	3474		16454	(3)	
M. MARTY	0.3 WEST	1-12"	8	25	36		78	27			174	61	
G. S. AND D. C. SMITH	1.4 EAST	1-8"				6	98	187	88		379	120	
I. E. NALL	3.5 WEST	1-10"		19	35	39	52	62	14		221	145	
W. H. ROSS (B. V. ARAMBEL)	3.7 WEST	1-10"		13							13	10	
P. A. REISCHE	4.1 WEST	1-12"		4	39	90	72	123	32		360	(4) 206	
E. V. JACOBS (G. M. GOMES)	4.8 WEST	1-10"		66	56	85	73	91	92		463	110	
A. ARMSTRONG & COLUSA COUNTY BANK	5.1 WEST	1-10"			21	28	60	42	26		177	(5) 53	
T. J. HAGEMAN	6.8 WEST	3-8" (6)				19	34	25	21		99	140	
TOTALS (LOWER BUTTE CREEK AND BUTTE SLOUGH			8	1728	3565	3240	2824	6718	4381	1765	24229	2056 (7)	5560 (8)

* APPROXIMATE MILEAGE FROM JUNCTION WITH SACRAMENTO RIVER.

(1) ONLY DIVERSIONS WHICH OCCURRED PRIOR TO NOVEMBER 1ST ARE GIVEN FOR GUN CLUB ACREAGE. IN MOST INSTANCES THE DIVERSIONS FOR THIS PURPOSE EXTENDED INTO NOVEMBER AND DECEMBER.

(2) 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 HERE SHOWN. RE-DIVERSIONS FROM WEST BORROW PIT OF SUTTER BY-PASS WERE MADE AT MILE 28.4 RIGHT AND 28.6 RIGHT. (SEE SUTTER BY-PASS DIVERSIONS TABLE 32).

(3) SEE ACREAGE UNDER REDIVERSIONS AT MILE 28.4 RIGHT AND 28.6 RIGHT - WEST BORROW PIT SUTTER BY-PASS. OTHER INDEFINITE ACREAGE IN SUTTER BY-PASS BENEFITTED BY SUB-IRRIGATION.

(4) INCLUDES J. E. MESSICK 14; M. T. HEATON 20; FEITH 3; GRANNERMAN 3; C. P. REISCHE 80; AND P. A. REISCHE 86.

(5) ARMSTRONG 35, COLUSA COUNTY BANK 18.

(6) PREVIOUSLY LISTED AS 6 INCH UNITS.

(7) DOES NOT INCLUDE ACREAGE UNDER DIVERSION TO SUTTER BY-PASS - SEE FOOTNOTES (2) AND (3).

(8) NOTE THAT THIS INCLUDES AN ESTIMATE OF 5000 ACRES FOR WHICH THE DIVERSIONS ARE NOT REPORTED.

TABLE 32

BY-PASS AND DRAINAGE CHANNEL DIVERSIONS

WATER USER	MILE AND BANK	NUMBER AND SIZE OF PUMP	MONTHLY DIVERSIONS IN ACREFEET MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	TOTAL DIVERSION MARCH TO OCTOBER ACRE-FEET	ACREAGE IRRIGATED GENERAL	RICE
WEST BORROW PIT OF SUTTER BY-PASS													
	(1)												
SUTTER BASIN CORPORATION	0.2 L			PLANT		DISMANTLED							
SUTTER BASIN CORPORATION #6	2.2 L			PLANT		DISMANTLED							
— SOUTHERN PACIFIC RAILROAD CROSSING —	MILE 2.5												
SUTTER BASIN CORPORATION #5	4.6 L			PLANT		DISMANTLED							
— KNIGHTS LANDING-MARYSVILLE CAUSEWAY —	MILE 12.7												
— WEST BORROW PIT GAGING STATION —	MILE 15.7	SEE TABLE 62											
MIDDLETON AND DESSEZ	17.0 R	1-15"			NO	DIVERSION							
— SOUTH LEVEE TISDALE BY-PASS —	MILE 18.9												
— RECLAMATION DISTRICT 1660 —	GRAVITY RETURN	MILE 19.3											
D. C. SMITH, E. I. MC GRATH AND S. A. MC KEEHAN	27.1 R	1-16"			NO	DIVERSION							
BUTTE SLOUGH IRRIGATION COMPANY LTD. (2)	28.4 R	GRAVITY		646	1444	988	732	2096	1040		6946	4037	
BURMOOD-TARKE-MC GRATH & MESSICK(2)	28.6 R	2-10"			59	75	44				178	110	
—NORTHERN ELECTRIC RAILROAD CROSSING —	MILE 29.15												
EAST BORROW PIT OF SUTTER BY-PASS													
	(3)												
SUTTER BASIN COMPANY	0.45 S*			PLANT		DISMANTLED							
RAY HUGHES	0.1 S*	1-10"			NO	DIVERSION							
E. H. CHRISTENSEN	(4)1.4 N	1-12"		104	251	273	193	131			952		(5)400
E. H. CHRISTENSEN	(4)1.4 N	1-12"			405	388	312	208	19		1332		(6)
J. F. HOLMES AND R. E. HUGHES	1.5 N*	1-15"			NO	DIVERSION							
SUTTER BASIN COMPANY	2.2 N	1-16"			NO	DIVERSION							
J. F. HOLMES AND R. E. HUGHES	3.1 N*	1-15"		134	584	550	673	597	69		2607		350
SUTTER BASIN COMPANY	4.1 N			PLANT		DISMANTLED							
E. H. CHRISTENSEN AND SON (7)	4.3 N	1-15"		636	494	463	512	188	108		2401		350
— KNIGHTS LANDING-MARYSVILLE CAUSEWAY —	MILE 4.4 N												
ARNOLD E. CHRISTENSEN	5.8 N	1-15"			NO	DIVERSION							
— EAST LEVEE OF WADSWORTH CANAL —	MILE 16.0 N												
R. L. MOREHEAD	18.75 N	1-10"			NO	DIVERSION							
F. W. DE WITT AND GEORGE SMITH	18.8 N*	1-4"			NO	DIVERSION							
MEYER-PLATTER-MOREHEAD-DE WITT BROS. -EPERSON AND MIDDLETON	19.1 N	1-14"			369	67	374	451	374		1635	616 (8)	
— NORTHERN ELECTRIC RAILROAD CROSSING —	MILE 20.0 N												

(1) MILEAGE IS GIVEN NORTHERLY FROM DRAINAGE PLANT OF RECLAMATION DISTRICT 1500. MILE 9.15 WEST BORROW PIT IS OPPOSITE CHANDLER.
(2) DIVERSIONS AT MILE 28.4 R AND 28.6 R WERE FROM WATER DIVERTED TO THE WEST BORROW PIT FROM BUTTE SLOUGH. THEY ARE INCLUDED IN THE TOTAL DIVERSION TO SUTTER BY-PASS AS LISTED UNDER BUTTE SLOUGH DIVERSIONS → (SEE TABLE 31).
(3) MILEAGE IS GIVEN NORTHERLY OR SOUTHERLY FROM CHANDLER. CHANDLER IS OPPOSITE MILE 9.15 WEST BORROW PIT. PLANTS ARE ON LEFT BANK UNLESS MARKED WITH ASTERISK DENOTING RIGHT BANK.
(4) PLANT IS ON DRAIN CANAL WHICH ENTERS BY-PASS AT THIS POINT.
(5) SERVED JOINTLY BY THIS AND THE OTHER PLANT AT SAME MILEAGE.
(6) SEE OTHER CHRISTENSEN PLANT AT SAME MILEAGE.
(7) NEW INSTALLATION 1932.
(8) MEYER 59, PLATTER 6, MOREHEAD 246, EPERSON AND MIDDLETON 255; ALSO 50 ACRES ON ADJOINING FRY PROPERTY.

TABLE 32 (CONTINUED)

BY-PASS AND DRAINAGE CHANNEL 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	JUN.	JUL.	AUG.	SEP.	OCT.		GENERAL	RICE
SACRAMENTO SLOUGH													
SUTTER BASIN CORPORATION	(1) 0.3 L		PLANT DISMANTLED										
HUGHES AND HOLMES (2)	1.4 R	1-24"	NO DIVERSION										
KNIGHTS LANDING RIDGE CUT													
RUSSELL BROTHERS	(3) 2.3 L	1-12"			12	28					40	(4)	
— RECLAMATION DISTRICT 730 —	DRAINAGE PLANT #2	MILE 3.8											
HERSHEY ESTATE (A.J.DARNEILLE)(5)	4.7 L	1-15"				163	86				249	139	
— WEST LEVEE YOLO BY-PASS —	MILE 6.3												
YOLO BY-PASS (EAST BORROW PIT OR TULE CANAL)													
CONAWAY RANCH (DAN DOYLE) (5)	(6) 4.2 R	1-12"					19	252	158		429	200	
— SACRAMENTO AND WOODLAND RAILROAD CROSSING —		MILE 6.2											
— RECLAMATION DISTRICT 1600 DRAINAGE PLANT —		MILE 10.0											
FRANK FISHER AND HENRY RICH	10.1 R	1-30"		974	1576	1730	2303	2297	1377	168	(7)10425	100	600
— FREMONT WEIR (EAST END) —	MILE 12.3												
BACK BORROW PIT RECLAMATION DISTRICT 1000													
W. F. SANDERCOCK	(8) 0.6 R	1-10"	NO DIVERSION										
— GAGING STATION — MILE 2.1	SEE TABLE 64												
TOTALS — BY-PASS AND DRAINAGE CHANNEL DIVERSIONS													
WEST BORROW PIT OF SUTTER BY-PASS			0	646	1503	1063	776	2096	1040	0	(9) 7124	4147	0
EAST BORROW PIT OF SUTTER BY-PASS			0	874	2103	1741	2064	1575	570	0	8927	616	1100
SACRAMENTO SLOUGH			0	0	0	0	0	0	0	0	0	0	0
KNIGHTS LANDING RIDGE CUT			0	0	12	191	86	0	0	0	289	139	0
YOLO BY-PASS (EAST BORROW PIT OR TULE CANAL)			0	974	1576	1730	2322	2549	1535	168	10854	300	600
BACK BORROW PIT RECLAMATION DISTRICT 1000			0	0	0	0	0	0	0	0	0	0	0
TOTALS			0	2494	5194	4725	5248	6220	3145	168	(9)27194	5202	1700

(1) MILEAGE IS GIVEN EASTERLY FROM DRAINAGE PLANT OF RECLAMATION DISTRICT 1500 WHICH IS AT HEAD OF SLOUGH.
(2) FORMERLY A. R. WAYBUR.
(3) MILEAGE IS GIVEN SOUTHERLY FROM HEAD IN BACK BORROW PIT NEAR KNIGHTS LANDING.
(4) 36 ACRES GENERAL CROPS IRRIGATED UNDER THIS DIVERSION IS INCLUDED IN ACREAGE LISTED FOR SACRAMENTO RIVER PLANT AT MILE 29.2 RIGHT WHICH ALSO SERVED THIS ACREAGE.
(5) NEW INSTALLATION 1932.
(6) MILEAGE IS GIVEN NORTHERLY FROM NORTH LEVEE OF SACRAMENTO BY-PASS.
(7) INCLUDES 1081 ACRE-FEET IN SEPTEMBER AND 168 ACRE-FEET IN OCTOBER PUMPED FOR DREDGE FLOTATION. THE WATER IN THE BORROW PIT AT THIS PLANT WAS MADE UP FROM R.D. 1600 DRAINAGE, CACHE CREEK, AND COLUSA BASIN DRAINAGE DIVERTED SOUTH VIA KNIGHTS LANDING RIDGE CUT PRIMARILY FOR DREDGE FLOTATION IN THE BORROW PIT. ADDITIONAL WATER FROM THIS SOURCE WAS DIVERTED BY GRAVITY TO SUPPLEMENT THE DIVERSION TO 270 ACRES RICE AND 1350 ACRES GENERAL CROPS FROM THE FISHER AND RICH SACRAMENTO RIVER PLANT AT MILE 22.5 RIGHT.
(8) MILEAGE IS GIVEN EASTERLY FROM SACRAMENTO RIVER.
(9) INCLUDES 7124 ACRE-FEET INCLUDED ALSO IN DIVERSIONS LISTED UNDER BUTTE SLOUGH. SEE FOOTNOTE (2) PAGE 52 AND FOOTNOTE (2) PAGE 51.

TABLE 33

FEATHER 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	JUN.	JUL.	AUG.	SEP.	OCT.		GENERAL	RICE
SUTTER BASIN CORPORATION	0.6 R	1-16"			NO	DIVERSION							
PUNTER AND RUTZ	1.55 L	1-6"			NO	DIVERSION							
SUTTER BASIN COMPANY	2.60 R	1-20"											
		1-26"				409	293	766	291		1759	380	
S. A. MC KEEHAN	5.44 L	1-6"			NO	DIVERSION							
J. M. INMAN (STARK BROS.)	6.44 L	1-8"		58	30	44	57	33	55	12	289	50	
M. SCHEIBER	7.7 L	1-8"				45	56	85	79		265	70	
— NICOLAUS GAGING STATION —	MILE 9.3	SEE TABLE 11											
— NICOLAUS BRIDGE —	MILE 9.4												
GEORGE POLLOCK COMPANY	9.75 R	(1) 1-20"		174	741	774	945	938	806	247	4625	675	250
GARDEN HIGHWAY MUTUAL WATER CO.	13.1 R	1-20"										1151	
		1-24"		484	492	746	1104	513	189		3528	(2)	
FEATHER RIVER WATER COMPANY	16.35 R	1-14"	152	156	59	171	308	45			891	301	
PLUMAS MUTUAL WATER COMPANY	17.5 L	1-22"		285	802	1375	1435	1978	1369	882	8126	1600	
G. C. SHANNON	18.75 R	1-6"			44	18	36	50	6		154	58	
ALICIA MUTUAL WATER COMPANY	24.0 L	1-16"											
		1-20"											
		1-26"		671	1944	2078	2429	2177	902	289	10490	1200	800
		(3) 1-30"									(3)		
W. D. BUTLER	25.7 R	1-8"			NO	DIVERSION							
OSWALD WATER DISTRICT (4)	25.7 R	1-16"	297	438	672	593	714	334	8	26	3082	526	
JACKSON DIGGS	27.2 R	1-12"	32	42	74	20	34				202	60	
— MOUTH OF YUBA RIVER —	MILE 27.3												
— YUBA CITY-MARYSVILLE BRIDGE —	MILE 28.0												
J. L. SULLIVAN	33.9 R	1-10"	141	6	111	102	159	25	5		549	160	
SUTTER BUTTE CANAL COMPANY	38.1 R	2-42"											
(SUNSET PLANT) (5)		1-26"			NO	DIVERSION							
PACIFIC HIGHWAY ORCHARDS TRACT	43.7 L(6)	1-18"			NO	DIVERSION							
(CHARLES COTTRELL)	H.SL. 0.4L												

* MILEAGE ALONG RIVER ABOVE MOUTH.
(1) OLD UNITS REMOVED AND 20 INCH UNIT INSTALLED IN 1932.
(2) INCLUDES 255 ACRES OF BROWN AND PURINGTON.
(3) DIVERSION OF 3549 ACRE-FEET PRIOR TO JUNE 12TH WAS THROUGH 30" PUMP ON OLD HIGH WATER CHANNEL.
(4) NEW INSTALLATION 1932.
(5) SEE SUTTER BUTTE CANAL COMPANY DIVERSION AT MILE 58.1 RIGHT.
(6) PLANT DIVERTS FEATHER RIVER WATER BACKED INTO HONCUT SLOUGH. SLOUGH IS TRIBUTARY TO FEATHER RIVER AT MILE 43.7 LEFT. MILEAGE OF PLANT ABOVE MOUTH OF HONCUT SLOUGH IS INDICATED.

TABLE 33 (CONTINUED)

FEATHER 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	JUN.	JUL.	AUG.	SEP.	OCT.		GEN-ERAL	RICE
MOZNETT-WETMORE SUBDIVISION #1 (CHARLES ST. CLAIRE)	43.7 L(1) H.SL.1.2L	1-10"		21	74	91	64	79	37		366	175	
MANUEL A. BARBA	43.7 L(1) H.SL.1.25L	1-8"				13	6	14	1		34	60	
A. P. BARBA (JOHN BETTENCOURT)	47.9 L	1-12"			42	294	190				526	120	
E. F. BIGGS	48.3 L	1-10"					49	85			134	125	
J. F. HARRIGER	51.1 L	1-7"			4	20	11	17			52	40	
EDWARD STEADMAN	51.4 R	1-10"				79	74	63			216	100	
SILVA-BERGTHOLDT	51.6 R	1-5"			12	3					15	10	
BLOWER BROTHERS	52.1 L	1-9"				22	30	43	21		116	100	
C. O. KISTER	52.3 L	1-8"			26	18	34	18	33		129	45	
F. L. MORRIS	52.7 L	1-8"		12	17	6					35	40	
FRANK DUTRA	52.9 R	1-6"		6		18	12	21			57	30	
G. H. BOGUE	53.1 R	1-6"		2	15	43	22	19	18		119	37	
BUDH SINGH	54.7 R	1-8"	48	21	14	39	44	17			183	60	
HEARST ESTATE (SUNICAL PACKING CO.)	55.1 L	1-14"		111	28	109	211	135	139		733	310	
L. A. KISTER	55.5 L	1-8"				48	84	12			144	80	
RIO BONITA RANCH	56.6 R	1-14"			NO	DIVERSION							
J. H. ABBEY	56.8 R	1-8"			NO	DIVERSION							
ALVIN KISTER	57.0 L	1-8"				13	23	2	1		39	67	
J. E. CARRICO	57.0 R	1-8"		13	19	17	18	3			70	35	
HENRY HASELBUSCH	57.9 R	1-10"			11	34	35	30	4		114	72	
EMMA C. EAKLE	58.1 R			PLANT		DISMANTLED							
SUTTER BUTTE CANAL COMPANY	58.1 R(2)	GRAVITY	1240	35512	55925	58531	59445	54101	32878	17158	314790(3)	15808	9647
RICHVALE IRRIGATION DISTRICT	58.1 R(2)	GRAVITY	248	7103	11185	11706	11889	10820	6575	3432	62958(4)	177	7296
WESTERN CANAL COMPANY (5)	59.7 R	GRAVITY		4887	13609	16661	19829	20757	5942	238	81923(5)	393	10115
TOTALS			2158	50002	85950	94140	99640	93180	49359	22284	496713	24115	28108

* MILEAGE ALONG RIVER ABOVE MOUTH.

(1) PLANT DIVERTS FEATHER RIVER WATER BACKED INTO HONCUT SLOUGH. SLOUGH IS TRIBUTARY TO FEATHER RIVER AT MILE 43.7 LEFT. MILEAGE OF PLANT ABOVE MOUTH OF HONCUT SLOUGH IS INDICATED.

(2) THIS IS NOW A COMMON POINT OF DIVERSION FOR SUTTER BUTTE CANAL COMPANY AND RICHVALE IRRIGATION DISTRICT. OWNERSHIP IN THE WATER IS DIVIDED FIVE-SIXTHS TO SUTTER BUTTE CANAL COMPANY AND ONE-SIXTH TO RICHVALE IRRIGATION DISTRICT AND THE TOTAL MEASURED DIVERSION HAS BEEN ARBITRARILY DIVIDED IN THIS RATIO TO GIVE THE DIVERSION FOR EACH AS HERE GIVEN.

(3) ADDITIONAL NOVEMBER DIVERSION, 14500 ACRE-FEET.

(4) ADDITIONAL NOVEMBER DIVERSION, 2890 ACRE-FEET.

(5) IN ADDITION TO DIVERSIONS HERE LISTED THERE WERE DIVERSIONS BY WESTERN CANAL FOR FLOODING PONDS OF DUCK CLUBS IN BUTTE BASIN AS FOLLOWS: (ACRE-FEET) OCTOBER 11,157, NOVEMBER 14836, DECEMBER 8021, TOTAL 34014.

TABLE 34

YUBA 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	JUN.	JUL.	AUG.	SEP.	OCT.		GEN-ERAL	RICE
DAVIS BROTHERS (1)	2.0 L	1-8"			20	59	58	11			148	60	
MARYSVILLE RIVER FARMS COMPANY	2.8 L				NO	DIVERSION							
E. O. RUBKE	3.9 L	1-8"					7				7	5	
DANTONI ORCHARDS	4.2 L				PLANT	DISMANTLED							
WM. M. DINSMORE	4.5 L				PLANT	DISMANTLED							
DANTONI ORCHARS (EARL FRUIT CO.)	5.2 L	1-8"		81	167	78					326	75	
MARYSVILLE RIVER FARMS COMPANY	6.6 L	1-12"				101	116	150	37		404	140	
L. A. PLANTZ (2)	(2)6.8 L	1-10"			NO	DIVERSION							
HALLWOOD IRRIGATION COMPANY AND CORDUA IRRIGATION DISTRICT	11.0 R	GRAVITY		8490	9719	9438	9036	8720	6096	3969	(3)55468	4570 (3)	2615 (3)
W. P. HAMMON	12.3 L	GRAVITY		207	245	297	308	307	238	246	(4) 1848	100	
TOTALS			0	8778	10151	9973	9525	9188	6371	4215	58201	4950	2615

* APPROXIMATE MILEAGE ALONG RIVER ABOVE HIGHWAY CROSSING AT MARYSVILLE.

(1) NEW INSTALLATION 1932.

(2) PREVIOUSLY LISTED AS L. A. PLANT, AT MILE 6.2 LEFT. IN NOVEMBER 1931 THIS PUMP WAS MOVED FROM THAT LOCATION TO MILE 6.8 LEFT.

(3) HALLWOOD IRRIGATION COMPANY AND CORDUA IRRIGATION DISTRICT HAVE A COMMON POINT OF DIVERSION AND COMMON CANAL FOR ABOUT ONE-HALF MILE; DIVERSION AND ACREAGE FIGURES ARE FOR COMBINED PROJECTS. IRRIGATED ACREAGE IS SEGREGATED AS FOLLOWS: HALLWOOD, RICE 1000, GENERAL 4300; CORDUA, RICE 1615, GENERAL 270.

(4) THIS IS A CONTINUOUS GRAVITY DIVERSION. THE WATER IS USED ON AN ORANGE GROVE AND THE SURPLUS IS SPILLED BACK TO THE RIVER.

TABLE 35

AMERICAN RIVER DIVERSIONS

WATER USER	*MILE AND BANK	NUMBER AND SIZE OF PUMP	MONTHLY DIVERSIONS IN ACRE-FEET								TOTAL DIVERSION MARCH TO OCTOBER ACRE-FEET	** TOTAL ACREAGE
			MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.		
JOE CORRY	0.05 R	1-8"			NO	DIVERSION						
G. A. MEISTER	3.2 L	1-10"			NO	DIVERSION						
G. A. MEISTER	3.6 L	1-4"	5	24	3	26	23	15	18	5	119	50
		1-6"										
G. A. MEISTER (H. SUMIDA)	3.8 L	1-6"	6	8	11	6	15	13	6	3	68	38
— GAGING STATION — AMERICAN RIVER AT SACRAMENTO —		MILE 6.0		SEE TABLE 12								
CUTTER BROTHERS	6.8 L	1-5"			7	16			4	2	29	35
S. H. COWELL	7.1 L	1-7"					31	49			80	40
E. CLEMENS HORST	7.5 R	1-8"				21	94				115	40
FRED KING	7.7 R	1-4"			3	17	31	1	9	7	68	25
H. MORITA	7.9 R	1-6"			NO	DIVERSION						
M. T. HARDING	9.0 L	1-6" (1)			NO	DIVERSION						
SIERRA OAKS DAIRY (2)	9.2 R	1-8"			24	61	160	115	32	29	421	90
ROY K. MIURA (3)	9.2 L	1-8"	27	88		10		45	41	28	239	120
C. E. WELLS	9.45 L	1-5"			NO	DIVERSION						
C. E. WELLS	9.5 L	1-8"			NO	DIVERSION						
C. E. WELLS	9.55 L	1-5"			NO	DIVERSION						
HENRY COWELL	9.9 L	1-5"			NO	DIVERSION						
GIBBENS AND RICHARDSON	10.2 R	1-8"			NO	DIVERSION						
GUY H. RODDAN (4)	10.3 L	1-10"			24	23	29		18	4	98	35
G. E. ALLEN (5)	10.4 R	1-5"				28	18				46	53
DEL PASO HOP COMPANY	10.5 R	1-8"				47	3	11		10	71	30
ANNIE HOEY	11.2 L	1-6"			NO	DIVERSION						
J. T. GORE ESTATE	11.5 L	1-6"			NO	DIVERSION						
WM. A. MEYER	11.7 L	1-4"		3	12	11	14		5	5	50	29
HARRY NAKATOMI	11.7 L	1-5"			NO	DIVERSION						
H. T. DANIELSON	13.1 R	1-5"	1	7	12	5	23	13	4	2	67	(6) 18
P. OSTERLE	13.2 R	1-6"						70			70	20
MARY DETERDING	13.9 R	1-6"			NO	DIVERSION						
MARY DETERDING	15.1 R	1-6"			NO	DIVERSION						
CARMICHAEL IRRIGATION DISTRICT	16.0 R	1-12"										
		1-8"		260	502	845	876	829	419	206	(7) 3937	2520
		1-6"										
WILLIAM H. DEVLIN	17.1 R	1-6"										
		1-1¼"						3			3	(8) 22
— FAIR OAKS GAGING STATION —	MILE 19.2											
TOTALS			39	390	598	1116	1317	1164	556	301	5481	3165

* MILEAGE ALONG RIVER ABOVE MOUTH.
** ALL GENERAL CROPS. NO RICE.
(1) PREVIOUSLY LISTED AS 8 INCH.
(2) FORMERLY EDWARD MORININI.
(3) FORMERLY A. F. COUNSMAN.
(4) FORMERLY R. S. AND W. C. SEYDEL.
(5) FORMERLY E. H. GERBER.
(6) INCLUDES 6 ACRES OF C. H. DAVIS, ADJOINING.
(7) FLOW RECORDER INSTALLED ON DISCHARGE LINE SEPTEMBER 1ST. DIVERSIONS PREVIOUSLY COMPUTED FROM POWER CONSUMPTION, HEAD AND PLANT EFFICIENCY TESTS BUT WITH UNKNOWN REDUCTION IN EFFICIENCY DUE TO MAINTENANCE OF PIPE LINE PRESSURE WITH OUTLETS VARIOUSLY THROTTLED.
(8) ADDITIONAL WATER FOR THIS ACREAGE OBTAINED FROM FAIROAKS WATER COMPANY.

TABLE 36

DELTA UPLANDS DIVERSIONS FROM CACHE SLOUGH

WATER USER	LOCATION	NUMBER AND SIZE OF PUMP	MONTHLY DIVERSIONS IN ACRE-FEET								TOTAL DIVERSION MARCH TO OCTOBER ACRE-FEET	** ACREAGE IRRIGATED
			MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.		
RECLAMATION DISTRICT NO. 2068	SW¼ NE¼ SEC. 34 T 6 N R 1 E	1-36" 1-30"	334	964	1655	1928	1744	1764	1400	1305	11094	3715

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TABLE 37

DELTA UPLANDS DIVERSIONS FROM OLD SAN JOAQUIN RIVER

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	JUN.	JUL.	AUG.	SEP.	OCT.		
EAST CONTRA COSTA IRRIGATION DISTRICT	36.5 L (1)	2-30" 1-24" 1-18"	184	968	4307	3740	3498	3032	2378	1402	19509	10615
BYRON-BETHANY IRRIGATION DIST.	40.9 L (2)	1-30" 1-26"	112	1076	2199	2114	2019	1903	1346	384	11153	8150
JOE SANTOS (3)	44.6L(4)	1-7"			NO	DIVERS		ION				
E. H. STEVENSON	45.3 L	1-12"			23		9	7			39	30
H. LINDEMAN	47.2 L	1-12"			39	66	74	21			200	90
A. F. NOONIS	47.2 L	1-10"			NO	DIVERS		ION				
WEST SIDE IRRIGATION DISTRICT	(5)47.65 L	7-15"		2477	1620	1857	2734	1966	872	318	11844	6039
N. E. AND JOHN WELTY (T.B.SILVA)	48.7 L	1-8"		28	5	29	23	27	36		148	60
NAGLEE-BURKE IRRIGATION DIST.	50.4 L	1-16" 1-18"		676	835	1078	1029	1029	838	508	5993	2170
FREMONT IRRIGATION ASSOCIATION	50.9 L	1-14"		173	257	358	384	323	211	4	1710	636
ATTILIO CASSERINI	51.2 L	1-8"		14		16		13	12		55	36
LABRUCHERIE & CORBARI (6)	52.4 L	1-10"		48	33	85	33	58	25	20	302	116
— TOM PAINE SLOUGH — MILE 54.3												
TOTALS			296	5460	9318	9343	9803	8379	5718	2636	50953	27942

* DISTANCE ALONG THE RIVER FROM ITS MOUTH FOUR AND ONE-HALF MILES BELOW ANTIOCH. MILEAGE AS ESTABLISHED BY WAR DEPARTMENT SURVEY OF 1913-15.

** ALL GENERAL CROPS. NO RICE.

(1) TO JUNCTION OF OLD RIVER AND INDIAN SLOUGH. PUMPING PLANT IS LOCATED TWO AND ONE-HALF MILES WEST ALONG INDIAN SLOUGH.

(2) TO JUNCTION OF OLD RIVER AND ITALIAN SLOUGH. PUMPING PLANT IS LOCATED TWO AND THREE-FOURTHS MILES SOUTHWEST ALONG ITALIAN SLOUGH AND EXTENSION CUT.

(3) FORMERLY JOE F. COSTA.

(4) PLANT IS ON CUT WHICH JOINS RIVER AT MILE 44.6 LEFT.

(5) TO JUNCTION OF OLD RIVER WITH INTAKE CUT. PUMPING PLANT IS LOCATED ONE MILE SOUTH ALONG INTAKE CUT.

(6) FORMERLY LABRUCHERIE-PLATTI AND SMALLPAGE.

TABLE 38

DELTA UPLANDS DIVERSIONS FROM TOM PAINE SLOUGH

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	JUN.	JUL.	AUG.	SEP.	OCT.		
STINSON ESTATE COMPANY	0.7 S	2-18"		105	163	155	199	236	128	49	1035	(1)1850
STINSON ESTATE COMPANY	1.2 S	1-18"		17						122	(2) 139	(2)
HOLLY WESTERN SUGAR COMPANY	2.1 S(3)	1-12"					160	160	154	160	(4) 634	INDUSTRIAL
TRACY CLOVER IRRIGATION DIST.	2.1 S(3)	1-16"	67	122	230	188	175	294	320	60	1456	565
CALIFORNIA IRRIGATED FARMS CO.												
PLANT NUMBER 1	2.9 S	1-12"		102	5	97	54	93	59	8	418	(5)2625
PLANT NUMBER 3	6.3 S	1-24"(6)		1236	319	1185	1011	1016	1006	361	6134	(7)
PLANT NUMBER 5	8.3 S	1-12"		123	180	158	240	169	140	15	1025	(7)
PLANT NUMBER 5A	9.0 S	1-12"		104	29	100	113	100	87		533	(7)
TOTALS			67	1809	926	1883	1952	2068	1894	775	11374	5040

* 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).
** ALL GENERAL CROPS. NO RICE.
(1) THIS IS THE TOTAL ACREAGE IRRIGATED FROM THIS PLANT AND THAT AT MILE 1.2 S AND INCLUDES 950 ACRES IRRIGATED ALSO BY WASTE WATER FROM HOLLY WESTERN SUGAR COMPANY, MILE 2.1 S.
(2) SEE PLANT AT MILE 0.7 S FOR ACREAGE IRRIGATED AND ADDITIONAL WATER DIVERTED.
(3) TO JUNCTION OF TOM PAINE SLOUGH AND DREDGER CUT. PUMPING PLANT IS LOCATED 1½ MILES SOUTH ALONG DREDGER CUT.
(4) THIS WATER WAS REUSED BY STINSON ESTATE TO IRRIGATE 950 ACRES SERVED ALSO FROM STINSON PLANTS. SEE MILE 0.7 S.
(5) THIS IS THE TOTAL UPLANDS AREA (SOUTH OF TOM PAINE SLOUGH) IRRIGATED FROM ALL CALIFORNIA IRRIGATED FARMS COMPANY PLANTS ON TOM PAINE SLOUGH.
(6) PREVIOUSLY LISTED AS 20 INCH.
(7) SEE PLANT AT MILE 2.9 S.

TABLE 39

DELTA UPLANDS DIVERSIONS FROM SAN JOAQUIN RIVER

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	JUN.	JUL.	AUG.	SEP.	OCT.		
— GARWOOD BRIDGE — MILE 45.3												
PAUL WESTON	46.3 R	1-12"		38	238	170	83	12	11		552	215
AUGUST EISELE	47.2 R	1-5"				1.3	1.3	1.5			4.1	3
WOLFINGER BROTHERS	47.3 R	1-10"			NO	DIVERSION						
JOHN HAACK	47.7 R	1-4"			NO	DIVERSION						
JOHN HAACK	48.0 R	1-12"	2	7	68	19	18	526	25	20	685	170
H. G. LEARNED	48.3 R	1-4"		4	7	6	11	12	6	3	49	15
WALDO ROHNERT (1)	48.5 R	1-6"	5	29	40	45	26	30	13	9	197	60
I. YOSHIDA	48.5 R	1-3½"		5	3	1		13	8	4	34	7
FRANK PICCARDO	48.6 R	1-6"	10	21	18	22	21	20	19	9	140	70
G. ACCINELLI	48.7 R	1-5"		24	14	33	10	3	3	2	89	55
M. O. COUPER (M. MATSUMOTO)	49.0 R	1-5"			NO	DIVERSION						
METTLER, CROSS AND DRURY (S. B. CHAPMAN)	49.5 R	1-14"			38	33	26	36	20		153	100
A. A. RODGERS	50.1 R	1-10"			NO	DIVERSION						
— BRANDT BRIDGE — MILE 50.2												
FRANK REICHMUTH (2)	50.4 R	1-8"		31	26	44	33	42	56	27	259	78
JOHN BRANDT	50.5 R	1-6"			NO	DIVERSION						
JOHN BRANDT	50.8 R	1-6" (3)		3	26	28	21	18	10	7	113	28
CALIFORNIA LANDS, INC. (4)	53.2 R (5)	1-12"			62	44	25	42	40		213	100
F. DE LIMA	53.4 R	1-8"	3	16	15	18	14	6	8		80	33
M. DOS REIS	53.7 R	1-12"		88	228	166	180	215	91	32	1000	520
W. C. FRANK	54.9 R	1-10"			NO	DIVERSION						
— JUNCTION WITH MIDDLE RIVER — MILE 56.2												
OAKWOOD STOCK FARM	57.0 R	1-14"		215	114	165	168	132	142		936	130
S. MAURO	57.2 R	1-5"			NO	DIVERSION						

* DISTANCE ALONG SAN JOAQUIN RIVER FROM ITS MOUTH FOUR AND ONE-HALF MILES BELOW ANTIOCH. (MILEAGE AS ESTABLISHED BY WAR DEPARTMENT SURVEY OF 1913-15.)

** ALL GENERAL CROPS. NO RICE.

(1) FORMERLY JOE CALCAGNO.

(2) FORMERLY N. LAGLER AND JOE REICHMUTH.

(3) REPLACES FORMER 10 INCH UNIT.

(4) FORMERLY B. C. LEAL.

(5) CORRECTED MILEAGE - FORMERLY LISTED AS 53.5 RIGHT.

TABLE 39 (CONTINUED)

DELTA UPLANDS DIVERSIONS FROM SAN JOAQUIN RIVER

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	JUN.	JUL.	AUG.	SEP.	OCT.		
T. J. DUTNALL (1)	57.3 R	1-3"			1.6	0.8	1.0	0.4	0.4		4.2	3
A. J. THOMPSON	57.3 R	1-5"			1		4	8	4		17	(2) 11
G. GARDELLA COMPANY	57.5 R	1-4"	8	11	6	7	5	4	3		44	(3) 10
V. SANGUENETTI	58.4 R	1-2½"		2.1	4.4	1.8	3.1	3.7	1.1		16.2	15
G. B. FIGARI (G. ALFIERI)	58.6 R	1-3"		0.6	0.7	1.7	1.2	2.7	0.5		7.4	5
R. MAURO	58.7 R	1-4"		0.5	0.6	1.3	1.6	1.5	0.2		5.7	5
— MOSSDALE BRIDGE — MILE 58.9	RECORDING GAGE											
C. C. ABERSOLD	59.2 R	1-6"			NO	DIVERSION						
H. A. NIESTRATH (JOSEPH EGGER)	59.3 R	1-14"	44	58		85	90	73	116		466	110
— JUNCTION WITH PARADISE CUT —	PARADISE DAM MILE 62.2											
BANTA CARBONA IRRIGATION DIST.	67.5 L	1-36" 3-24" 2-20"	1380	7381	4216	3968	8505	5761	3496	1458	36165 (4)	15424 (5)
MC MULLIN ESTATE	71.0 R	1-16"		324	593	110	572	223	147	52	2021	1581
MORTENSEN-ANDERSON AND WHITMAN	73.2 R	1-12"		261	47	162	152	164	145	81	1012	(6) 340
— U. S. G. S. GAGING STATION —	"SAN JOAQUIN RIVER NEAR VERNALIS" MILE 76.7 SEE TABLE 16											
TOTALS			1452	8519	5767	5133	9972	7349	4365	1704	44263	19008

* DISTANCE ALONG SAN JOAQUIN RIVER FROM ITS MOUTH FOUR AND ONE-HALF MILES BELOW ANITOCH. (MILEAGE AS ESTABLISHED BY WAR DEPARTMENT SURVEY OF 1913-15.)

** ALL GENERAL CROPS. NO RICE.

(1) NEW INSTALLATION IN 1932.

(2) INCLUDES 4 ACRES ON ADJOINING GARDELLA PROPERTY. SEE MILE 57.5 RIGHT.

(3) 4 ACRES ADDITIONAL IRRIGATED FROM THOMPSON PLANT AT MILE 57.3 RIGHT.

(4) 354 ACRE-FEET ADDITIONAL DIVERTED IN NOVEMBER.

(5) INCLUDES 1523 ACRES OUTSIDE OF DISTRICT BOUNDARIES, OF WHICH 379 ACRES WERE IN KASSON DISTRICT.

(6) MORTENSEN 160, ANDERSON 125, AND WHITMAN 55.

TABLE 40

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	JUN.	JUL.	AUG.	SEP.	OCT.		GEN-ERAL	RICE
— U.S.G.S. GAGING STATION "SAN JOAQUIN RIVER NEAR VERNALIS" — MILE 0.0 SEE TABLE 16													
RIVER JUNCTION FARMS CO. NO. 2	2.4 R	1-14"			NO	DIVERSION							
— STANISLAUS RIVER — MILE 3.0 SEE TABLE 25													
VERNALIS INVESTMENT COMPANY	5.25 L	3-12"	170	428	414	462	583	595	494	391	3537	1000	
EL SOLYO RANCH	5.35 L	3-18"											
		1-12"	1139	1738	1584	1069	2033	1943	1424	1562	12492	3324	
— TUOLUMNE RIVER — MILE 14.3 SEE TABLE 23													
WEST STANISLAUS IRRIGATION DIST.	15.1 L	3-26"	1904	7581	4095	2787	5736	5382	3255	2726	(1)33466	(2)2096	
WHITE LAKE RANCH NO. 1	(3) 15.1 L	1-6"			NO	DIVERSION							
WHITE LAKE RANCH NO. 2	(3) 15.1 L	1-8"			NO	DIVERSION							
WHITE LAKE RANCH NO. 3	(3) 15.1 L	1-8"	20	39	7		135	200	135	161	(4) 697	43	
— LAIRD SLOUGH BRIDGE — MILE 19.35 SEE TABLE 15													
CHARLES MOREING	22.2 L	1-16"		47	170	98	125	157	32	6	635	146	
PATTERSON WATER COMPANY (5)	27.7 L	4-26"											
		1-18"		6218	3914	6462	5883	5655	5633		33765	13500	
		1-14"											
WISNOM AND ROSS (C.C. JONES)(6)	27.8 R	1-10"	15	83	31	46	85	123	14		397	165	
MORTGAGE GUARANTEE COMPANY (7)	29.8 R	1-10"	25	3							28	120	
PATTERSON RANCH COMPANY	33.1 L	2-16"	103	420	543	589	702	672	474	181	3684	810	80
E. USTICK	OPP. 34.2 R			PLANT		DISMANTLED							
E. USTICK	35.85 R	1-12"	37	20	48	36	34	59	57	9	300	80	
— CROWS LANDING BRIDGE — MILE 36.7													
JAMES J. JOHNSON	36.8 R	1-10"			NO	DIVERSION							
A. J. SILVIERA	37.15 R	1-6"			5						5	25	
A. J. SILVIERA	37.65 R	1-7"	7	8	1	13	27	24	26	7	113	25	
NELSON BROTHERS	38.25 R	1-10"	20	20	20		20	20	20	10	130	24	
L. B. AND E. M. CROW (M. S. CATRINA)	39.35 L	1-6"	10	23	61	115	83	53	23	18	386	190	
OSCAR HOGAN	39.75 R	1-12"	60	117	125	125	125	103	40	20	715	165	
— U.S.G.S. GAGING STATION "SAN JOAQUIN RIVER NEAR NEWMAN" — MILE 47.0 SEE TABLE 14													
— MERCED RIVER — MILE 47.05 SEE TABLE 18													
— TURNER RANCH BRIDGE GAGING STATION — MILE 82.0 (8)													
TOTALS			3510	16745	11018	11802	15571	(9) 14886	(9) 11562	(9) 5010	(9) 90104	39813	80

* MILEAGE ALONG RIVER ABOVE DURHAM FERRY BRIDGE (U.S.G.S. GAGING STATION "SAN JOAQUIN RIVER NEAR VERNALIS").

(1) ADDITIONAL WATER WAS DIVERTED AS FOLLOWS: (ACRE-FEET) FEBRUARY 437; NOVEMBER 576; DECEMBER 36.

(2) INCLUDES 13410 ACRES OF GRAIN LAND.

(3) PUMP ON CUT LEADING TO WEST STANISLAUS IRRIGATION DISTRICT PLANT.

(4) APPROXIMATELY ONE-HALF OF THE DIVERSION ESTIMATED TO HAVE BEEN SPILLED BACK TO SLOUGH. FOR TOTALS AND RETURN WATER COMPUTATIONS NET DIVERSIONS WERE ASSUMED AS FOLLOWS: AUGUST 100, SEPTEMBER 70, OCTOBER 80.

(5) PREVIOUSLY REPORTED AS PATTERSON COLONY.

(6) FORMERLY SARAH J. RIDGES.

(7) PLANT INSTALLED IN FEBRUARY 1931 BUT NOT LISTED IN THAT YEAR. 300 ACRES OF GENERAL CROPS REPORTED TO HAVE BEEN IRRIGATED IN 1931.

(8) PREVIOUSLY LISTED AS "SAN LUIS RANCH GAGE" AT MILE 80.7. MILEAGE CORRECTED TO 82.0 (GAGE LOCATION NOT CHANGED).

(9) SEE FOOTNOTE FOR WHITE LAKE RANCH PLANT #3 MILE 15.1 L.

TABLE 41

MERCED 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	JUN.	JUL.	AUG.	SEP.	OCT.		
— MERCED RIVER GAGING STATION "MERCED RIVER NEAR MOUTH"					MILE 1.1	SEE TABLE 18						
STEVINSON CORPORATION	2.2 R	1-15"			NO	DIVERSION						
STEVINSON WATER DISTRICT (1)	3.8 R	1-15"	55	124	194	278	534	385	329	157	2056	460
FLOYD STEVINSON	4.0 L	1-8"	1	6	8						15	2
J. F. PECK	6.1 L	1-18"			NO	DIVERSION						
STEVINSON WATER DISTRICT (2)	6.25 L	1-6"			NO	DIVERSION						
STEVINSON WATER DISTRICT (1)	6.55 L	1-15"		17	17	13	30	3			80	30
FRANCIS HARTMAN	8.5 L	1-12"		42	77	64	43	40	18	3	287	85
MARY COLLIER	8.85 L	1-15"				25	36	28	16		105	60
GRACE MC CULLAGH	9.4 L	1-10"	84	161	185	287	250	228	162	42	1399	185
J. R. ADAMS & J. B. SILVA (3)	10.35 L	1-10"	61	160	270	384	310	249	220	90	1744	400
W. D. ADAMS	10.85 L	1-12"	113	258	322	352	370	381	357	214	2367	403
C. G. MC LAUGHLIN	11.4 L	1-6"	10	19	9		17	25	16	9	105	23
H. F. MILLIKEN (DAN PARROS) (4)	11.6 L	(4) 1-10"				11	37	52	34	4	138	100
J. REGELLO (5)	11.6 L	(5) 1-12"	29	79	103	94	97	103	84	34	623	80
— NEW MILLIKEN BRIDGE —	MILE 11.65											
BETTENCOURT, NEVES & AZEVEDO	12.85 L	1-10"	29	90	148	169	200	187	118	27	968	259
CALIFORNIA LANDS, INCORPORATED	16.5 L	1-12"	32	49	41	65	53	48	58	23	369	90
MERCED RIVER FARM COMPANY (6)	17.05 L	1-6"	3	4	11	10	11	5	5	3	52	18
— U.S.G.S. GAGING STATION "MERCED RIVER NEAR LIVINGSTON"					MILE 17.1							
R. G. WOODWARD (7)	17.3 L	1-6"						1		1	2	5
FRED GRIFFITH	17.7 L	1-5"			5	2	4	4	3	3	21	8
J. A. SHIELDS	18.2 L	1-6"				3	5	3	2	1	14	11
J. A. MC DONOUGH (7)	19.2 L	1-6"	3	10	10	10	10	10	10	5	68	10
JOHN REININGHAUS (8)	20.4 L	1-6"	8	17	21	36	48	48	35		213	(9) 90

* MILEAGE ALONG RIVER ABOVE MOUTH.
** ALL GENERAL CROPS. NO RICE.
(1) FORMERLY STEVINSON CORPORATION.
(2) PLANT INSTALLED IN 1927 BUT NO RECORD OF OPERATION PREVIOUS TO 1932 HAS BEEN REPORTED.
(3) FORMERLY J. R. ADAMS.
(4) THE 12" UNIT FORMERLY REPORTED UNDER THIS OWNERSHIP IS NOW SEPARATELY OPERATED BY J. REGALLO.
(5) NOT A NEW INSTALLATION. SEE FOOTNOTE UNDER H. F. MILLIKEN.
(6) FORMERLY LISTED AS MERCED RIVERSIDE FARM COMPANY.
(7) PLANT INSTALLED IN 1926 BUT NO OPERATION RECORD KEPT PRIOR TO 1932.
(8) FORMERLY SCOTT HUGHES.
(9) ADDITIONAL WATER FOR THIS ACREAGE WAS OBTAINED FROM A FIVE INCH WELL PUMP.

TABLE 41 (CONTINUED)

MERCED 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	JUN.	JUL.	AUG.	SEP.	OCT.		
— SOUTHERN PACIFIC RAILROAD (MAIN LINE)	MILE 21.05											
WM. COLLIER (CABRALL & COMPANY)	22.0 R	1-6"			15	15	15	15	15	15	90	27
WM. COLLIER (CABRALL & COMPANY)	22.2 R	1-12"					54	136	103	20	313	160
M. MC CONNELL (VEIERA & SANTOS)	(1) 23.7 L	1-5"			NO	DIVERSION						
M. MC CONNELL (VEIERA & SANTOS)	(2) 24.7 L	1-5"		5	5	6	6	5	5		32	10
M. MC CONNELL (VEIERA & SANTOS)	24.9 L	1-6"		6	7	7	7	7	7	6	47	30
LINEHERS COMPANY	25.75 R	1-10"			NO	DIVERSION						
RIVER FARMS ASSOCIATION (3)	26.3 R	1-8"		17	153	79	99	63	22	5	438	84
C. A. LAUGHLIN	26.55 R	1-6"		17	30	36	32	9			124	20
— SANTA FE RAILROAD —	MILE 27.05											
W. MAGUNSON (4)	27.6 L	1-10"			NO	DIVERSION						
Y. TANABE	27.95 R	1-6"	5	11	6	1		4	8	5	40	20
G. H. LOVELY	28.4 R	1-4"	4	9	8	2					23	20
J. CAMPADONCIA	28.6 R	1-6"	3	8	8	4	5	8	10	6	52	15
R. K. KYNASTON (A.L.MC CORMACK)	28.85 R	(5) 1-8"	19	40	36	47	35	18	16	4	215	50
C. L. MEHRTON	29.1 R	1-7"	3	7	7	1	7	15	11	7	58	20
TONY DEMCHILLI (6)	29.75 R	1-6"		4	14	17	15	9	5		64	24
AMERICAN NATIONAL TRUST CO. (7)	29.9 R	1-6"	5	12	12	6	2	1	2	1	41	34
AMERICAN NATIONAL TRUST CO. (7)	30.95 R	1-12"			NO	DIVERSION						
AMERICAN NATIONAL TRUST CO. (8)	31.7 R	1-8"			NO	DIVERSION						
— SOUTHERN PACIFIC RAILROAD OAKDALE BRANCH —			MILE 32.52									
L. RUSCONI	33.55 R	1-7"	52	139	48	191	174	157	78	10	849	170
C. P. STOUT	39.2 L	1-24"	5	23	38	46	33	45	38	16	244	50
— GAGING STATION "MERCED RIVER AT YOSEMITE VALLEY RAILROAD CROSSING"						MILE 42.1		SEE TABLE 17				
TOTALS			524	1334	1808	2261	2539	2292	1787	711	13256	3299

* MILEAGE ALONG RIVER ABOVE MOUTH.
** ALL GENERAL CROPS. NO RICE.
(1) PLANT INSTALLED PRIOR TO 1928 AND SUBSEQUENTLY OPERATED EACH SEASON EXCEPT 1932, BUT NO OPERATION RECORD KEPT.
(2) PLANT INSTALLED IN 1930 BUT NO OPERATION RECORD KEPT PRIOR TO 1932.
(3) FORMERLY STATE LAND SETTLEMENT (DELHI).
(4) FORMERLY N. K. SCHMIDT.
(5) PREVIOUSLY LISTED AS LO" PUMP.
(6) FORMERLY J. G. STRONG.
(7) FORMERLY CARAGLIO AND FIRPO.
(8) FORMERLY JOHN CARAGLIO.

TABLE 42

DRY CREEK 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	JUN.	JUL.	AUG.	SEP.	OCT.		
— MODESTO EMPIRE BRIDGE — MILE 0.75												
WM. BASSO	2.55 L	1-5"			1.9			1.2	1.3		4.4	5
— GAGING STATION "DRY CREEK NEAR MODESTO" — MILE 2.60 SEE TABLE 20												
H. D. MOTHERSELL (1)	2.9 R	1-4"				2.0		1.0	0.5		3.5	3
C. AYER	3.25 L	1-4"			0.1	0.3	0.3	0.6	0.9		2.2	3
JOHN HANSBROUGH (2)	3.8 L	1-6"			1	3	7	5	3	1	20	15
MERRILL HOBORN (3)	4.2 R	1-5"			6	8	12	14	9	4	53	29
W. H. HOWELL	5.0 L	1-6"	2	1	2	5	5	4	1		20	20
L. C. COLLINS (4)	5.3 L	1-5"	1	1	1	3	2	3	1	1	13	14
— SANTA FE RAILROAD — MILE 6.1												
A. J. STURTEVANT JR.	6.35 L	1-6"		PLANT ABANDONED								
— NEW HOPE SCHOOL CROSSING — MILE 10.6												
J. S. TULLY	14.15 R	1-6"			NO DIVERSION							
— SOUTHERN PACIFIC RAILROAD (OAKDALE BRANCH) — MILE 16.35												
— GAGING STATION "DRY CREEK AT OLD WATERFORD BRIDGE" — MILE 16.9 SEE TABLE 19												
TOTALS			3	2	12	21	26	29	17	6	116	89

* MILEAGE ALONG CREEK ABOVE JUNCTION WITH TUOLUMNE RIVER.
** GENERAL CROPS. NO RICE.
(1) FORMERLY W. A. YOUNG.
(2) PLANT INSTALLED IN 1926 BUT NO RECORD OF OPERATION PRIOR TO 1932.
(3) PLANT INSTALLED BEFORE 1932 BUT NO RECORD OF OPERATION OBTAINED PRIOR TO THAT YEAR.
(4) FORMERLY J. R. MILLS.

TABLE 43

TUOLUMNE 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	JUN.	JUL.	AUG.	SEP.	OCT.		
JOHN CALDWELL	1.8 R	1-10"		54	66	31	73	20			244	40
J. M. DE SOUZA	2.2 R	1-6"	9	12	15	10	15	19	21	14	115	30
E. B. HENRY	3.1 R	(1) 1-8"		36	21	23	20	28	15	18	161	31
— GAGING STATION "TUOLUMNE RIVER AT TUOLUMNE CITY"			MILE 3.35		SEE TABLE 23							
BANCROFT FRUIT FARM	4.1 R	1-10"		17	1	22	27	15	7	1	90	12
BANCROFT FRUIT FARM	5.0 R	1-10"		4	46	50	71	77	22	26	296	160
RANDOLPH MARKETING COMPANY	7.1 R	1-10"	20	54	59	63	113	80	42	10	441	200
W. F. DUFFY	8.4 R	1-10"	8	48	37	69	101	78	63	19	423	130
JAMES BERRYHILL	13.0 L	1-6"			NO	DIVERSION						
JAMES BERRYHILL	13.6 L	1-6"			NO	DIVERSION						
— SOUTHERN PACIFIC RAILROAD (MAIN LINE) —			MILE 15.8									
— SANTA FE RAILROAD —	MILE 21.6											
— SOUTHERN PACIFIC RAILROAD (OAKDALE BRANCH)			MILE 31.5									
— GAGING STATION "TUOLUMNE RIVER AT HICKMAN BRIDGE" —				MILE 31.7		SEE TABLE 22						
GEORGE H. SAWYER	39.8 L	1-6"		9	15	13	18	14	11	7	87	50
A. J. JAMIESON					NO	DIVERSION						
— GAGING STATION "TUOLUMNE RIVER AT ROBERTS FERRY BRIDGE" —				MILE 39.9		SEE TABLE 21						
TOTALS			37	234	260	281	438	331	181	95	1857	653

* MILEAGE ALONG RIVER ABOVE MOUTH.
** GENERAL CROPS. NO RICE.
(1) REPLACES FORMER 6" UNIT.

TABLE 44

STANISLAUS 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	JUN.	JUL.	AUG.	SEP.	OCT.		
— GAGING STATION "STANISLAUS RIVER AT HATMARK RANCH" —				MILE 5.24		SEE TABLE 25						
HATMARK RANCH (1)	5.25 L	2-14"		75	12	89	75	52	31		334	75
BRET HARTE WATER USERS ASSN. (2)	5.9 R	1-20"		419	596	906	897	768	530	173	4289	1000
MC MULLIN RECLAMATION DIST. 2075	5.95 R	2-16"	254	370	491	535	328	460	381	132	2951	781
HENRY PELUCCA	6.7 L	1-15"		21	28	24	27	18	22	9	149	31
S. M. UPDIKE	7.4 L	1-10"			NO	DIVERSION						
S. M. UPDIKE	8.2 L	1-12"		8	73	6	5	64	10		166	60
D. F. KOETITZ	10.1 L	(3) 2-10"	20	24	44	58	51	36	37	15	285	100
D. F. KOETITZ	10.4 L	1-18"			NO	DIVERSION						
— SOUTHERN PACIFIC RAILROAD (MAIN LINE) —		MILE 15.9										
BUCKS RANCH (4)	18.5 R	1-12"				37	38	38	37	38	188	75
G. R. STODDARD	19.9 L	1-7"				11	17	10	7	2	47	35
PALO ALTO COMPANY (5)	20.75 R	1-14"	93	175	241	258	268	166	114	88	1403	230
HEATH RANCH (6)	21.25 L	1-4"	15	6	1	18	22	20	16	5	103	18
EARL FRUIT COMPANY (7)	21.75 R	1-8"	46	41	33	35	32	22	11		220	87
T. K. BAIRD ESTATE (FINNEY RANCH) (7)	27.0 L	1-6"	3	3	10	17	20	24	20	9	106	30
— MODESTO-ESCALON BRIDGE —	MILE 28.15											
— SANTA FE RAILROAD —	MILE 31.85											
— SOUTHERN PACIFIC RAILROAD (OAKDALE BRANCH) —				MILE 39.0								
— GAGING STATION "STANISLAUS RIVER AT ORANGE BLOSSOM BRIDGE" —					MILE 44.7		SEE TABLE 24					
TOTALS			431	1142	1529	1994	1780	1678	1216	471	10241	2522

* MILEAGE ALONG RIVER ABOVE MOUTH.
** GENERAL CROPS. NO RICE.
(1) FORMERLY ELLIOT RANCH.
(2) FORMERLY RIVER JUNCTION FARMS.
(3) A 10" GASOLINE OPERATED PUMP WAS INSTALLED TEMPORARILY TO SECURE ADDITIONAL WATER IN MAY.
(4) THIS PLANT REPORTED TO HAVE BEEN IN USE FOR SEVERAL YEARS BUT NO OPERATION RECORD KEPT PRIOR TO 1932.
(5) FORMERLY PALO ALTO STOCK FARM.
(6) PLANT INSTALLED IN 1929 BUT NO OPERATION RECORD KEPT PRIOR TO 1932.
(7) PLANT INSTALLED PRIOR TO 1932 BUT NO PREVIOUS OPERATION RECORD HAS BEEN KEPT.

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 46 lists these channels in downstream order and gives the total flow as computed from the measurements.

Between Colusa and Red Bluff there are no large well defined return channels. Records or estimates of all 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 a return from the irrigation of the Anderson-Cottonwood Irrigation District.

Return Flow from other than Sacramento River Sources

In the water returned to the Sacramento River as included in Table 46 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 from Feather River irrigation.

Relation of Sacramento Return Water to Irrigation Draft

Tables 47 and 48 record the Sacramento River return water, June to September, inclusive, 1932, and indicate the relation between the return and the diversions from which it is derived. The high figure of 77 per cent for the June return flow (Table 48) probably indicates that in that month there was still considerable natural local run-off, drainage from

Winter and Spring groundwater storage, etc. For this reason, Table 48-A giving only the figures for July to September, inclusive, may indicate more correctly the draft-return water relation in the 1932 season. Since, in Tables 47 and 48, it is the purpose to show the return water from Sacramento River diversions only, the inflow from Butte Slough, East Borrow Pit of Sutter By-Pass, Back Borrow Pit of Reclamation District 1000 and from the Feather and American Rivers has been excluded. In Table 47 is shown the relation to the diversions of that return water only which was measured at the well defined channels. With the records available for the discharge of the Sacramento River at Red Bluff, Butte City, Colusa, Wilkins Slough, Knights Landing, and Verona and all diversions between these points recorded, as well as the Feather River and other well defined inflows, it is possible to compute what should represent the total water returned to the river between each of these points, including not only the flow in the definite channels which were measured, but all seepage, groundwater return, etc., which could not be directly measured. The figures for the return water computed in this manner and the relation of this return to the draft are shown in Tables 48 and 48-A. It should be noted, however, that the 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 accretations is not susceptible of computation in the manner outlined because of the fact that no record of flow actually measured at Sacramento is available.

A comparison of the data of Tables 47 and 48-A for the period July to September, inclusive, shows that seepage, groundwater return, etc., which could not be directly measured, amounted to 16 per cent

of the irrigation draft, while the direct return measured in definite channels totalled 31 per cent of the draft. The total return in this period amounted to 47 per cent of the draft. A comparison of the accumulated return water and the accumulated irrigation draft, in downstream order, Red Bluff to Sacramento, for the period July to September, inclusive, 1932, is shown on Plate 1. This shows also, the average discharge, inflow and draft for the period at all points in this stretch of the river. The return water line is plotted from the data of Table 48-A.

Draft-Return Water Relation for Particular Sacramento Valley Areas

In the Sacramento Valley there are certain units or districts that are set apart physically by levees or otherwise, so that the return water in each district may be readily segregated when the records of all diversions to and discharges from the unit are available. Included in such units are, the area above the Colusa-Williams Highway Crossing of Colusa Trough, Reclamation District 108, and Reclamation District 1500. The relation between the 1932 draft and return water for the Colusa Trough area is shown in Table 49 and for Reclamation Districts 108 and 1500, in Tables 50 and 51, respectively.

Tables 54 to 65, inclusive, present in detail the discharge records for the Sacramento Valley return water channels.

San Joaquin Return Waters

In the 1932 San Joaquin Valley return water measurements, the gaging stations were located at the same points as in 1929, 1930 and 1931 and the same methods were followed. A continuous record of the discharge from August to October, inclusive, was secured at an upper and lower station on each stream: San Joaquin, Stanislaus, Tuolumne and Merced Rivers and Dry

Creek. On the Tuolumne and San Joaquin Rivers, continuous records of discharge were also obtained at intermediate stations; one on the Tuolumne River at Hickman Bridge and two on the San Joaquin River, one near Grayson (Laird Slough) and the other just below the junction with Merced River. The latter is the station maintained by the U. S. Geological Survey and referred to as "San Joaquin River near Newman". (See Table 14). Maintenance of these stations was started in April but due to high snow run-off in the succeeding months of May, June, and July, the records could not be used for accurate determination of the return flow until the latter part of July. For this reason the period of the 1932 return flow records begins with August 1st. Measurements and records of all pumping diversions between stations on each stream were obtained, thereby completing the necessary data for the computation of the return water. The records for the gaging stations are given in Chapter II, Tables 14 to 25, inclusive, and the diversion records for the San Joaquin streams are given in Chapter III, Tables 40 to 44, inclusive.

Table 52 gives the results of the San Joaquin return water measurements and Table 53 shows a comparison of the 1932 return water with the irrigation draft in the San Joaquin Valley. Plate 2 depicts the accumulated return water on the San Joaquin River in downstream order, Turner Ranch Bridge to Vernalis, for the period August to October, inclusive, 1932 and shows also for this period, the average discharge, inflow and draft at all points in this stretch of the river.

Comparative Sacramento and San Joaquin Return Water, 1924 to 1932

Comparative figures, 1924 to 1932, for the Sacramento and San Joaquin seasonal return water in per cent of the irrigation draft

are shown in Table 45. Figures for the seasonal stream flow of the Sacramento River at Red Bluff and the San Joaquin River near Vernalis in per cent of the 40-year mean 1889-1929 are given also in order to show what relation, if any, there may have been between the variation from year to year in the run-off and the variation in the return water percentages. With respect to the Sacramento River data, there appears to be a close relationship between the seasonal run-off at Red Bluff and the return flow percentages. The higher return flow percentages occurred in the years of good run-off and the decrease in percentage in the years when the run-off was greatly below normal is very marked. This is undoubtedly a reflection of the conservation and waste prevention measures effected in the seasons of low water supply. In these seasons, the spill from the rice fields and all controllable wastes were practically eliminated in order that the river diversions might be reduced accordingly. The latter, then, approached more nearly the actual consumptive requirements of the crops so that the return flow percentage was considerably smaller. In the seasons of less critical water supply and correspondingly less urgent demand for conservation, the greater facility in irrigation operations obtained by larger diversions and correspondingly greater wastes and spill, may offer an explanation of the larger return water percentages in these seasons. In the years of more normal stream flow there probably occurs also, a greater accretion from groundwater storage, etc., and in this event the additional return from this source should not, strictly speaking, be included in the percentage figures since this would not be a return derived from the irrigation draft.

In the case of the San Joaquin return water data there appears to be no such definite relation between the seasonal flow of the San Joaquin River and its tributaries in per cent of normal and the return water per-

centages. This may be due to the regulation which occurs in Lake McClure on the Merced River, Don Pedro Reservoir on the Tuolumne River and Melones Reservoir on the Stanislaus River. It is to be noted that 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 to September, inclusive, the percentage is always greater than when the July-September period is used. Under the suspicion that there may be a considerable lag between the diversions and corresponding return flow, the figures in the last column of Table 45 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 run-off percentages but their variation from year to year is considerably reduced and a more or less constant percentage of return flow is indicated.

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. 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, much of the drainage from the major foothill diversions may pass to the underground water and from there, in the lower areas of many of the irrigation districts, be recovered by drainage pumps for re-use in the irrigation canals. Considerable of the San Joaquin return, therefore, may never reach the river to be accounted for in the return water measurements.

TABLE 45

SACRAMENTO AND SAN JOAQUIN RETURN WATER PERCENTAGES, 1924-1932

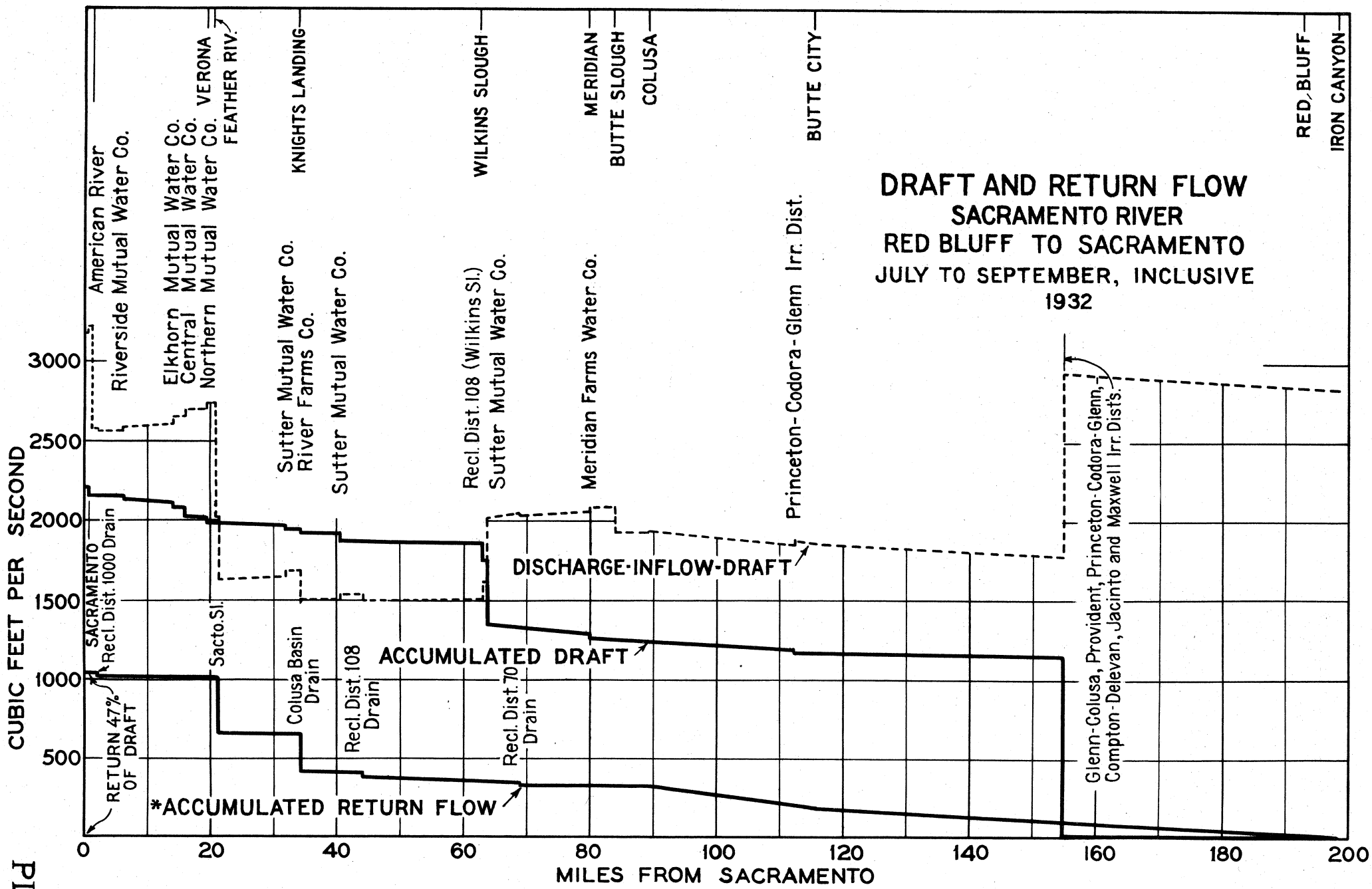
Year	Sacramento River			San Joaquin River			
	Seasonal Run-off at Red Bluff in per cent of Normal*	Return Water in per cent of Diversions		Seasonal Run-off at Vernalis in per cent of Normal**	Return Water in per cent of Diversions		Aug.-Sep. Return in per cent of Jul-Aug. Diversions
		June-Sept. Incl.	July-Sept. Incl.		July-Sept. Incl.	Aug.-Sept. Incl.	
1924	36	33	33	24	35	41	29
1925	86		55	86		38	23
1926	61	49	45	55	28	32	22
1927	117	66	59	100		32	23
1928	82	49	46	67	28	28	23
1929	47	42	39	44	19	21	16
1930	65	55	47	50	21	22	17
1931	36	33	32	23	(1)27	40	18
1932	54	56	47	101		(2)26	21

* 40-year Mean (1889-1929).

** 40-year Mean (1889-1929) of natural run-off at foothill stations of San Joaquin, Merced, Tuolumne and Stanislaus Rivers.

(1) May-September 19. June-September 23.

(2) August-October 29.



* In order to show return water from Sacramento River irrigation only, the discharge to the Sacramento River of the Feather and American Rivers is excluded as is also return through Butte Slough, a portion of the return through Sacramento Slough derived from Feather River diversions and the return through the Back Borrow Pit of Recl. Dist. 1000.

PLATE 1

TABLE 46

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

*From records for Butte Slough, District 70 Drain, District 108 Drain, Colusa Basin Drainage at Knights Landing, Sacramento Slough, District 1000 Drain (2d Bannon Slough) and Back Borrow Pit of District 1000.

Month	Acre-feet	Average Second-feet
June	51400	864
July	40800	663
August	47100	766
September	62500	1050
October	19700	320
June-October, Incl.	221500	730

*See Tables 55 to 59, Inclusive, 63 and 64.

TABLE 47

RELATION BETWEEN RETURN WATER AND DRAFT, SACRAMENTO RIVER, RED BLUFF TO SACRAMENTO, JUNE TO SEPTEMBER, 1932
(USING ONLY RETURN WATER WHICH ENTERED THROUGH DEFINITE MEASURED CHANNELS*)

	June		July		August		September		June to September Inclusive	
	Ac.Ft.	c.f.s	Ac.Ft.	c.f.s	Ac.Ft.	c.f.s	Ac.Ft.	c.f.s	Ac.Ft.	c.f.s
RETURN										
Reclamation District 70 Drain	1000	17	807	13	1180	19	722	12	3709	15
Reclamation District 108 Drain	1420	24	2850	46	3040	49	1800	30	9110	38
Colusa Basin Drainage at Knights Ldg.**	9960	167	7670	124	17400	283	20500	344	55530	229
Sacramento Slough (Less flow down East Borrow Pit Sutter By-Pass)	18600	312	20400	332	22400	364	21000	353	82400	340
Reclamation District 1000 Drain (2nd Bannon Slough)	1140	19	337	6	819	13	2230	38	4526	19
Total Return	32120	539	32064	521	44839	728	46252	777	155275	641
Total Diversions-Red Bluff to Sacramento	173350	2910	175371	2850	149046	2420	78678	1320	576445	2380
Return in Per Cent of Diversions	18		18		30		59		27	

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 a portion of the return through Sacramento Slough derived from Feather River diversions and the return through the Back Borrow Pit of Reclamation District 1000.

* As distinguished from use of all accretions as indicated in Table 48.
** Includes estimate of portion of flow diverted to Knights Landing Ridge Cut (exclusive of pondage loss). See Table 58.

TABLE 48

RELATION BETWEEN RETURN WATER AND DRAFT, SACRAMENTO RIVER, RED BLUFF TO SACRAMENTO, JUNE TO SEPTEMBER, 1932
(INCLUDING ALL ACCRETIONS)*

River Section	June (1)		July		August		September		Total Return Jun-Sep. Inc.		Red Bluff to Lower end of Section: Return		Red Bluff to Lower end of Section: Draft		Return in per cent of Draft
	Acre-feet	Aver cfs.	Acre-feet	Aver cfs.	Acre-feet	Aver cfs.	Acre-feet	Aver cfs.	Acre-feet	Aver cfs.	Acre-feet	Aver cfs.	Acre-feet	Aver cfs.	
Red Bluff-Butte City	36100	607	18200	296	10300	168	5260	88	69860	289	69860	289	294469	1220	24
Butte City-Colusa	16300	274	16000	260	6350	103	4050	68	42700	176	112560	465	314225	1300	36
Colusa-Wilkins Slough	22500	378	4100	67	1470	24	0	0	28070	116	140630	581	479046	1980	29
Wilkins Slough-Knights Ldg.	37500	630	13600	221	22200	361	20200	340	93500	386	234130	967	504375	2080	46
Knights Landing-Verona	19300	324	24700	402	21400	348	17900	301	83300	344	317430	1311	517424	2140	61
Verona-Sacramento **	1140	19	337	5	819	13	2230	37	4526	19	321956	1330	576445	2380	56
Total Return	132840	2232	76937	1251	62539	1017	49640	834	321956	1330					
Total Draft - Red Bluff to Sacramento	173350	2910	175371	2850	149046	2420	78678	1320	576445	2380					
Return in Per Cent of Draft	77 (1)		44		42		63		56						

* 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 chapers II and IV.

NOTE: In the return water here shown the discharge to the Sacramento River of the Feather and American Rivers is excluded as is also return through Butte Slough, a portion of the return through Sacramento Slough derived from Feather River diversions and the return through the Back Borrow Pit of Reclamation District 1000. Also, inflow from Mill, Antelope, Deer and other creeks between Red Bluff and Butte City has been excluded.

(1) It is probable that in June of 1932 there was still considerable natural local run-off, drainage from Winter and Spring groundwater storage, etc., which would account for the high percentage of return obtained for that month in this table. (Compare with June return, Table 47). Table 48-A, following, which is made up for July to September, inclusive, should, therefore, indicate more correctly, the draft-return water relation in the 1932 season.

*TABLE 48-A

RELATION BETWEEN RETURN WATER AND DRAFT, SACRAMENTO RIVER, RED BLUFF TO SACRAMENTO, JULY TO SEPTEMBER, 1932
(INCLUDING ALL ACCRETIONS)

River Section	July		August		September		Total Return July-Sept. Inclusive		Red Bluff to Lower End of Section				
									Return		Draft		Return in per cent of Draft
	Acre-feet	Aver cfs.	Acre-feet	Aver cfs.	Acre-feet	Aver cfs.	Acre-feet	aver cfs.	Acre-feet	Aver cfs.	Acre-feet	Aver cfs.	
Red Bluff - Butte City	18200	296	10300	168	5260	88	33760	185	33760	185	213288	1170	16
Butte City - Colusa	16000	260	6350	103	4050	68	26400	145	60160	330	226759	1240	27
Colusa - Wilkins Slough	4100	67	1470	24	0	0	5570	30	65730	360	338966	1860	19
Wilkins Slough-Knights Landing	13600	221	22200	361	20200	340	56000	307	121730	667	353787	1940	34
Knights Landing - Verona	24700	402	21400	348	17900	301	64000	351	185730	1018	362283	1990	51
Verona - Sacramento	337	5	819	13	2230	37	3386	13	189116	1036	403095	2210	47
Total Return	76937	1251	62539	1017	49640	834	189116	1036					
Total Draft - Red Bluff to Sacramento	175371	2850	149046	2420	78678	1320	403095	2210					
Return in per cent of Draft	44		42		63		47						

* Same as Table 48 except that June figures are eliminated. See note (1) Table 48.

TABLE 49

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

	Mile and Bank	May	June	July	Aug.	Sep.	May to Sept. Incl. Ac.Ft.	May to Sept. Incl. c.f.s.	Acreage Irrigated Rice	Acreage Irrigated General	Acreage Irrigated Gun Cl.
		Acre-feet									
DIVERSIONS											
- Sacramento River -											
Glenn-Colusa Irrigation Dist.	154.8 R	51134	53477	59364	55073	28052	247100	814	19875	42976	
Jacinto Irrigation District	154.8 R	1580	2586	3234	2514	2050	11964	40		3804	
Compton-Delevan Irrigation Dist	154.8 R	3128	3236	2850	2444	0	11658	39	1908	80	100
Provident Irrigation District	154.8 R	12672	10907	11538	11319	4364	50800	167	6335	40	300
Princeton-Codora-Glenn I.D.	154.8 R	8775	8317	8357	8943	5898	40290	133	(1) 2103	(1) 2866	
Maxwell Irrigation District	154.8 R	1764	1250	2030	1668	0	6712	22	1555		2110
C. L. Leonard	154.8 R	52	35	6	0	79	172	1		137	
California Lands Inc.	124.4 R	36	282	232	206	233	989	3		377	
Princeton-Codora-Glenn I.D.	112.4 R	1147	961	2667	1264	58	6097	20	(2)	(2)	
E. M. Gordon	103.9 R	783	598	820	838	326	3365	11	683		
National Pacific Land Company	103.7 R	192	276	327	233	117	1145	4		410	
Maxwell Irrigation District	102.8 R	936	985	1164	1005	0	4090	13	300	4	
A.F. & R. C. Wohlfrom	101.1 R	80	262	82	0	0	424	1		173	
- Colusa Trough -	*										
E. M. Gordon	12.1 R	43	0	109	52	42	246	1	(3)		
Gun Clubs at Compton Weir	11.8 R	0	0	147	424	73	644	2		35	
I. G. Zumwalt	2.2 R	799	538	625	115	100	2177	7	(4) 1200		
Total Diversions (Acre-feet		83121	83710	93552	86098	41392	387873		33959	50902	2510
Total Diversions (c.f.s.		1352	1406	1521	1400	695		1278			
RETURN											
Colusa Trough at Colusa-Williams Hy.		25800	19400	15600	19300	19800	99900	329			
Trough Diversions		842	538	881	591	215	3067	10			
Total Return (Acre-feet		26642	19938	16481	19891	20015	102967				
Total Return (c.f.s.		433	335	268	323	336		339			
Return in per cent of Diversions		32	24	18	23	48	27				

* Mileage above Colusa-Williams Highway.
(1) Total acreage served by this plant and that at Mile 112.4 R.
(2) See Plant at Mile 154.8 Right.
(3) Included in acreage given for Sacramento River plant at Mile 103.9 Right.

TABLE 50

RELATION BETWEEN RETURN WATER AND DIVERSIONS - RECLAMATION DISTRICT 108

	May		Jun.		Jul.		Aug.		Sep.		May to Sep. Inclusive		Acreage Irrigated	
	Acre-feet	Aver. c.f.s	Acre-feet	Aver. c.f.s	Acre-feet	Aver. c.f.s	Acre-feet	Aver. c.f.s	Acre-feet	Aver. c.f.s	Acre-feet	Aver. c.f.s	Rice	Genl
Diversions (1)	11201	182	12383	208	11940	194	7677	125	649	11	43850	144	5775	4228
Return Water (2)	2560	42	1420	24	2850	46	3040	50	1800	30	11670	38		
Return in per cent of Diversions		23		12		24		40		277		27		

(1) The diversions comprise all those from the Sacramento River, right bank, from Mile 43.1 to Mile 63.2. The principal ones are the plants of Reclamation District 108 at Wilkins Slough and Tyndall Mound.
(2) The return water is the discharge to the Sacramento River of Recl. Dist. 108 Drain at Rough and Ready Bend. See Tbl. 57.

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TABLE 51

RELATION BETWEEN RETURN WATER AND DIVERSIONS- RECLAMATION DISTRICT 1500

	May		Jun.		Jul.		Aug.		Sep.		May to Sep. Inclusive		Acreage Irrigated	
	Acre-feet	Aver. c.f.s	Acre-feet	Aver. c.f.s	Acre-feet	Aver. c.f.s	Acre-feet	Aver. c.f.s	Acre-feet	Aver. c.f.s	Acre-feet	Aver. c.f.s	Rice	Gen'l
Diversions (1)	34534	562	38011	639	33899	551	30212	491	21279	358	157935	520	9744	22501
Return Water (2)	18000	293	14700	247	18500	301	19900	324	17900	301	89000	293		
Return in per cent of Diversions		52		39		55		66		84		56		

(1) The diversions comprise all those from the Sacramento River, left bank, from Mile 29.9 to Mile 63.75. The principal ones are the Sutter Mutual Water Company's plants at Tisdale, State Ranch Bend and Portuguese Bend.
(2) The return water is the discharge through the drainage plant of Reclamation District 1500 on the west borrow pit of Sutter By-Pass. This water reaches the Sacramento River via Sacramento Slough. See Table 60.

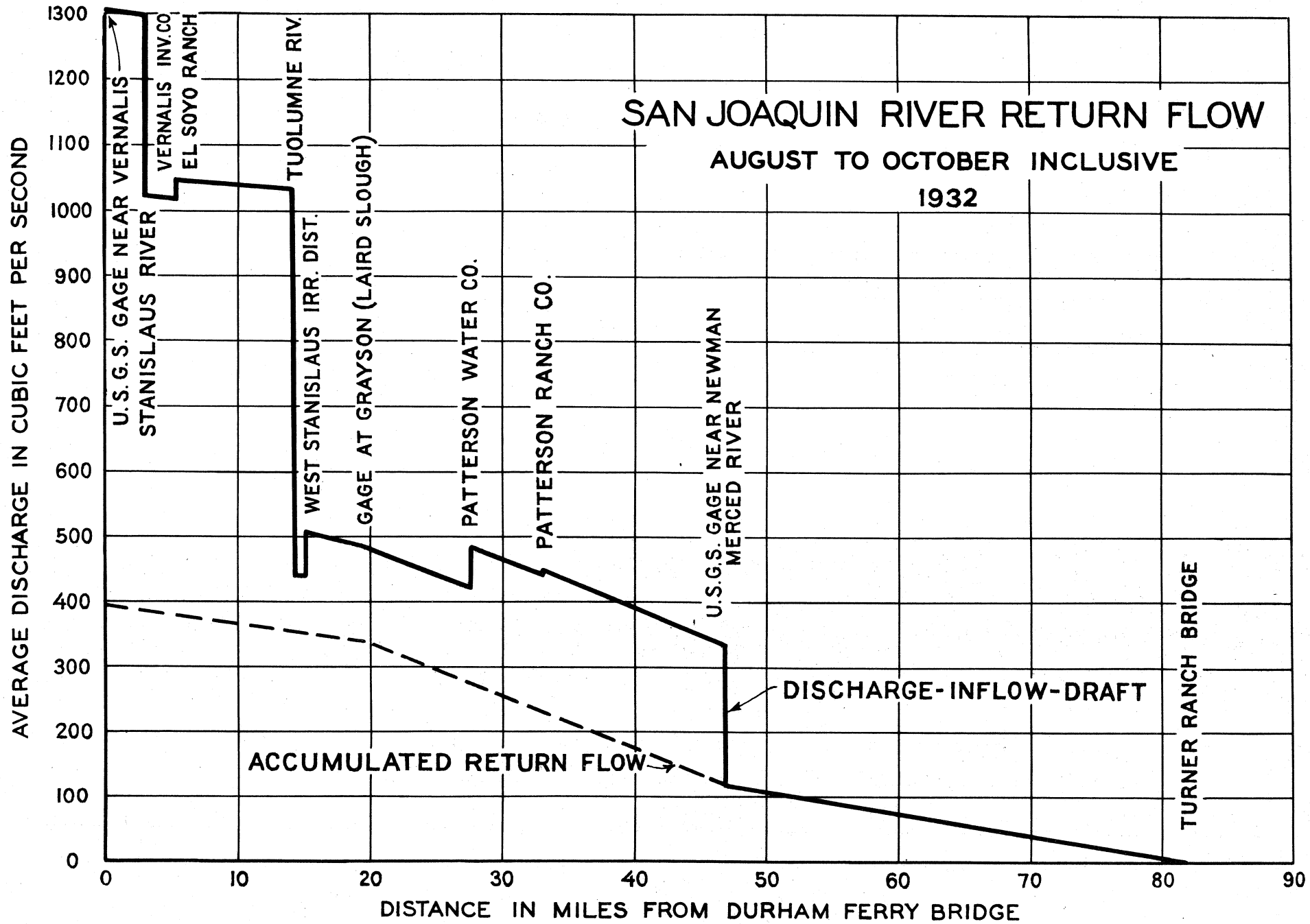
SAN JOAQUIN RIVER RETURN FLOW
AUGUST TO OCTOBER INCLUSIVE
1932
AVERAGE DISCHARGE IN CUBIC FEET PER SECOND
DISTANCE IN MILES FROM DURHAM FERRY BRIDGE
U.S.G.S. GAGE NEAR VERNALIS
STANISLAUS RIVER
VERNALIS INV.CO.
EL SOYO RANCH
TUOLUMNE RIV.
WEST STANISLAUS IRR. DIST.
GAGE AT GRAYSON (LAIRD SLOUGH)
PATTERSON WATER CO.
PATTERSON RANCH CO.
U.S.G.S. GAGE NEAR NEWMAN
MERCED RIVER
TURNER RANCH BRIDGE
DISCHARGE-INFLOW-DRAFT
ACCUMULATED RETURN FLOW
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
0
10
20
30
40
50
60
70
80
90

PLATE 2

TABLE 52

RETURN FLOW IN SAN JOAQUIN VALLEY STREAMS - 1932
(ACRE-FEET EXCEPT AS NOTED)

		AUG.	SEP.	OCT.	AUG.-OCT. INCL.
SAN JOAQUIN RIVER					
DISCHARGE AT TURNER RANCH BRIDGE (1)		0	0	0	0
DISCHARGE NEAR NEWMAN	TABLE 14	21200	19600	19600	60400
INFLOW OF MERCED RIVER	TABLE 18	12600	14100	13500	40200
NET RETURN FLOW - TURNER RANCH BRIDGE TO NEWMAN GAGE		8600	5500	6100	20200
NET RETURN FLOW - C.F.S. - TURNER RANCH BR. TO NEWMAN GAGE		140	93	99	111
DISCHARGE AT GRAYSON (LAIRD SLOUGH)	TABLE 15	31300	26900	31300	89500
ACCRETION - NEWMAN TO GRAYSON		10100	7300	11700	29100
DIVERSION - NEWMAN TO GRAYSON	TABLE 40	6866	6319	251	13436
RETURN FLOW - NEWMAN TO GRAYSON		17000	13600	11900	42500
RETURN FLOW - C.F.S. - NEWMAN TO GRAYSON		276	228	194	232
DISCHARGE NEAR VERNALIS	TABLE 16	71300	63700	103000	238000
INFLOW OF TUOLUMNE AND STANISLAUS RIVERS	TBLS. 23 & 25	39800	40700	77300	157800
NET ACCRETION - GRAYSON TO VERNALIS		200	-3900	-5600	-9300
DIVERSIONS - GRAYSON TO VERNALIS	TABLE 40	8020	5243	4759	18022
NET RETURN FLOW - GRAYSON TO VERNALIS		8220	1340	-840	8720
NET RETURN FLOW - C.F.S. - GRAYSON TO VERNALIS		134	22	-13	48
NET RETURN FLOW - TURNER RANCH BRIDGE TO VERNALIS		33800	20400	17200	71400
NET RETURN FLOW - C.F.S. - TURNER RANCH BR. TO VERNALIS		550	343	280	391
STANISLAUS RIVER					
DISCHARGE AT ORANGE BLOSSOM BRIDGE	TABLE 24	2280	2190	2160	6630
DISCHARGE AT HATMARK RANCH (2)	TABLE 25	16200	17300	16500	50000
ACCRETION - ORANGE BLOSSOM TO HATMARK		13920	15110	14340	43370
DIVERSIONS - ORANGE BLOSSOM TO HATMARK	TABLE 44	1678	1216	471	3365
RETURN FLOW - ORANGE BLOSSOM TO HATMARK		15600	16300	14800	46700
RETURN FLOW - C.F.S. - ORANGE BLOSSOM TO HATMARK		254	274	241	256
TUOLUMNE RIVER					
DISCHARGE AT ROBERTS FERRY BRIDGE	TABLE 21	3040	2560	43500	49100
DISCHARGE AT HICKMAN BRIDGE	TABLE 22	6980	6620	47300	60900
ACCRETION - ROBERTS FERRY TO HICKMAN		3940	4060	3800	11800
DIVERSIONS - ROBERTS FERRY TO HICKMAN	TABLE 43	14	11	7	32
RETURN FLOW - ROBERTS FERRY TO HICKMAN		3950	4070	3810	11830
RETURN FLOW - C.F.S. - ROBERTS FERRY TO HICKMAN		64	69	62	65
DISCHARGE AT TUOLUMNE CITY BRIDGE	TABLE 23	23400	22800	60400	106600
INFLOW OF DRY CREEK	TABLE 20	3910	5290	5310	14510
NET ACCRETION - HICKMAN TO TUOLUMNE CITY		12510	10890	7790	31190
DIVERSIONS - HICKMAN TO TUOLUMNE CITY	TABLE 43	250	134	56	440
NET RETURN FLOW - HICKMAN TO TUOLUMNE CITY		12800	11000	7850	31650
NET RETURN FLOW - C.F.S. - HICKMAN TO TUOLUMNE CITY		208	185	126	173
NET RETURN FLOW - ROBERTS FERRY TO TUOLUMNE CITY		16700	15100	11700	43500
NET RETURN FLOW - C.F.S. - ROBERTS FERRY TO TUOLUMNE CITY		272	254	190	238
DRY CREEK					
DISCHARGE AT OLD WATERFORD BRIDGE	TABLE 19	514	897	1060	2471
DISCHARGE AT MOUTH	TABLE 20	3910	5290	5310	14510
ACCRETION - OLD WATERFORD BRIDGE TO MOUTH		3396	4393	4250	12039
DIVERSIONS - OLD WATERFORD BRIDGE TO MOUTH	TABLE 42	29	17	6	52
RETURN FLOW - OLD WATERFORD BRIDGE TO MOUTH		3420	4410	4260	12090
RETURN FLOW - C.F.S. - OLD WATERFORD BRIDGE TO MOUTH		56	74	69	66
MERCED RIVER					
DISCHARGE AT YOSEMITE VALLEY RR. CROSSING	TABLE 17	1790	2040	1060	4890
DISCHARGE NEAR MOUTH	TABLE 18	12600	14100	13500	40200
ACCRETION - YOSEMITE VALLEY RR. CROSSING TO MOUTH		10810	12060	12440	35310
DIVERSIONS - YOSEMITE VALLEY RR. CR. TO MOUTH	TABLE 41	2292	1787	711	4790
RETURN FLOW - YOSEMITE VALLEY RR. CROSSING TO MOUTH		13100	13800	13200	40100
RETURN FLOW - C.F.S. - YOSEMITE VALLEY RR. CR. TO MOUTH		213	232	215	220

(1) PREVIOUSLY REFERRED TO AS SAN LUIS RANCH GAGING STATION.
(2) FORMERLY ELLIOT RANCH.

TABLE 53

COMPARISON OF DIVERSIONS AND RETURN WATER, SAN JOAQUIN VALLEY, 1932

(QUANTITIES IN ACRE-FEET EXCEPT AS NOTED)

	AUG.	SEP.	OCT.	AUG.-OCT INC.
DIVERSIONS				
SAN JOAQUIN RIVER NEAR FRIANT (1) (2) (MILLER AND LUX CANALS, ETC.)	90400	69000	67000	226400
MERCED RIVER AT EXCHEQUER (1) (2) (MERCED IRR. DIST. CANAL, ETC.)	92200	66000	28300	186500
TURLOCK IRRIGATION DISTRICT CANAL (1)	57400	72000	37500	166900
MODESTO IRRIGATION DISTRICT CANAL (1)	28900	34500	18300	81700
SOUTH SAN JOAQUIN AND OAKDALE IRRIGATION DISTRICT CANAL (1)	37700	32300	15700	85700
OAKDALE IRRIGATION DISTRICT CANAL (1)	15900	14200	9590	39690
PUMPING DIVERSIONS - SAN JOAQUIN, STANISLAUS, TUOLUMNE, MERCED RIVERS AND DRY CREEK (3)	19200	14800	6300	40300
TOTAL DIVERSIONS	341700	302800	182690	827190
TOTAL DIVERSIONS (AVERAGE SECOND-FEET)	5560	5090	2970	4530
RETURN				
SAN JOAQUIN RIVER NEAR VERNALIS (1)	71300	63700	103000	238000
PUMPING DIVERSIONS - SAN JOAQUIN, STANISLAUS, TUOLUMNE, MERCED RIVERS AND DRY CREEK (3)	19200	14800	6300	40300
TOTAL RETURN	90500	78500	109300	278300
UNDIVERTED POWER RELEASES (TUOLUMNE RIVER)			40400	40400
*NET RETURN	90500	78500	68900	237900
*NET RETURN (AVERAGE SECOND-FEET)	1470	1320	1120	1300
*RETURN IN PER CENT OF DIVERSIONS	26	26	38	29

NOTE: HIGHER RIVER STAGES FROM SNOW RUN-OFF PREVENTED MEASUREMENTS OF RETURN WATER PRIOR TO LATE JULY IN 1932.

(1) U. S. G. S. STATION.

(2) THIS FLOW ALL DIVERTED BELOW GAGING STATION AFTER AUGUST 1ST.

(3) SEE TABLES 40 TO 44, INCLUSIVE. THIS IS RETURN WATER DIVERTED BY PUMPING.

* UNDETERMINED RETURN WATER FROM SOUTH SAN JOAQUIN IRRIGATION DISTRICT ENTERING SAN JOAQUIN RIVER BELOW VERNALIS GAGING STATION IS NOT INCLUDED IN THESE FIGURES. ALSO, NO ACCOUNT IS TAKEN OF RETURN TO GROUND-WATER RE-DIVERTED TO IRRIGATION CANALS VIA DRAINAGE PUMPS IN THE VARIOUS IRRIGATION DISTRICTS.

TABLE 54

DISCHARGE OF COLUSA TROUGH AT COLUSA-WILLIAMS HIGHWAY

Day	Daily Discharge in Second-feet						
	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.
1		357	507	291	278	297	153
2		352	520	241	291	283	151
3		382	549	237	283	325	115
4		431	487	232	263	331	129
5		475	453	221	254	363	129
6		461	395	219	263	365	128
7		447	359	219	268	376	120
8		411	329	227	263	359	122
9	*138	397	308	236	257	359	120
10	138	413	302	232	263	355	119
11	151	427	297	232	264	374	146
12	155	431	308	236	274	417	129
13	173	461	291	241	283	441	111
14	182	432	272	255	297	477	102
15	214	407	264	291	319	481	99
16	209	395	268	287	329	481	78
17	214	391	285	283	350	505	73
18	209	401	293	280	359	465	92
19	232	421	291	276	373	405	76
20	243	451	287	274	363	363	76
21	255	491	278	263	359	331	76
22	276	497	272	255	355	291	69
23	285	493	270	268	361	264	69
24	294	471	272	264	363	228	68
25	303	441	270	259	344	200	68
26	312	363	268	268	357	187	65
27	321	291	266	272	363	174	66
28	330	334	264	264	350	164	66
29	339	377	278	257	338	155	65
30	348	420	283	255	338	153	65
31		464		255	308		65
Mean	**242	419	326	255	314	332	97
Ac.Ft. for Month	**10600	25800	19400	15600	19300	19800	5970

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.

* Beginning of record for season.
** 22 days.

TABLE 55

DISCHARGE OF BUTTE SLOUGH

Day	Daily Discharge in Second-feet					
	May	Jun.	Jul.	Aug.	Sep.	Oct.
1		390	162	73	137	278
2		419	172	80	144	218
3		406	173	65	145	204
4		427	141	66	134	179
5		423	161	67	119	148
6		413	155	72	126	150
7		413	173	73	129	123
8		412	148	63	137	105
9		390	113	63	140	122
10		335	250	60	144	129
11		420	250	60	160	140
12		342	250	38	175	146
13		333	250	39	199	144
14		305	250	44	210	140
15		295	250	53	218	128
16			250	77	258	121
17		334	250	100	362	79
18		252	250	86	317	74
19	*324	262	250	90	321	69
20	319	241	250	85	364	53
21	313	239	250	86	395	41
22	370	233	250	87	361	28
23	383	179	250	99	347	16
24	319	150	36	102	330	10
25	402	164	26	107	319	10
26	395	172	28	109	389	10
27	350	180	77	111	356	6
28	346	156	35	118	324	5
29	372	176	29	123	289	6
30	365	183	69	129	270	91
31	391		77	135		137
Mean	**357	288	170	83	244	100
Ac.Ft. for Month	**9220	17100	10500	5080	14500	6170

NOTE: This is the discharge to Sacramento River at Mile 84 Left as measured at and below the dam of Butte Slough Irrigation Company ½ mile above the mouth of Butte Slough. This flow and Butte Slough and Creek diversions (See Table 31) are made up almost entirely of return water from lands irrigated by Feather River diversions except for Butte Creek flow as measured at the station one mile west of the East Side Highway. (See Tbl.10)

* Beginning of record for season.
** 13 days.

TABLE 56

DISCHARGE OF RECLAMATION DISTRICT 70 DRAIN

Day	Daily Discharge in Second-feet							
	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.
1	*			21	14	18	12	6
2			26	19	14	18	11	6
3				19	14	18	12	6
4				21	14	18	12	28
5				19	15	18	12	11
6				17	15	18	26	9
7				19	15	19	26	8
8				19	15	20	25	8
9				19	15	20	25	7
10				19	14	20	19	7
11				17	6	20	20	7
12		25		15	6	20	19	7
13		17	24	19	6	20	19	8
14		12	19	19	6	20	18	6
15		12	18	23	7	20	14	6
16		8	18	9	7	20	14	6
17		14	24	17	27	20	5	5
18			22	21	26	27	5	4
19		8	25	20	25	26	6	4
20		12	24	20	11	26	5	4
21		6	24	21	11	25	5	6
22		6	21	20	11	24	6	5
23		10	16	10	11	24	6	6
24		10	21	12	11	24	6	5
25			22	11	11	24	6	6
26			19	12	11	10	6	6
27			19	11	11	11	6	6
28			18	11	11	11	6	4
29			19	12	11	11	6	6
30			19	13	11	12	6	5
31			32		25	11		6
Mean		4.7	13.9	16.8	13.1	19.1	12.1	6.9
Ac.Ft. for Month		278	853	1000	807	1180	722	424

NOTE: All gravity flow.
This is the drainage returned to the Sacramento River at Mile 68.8 left from District 70.
* Beginning of record for season.

TABLE 57

DISCHARGE OF RECLAMATION DISTRICT 108 DRAIN AT ROUGH & READY BEND

Day	Daily Discharge in Second-feet						
	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.
1	*	186		31	46	43	7
2			165	24	43	53	8
3	117			22	43	55	11
4				33	53	55	8
5		132	255	35	46	48	6
6				35	43	50	8
7				41	48	50	9
8		204		42	55	48	10
9				47	57	48	10
10				45	57	50	12
11				43	57	48	6
12				45	59	39	6
13				49	66	39	4
14				49	57	38	4
15			14	52	59	33	3
16			20	53	48	34	4
17			26	64	44	30	6
18			26	54	44	25	7
19			16	60	48	19	8
20		140	16	62	50	15	8
21			14	68	50	14	5
22		170	18	55	46	14	4
23	193		18	48	48	8	4
24	341		10	46	48	6	4
25			16	46	48	5	3
26			20	46	46	9	5
27			20	48	44	9	5
28			20	48	46	9	5
29		200	18	46	46	8	7
30	192	260	24	48	44	8	7
31				50	46		8
Mean	28.1	41.7	23.9	46.3	49.5	30.3	6.5
Ac.Ft. for Month	1670	2560	1420	2850	3040	1800	401

NOTE: This is all gravity flow and represents drainage from Reclamation District 108 discharged to the Sacramento River at Rough and Ready Bend, Mile 44.0 Right.

* Beginning of record for season.

TABLE 58

DISCHARGE OF COLUSA BASIN DRAINAGE AT KNIGHTS LANDING

Day	Daily Discharge in Second-feet				
	Jun.	Jul.	Aug.	Sep.	Oct.
1	*335	133	295	276	5
2	335	140	550	245	7
3	339	226	364	230	15
4	320	209	287	170	14
5	290	170	239	219	17
6	288	163	96	149	24
7	289	153	30	301	15
8	314	148	31	281	14
9	240	137	35	260	11
10	207	139	40	392	19
11	210	130	50	587	25
12	203	130	62	561	41
13	210	136	62	533	46
14	165	127	75	540	39
15	1	96	119	520	9
16	54	0	60	520	103
17	70	0	138	522	84
18	75	0	246	543	56
19	74	0	371	527	52
20	76	2	270	491	72
21	79	4	228	347	80
22	79	6	216	266	5
23	79	8	75	239	5
24	88	10	100	214	5
25	83	12	124	191	5
26	93	12	303	120	4
27	93	12	300	40	4
28	99	138	266	32	4
29	111	115	372	24	3
30	124	106	360	16	3
31		30	221		3
Mean	167	87	193	312	25
Ac.Ft. for Month	9960	5340	11900	18600	1560

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 34.15 Right, just above the Knights Landing gaging station. Irregularity in the 1932 flow was due to checking at the outfall gates whereby some of the flow was diverted via Knights Landing Ridge Cut for dredge flotation and irrigation in Yolo By-Pass. This diversion, exclusive of pondage loss in the Back Borrow Pit and Ridge Cut, is estimated to have been, (acre-feet) June 0, (water backing up to required elevation for diversion), July 2330, August 5480, September 1870, October 934.

* Beginning of record for season.

TABLE 59

DISCHARGE OF SACRAMENTO SLOUGH*

Day	Daily Discharge in Second-feet				
	Jun.	Jul.	Aug.	Sep.	Oct.
1	470	261	343	483	287
2	472	298	350	356	268
3	464	298	350	361	259
4	487	300	356	436	254
5	493	260	354	408	254
6	490	281	357	417	230
7	474	366	358	427	231
8	462	374	371	426	233
9	417	375	391	414	195
10	365	376	392	434	198
11	359	374	386	392	174
12	300	369	384	447	181
13	182	378	385	433	180
14	293	381	388	485	168
15	284	366	372	489	167
16	275	372	387	503	170
17	267	359	402	523	163
18	314	357	406	502	157
19	305	350	415	477	151
20	361	347	424	426	151
21	318	342	412	431	129
22	322	344	447	400	109
23	312	339	507	397	106
24	279	337	602	370	103
25	287	341	622	366	100
26	299	340	550	344	98
27	321	340	419	332	97
28	283	340	380	316	76
29	281	340	380	317	80
30	261	338	379	309	77
31		344	385		76
Mean	350	341	408	414	165
Ac.Ft. for Month	20800	21000	25100	24600	10200

* Water discharged through Sacramento Slough to the Sacramento River at Mile 21.2 Left. This is return water from irrigation and represents the sum of measurements at three points as follows: Reclamation District 1500 Drain, See Table 60; Sutter By-Pass East Borrow Pit, See Table 61; and Sutter By-Pass West Borrow Pit, See Table 62.

TABLE 60

DISCHARGE OF RECLAMATION DISTRICT 1500 DRAIN*

Day	Daily Discharge in Second-feet							
	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.
1	**66		226	256	205	315	420	185
2	51	29	226	263	242	318	278	163
3	7	118	271	291	242	315	282	154
4	51	118	227	316	242	318	357	149
5			275	325	202	315	319	149
6	29	29	290	325	221	315	319	123
7	51	85	259	313	310	315	305	123
8	47		266	307	321	318	300	123
9	12		275	281	324	318	291	87
10	58		238	244	327	318	309	93
11	29	98	279	251	327	318	300	72
12	84	62	266	197	324	315	363	82
13	29		263	85	332	315	309	82
14	40	53	266	205	332	318	319	72
15	66	78	290	205	317	318	318	72
16	6	155	290	205	321	315	328	77
17	50	153	291	205	314	327	343	72
18	50	148	291	248	318	330	318	67
19	50	152	290	235	315	338	356	62
20	50	214	300	286	318	336	318	62
21	63	209	333	239	315	334	318	56
22	50	200	311	244	318	340	291	46
23	38	214	552	248	315	340	291	46
24	25	214	232	226	315	338	269	47
25	120	362	291	235	318	344	269	46
26	50	116	291	248	318	324	251	46
27	50	227	291	269	318	320	238	47
28	63	321	291	230	317	324	220	36
29	56	321	311	226	318	329	220	46
30	56	266	472	205	315	329	211	46
31			344		318	337		47
Mean	45	131	293	247	301	324	301	83
Ac.Ft. for Month	2770	7820	18000	14700	18500	19900	17900	5110

* This discharge through Reclamation District 1500 drainage plant combines with the discharge given in Tables 61 and 62 to form the entire flow of Sacramento Slough, See Table 59.

** Beginning of record for season.

TABLE 61

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

Day	Daily Discharge in Second-feet						
	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.
1		9	95	9	9	26	41
2		8	94	9	10	41	40
3		8	62	9	9	43	40
4		8	64	10	10	43	40
5		66	64	9	9	53	40
6		112	64	9	10	62	40
7		126	64	9	9	86	40
8		103	63	9	17	90	40
9		78	49	9	37	87	40
10		99	40	9	38	87	40
11		115	32	9	32	52	40
12		77	32	9	32	42	40
13		36	32	9	32	80	40
14		24	32	10	30	119	40
15		16	32	9	23	116	41
16		13	32	9	30	112	41
17		13	32	9	33	109	41
18	**4	15	32	9	33	106	41
19	5	15	32	10	33	45	41
20	5	15	32	9	33	34	41
21	6	16	32	9	32	42	26
22	6	15	32	10	61	41	20
23	6	58	19	9	120	41	20
24	6	47	9	9	208	41	20
25	6	87	9	10	212	41	20
26	6	68	9	9	163	41	20
27	7	49	9	9	43	41	20
28	7	44	9	10	7	41	13
29	8	41	9	9	9	41	9
30	9	42	9	9	9	41	9
31		66		10	9		9
Mean	***6.2	48	38	9	43	61	32
Ac.Ft. for Month	***161	2950	2230	567	2660	3660	1970

* This flow is practically all return water from lands irrigated by Feather River diversions. This flow combines with the discharge given in Tables 60 and 62 to form the entire flow in Sacramento Slough. See Table 59.

** Beginning of record for season.

*** 13 days.

TABLE 62

DISCHARGE OF SUTTER BY-PASS - WEST BORROW PIT*
(OPPOSITE GELSHAUSER SLOUGH)

Day	Daily Discharge in Second-feet				
	Jun.	Jul.	Aug.	Sep.	Oct.
1	**119	47	19	37	61
2	115	47	22	37	65
3	111	47	26	36	65
4	107	48	28	36	65
5	104	49	30	36	65
6	101	51	32	36	67
7	97	47	34	36	68
8	92	44	36	36	70
9	87	42	36	36	68
10	81	40	36	38	65
11	76	38	36	40	62
12	71	36	37	42	59
13	65	37	38	44	58
14	56	39	40	47	56
15	47	40	41	55	54
16	38	42	42	63	52
17	30	36	42	71	50
18	34	30	43	78	49
19	38	25	44	76	48
20	43	20	45	74	48
21	47	18	46	71	47
22	46	16	46	68	43
23	45	15	47	65	40
24	44	13	56	60	37
25	43	13	66	56	34
26	42	13	63	52	32
27	43	13	56	53	30
28	44	13	49	55	27
29	46	13	42	56	25
30	47	14	41	57	22
31		16	39		20
Mean	65	31	41	52	50
Ac.Ft. for Month	3880	1910	2500	3070	3080

* This flow is measured at a point 15.7 miles above the main drainage plant of Reclamation District 1500. It includes all return water from Reclamation District 1660 and any spill or waste of water diverted to this Borrow Pit from Butte Slough (See diversion of Butte Slough Irrigation Company, Table31). This flow combines with the discharge given in Tables 60 and 61 to form the entire flow of Sacramento Slough. See Table 59.

** Beginning of record for season.

TABLE 63

DISCHARGE OF RECLAMATION DISTRICT 1000 DRAIN (2d BANNON SLOUGH)

Day	Daily Discharge in Second-feet						
	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.
1	*			39			
2			73			45	71
3			36		45		
4			31				44
5		72	37			134	
6			24	33			
7		72	30			44	
8		59				51	
9			36			77	44
10					46		
11	46	73	55			77	
12	67					44	
13	74		55			44	
14		79		45			
15		79	55			45	
16					46	44	51
17			48		46		
18	80			53			
19	74	52				44	
20	61					45	
21	68	46			72	44	
22			49		46	44	
23	68	58				44	44
24	67					51	
25					46	71	
26	74	46				44	
27	68		48			44	
28					66	44	
29		52				44	
30	68						
31		52					
Mean	27.2	23.9	19.2	5.5	13.3	37.5	8.2
Ac.Ft. for Month	1620	1470	1140	337	819	2230	504

NOTE: This is drainage from District 1000 pumped back to the Sacramento River at Mile 2.1 Left.

* Beginning of record for season.

TABLE 64

DISCHARGE OF BACK BORROW PIT RECLAMATION DISTRICT 1000

Day	Daily Discharge in Second-feet							
	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.
1	*							
2								
3								
4								2
5								4
6								6
7								7
8				*				7
9	'	'	'	'	'	'	'	7
10	'	'	'	'	'	'	'	7
11	W	W	W	W	W	W	W	8
12	O	O	O	O	O	O	O	8
13	L	L	L	L	L	L	L	8
14	F	F	F	F	F	F	F	8
15								9
16								9
17								9
18	O	O	O	O	O	O	O	10
19	N	N	N	N	N	N	N	10
20	'	'	'	'	'	'	'	10
21	'	'	'	'	'	'	'	9
22								9
23								8
24								8
25								7
26								7
27								7
28								6
29								6
30								6
31								6
Mean	0	0	0	0	0	0	0	6.7
Ac.Ft. for Month	0	0	0	0	0	0	0	412

NOTE: This is water flowing down the borrow pit outside the east levee of Reclamation District 1000 and entering the Sacramento River at Mile 1.3 Left. It is measured at the Old Garden Highway crossing (Natomas Trestle). This drainage is probably not derived from Sacramento River sources.

* Sacramento river back water in Borrow Pit, March 1, to June 8.

TABLE 65

DISCHARGE OF YOLO BY-PASS-EAST BORROW PIT
(TULE CANAL)*

Day	Daily Discharge in Second-feet				
	Jun.	Jul.	Aug.	Sep.	Oct.
1	**		NO FLOW	18	
2				8	
3				6	
4				6	
5				14	
6				14	
7				8	
8				8	
9				44	
10	NO FLOW	NO FLOW		51	NO FLOW
11				50	
12			10	29	
13			20	29	
14			25	24	
15			30	20	
16			25	14	
17			20	4	
18			15	4	
19			10	2	
20			8	2	
21			4	1	
22			0	1	
23			0	NO FLOW	
24			0		
25			0		
26			6		
27			12		
28			18		
29			37		
30			23		
31			33		
Mean	0	0	9.5	11.9	0
Ac.Ft. for Month	0	0	587	708	0

* Measured at south levee of Sacramento By-Pass. This station records any undiverted drainage from Reclamation District 1600. During the 1932 season Colusa Basin drainage diverted to the By-pass via Knights Landing Ridge Cut was retained in Tule Canal by a dam for dredge flotation. The discharge in August and September was spill over t this dam.

** Beginning of record for season.

CHAPTER V

USE OF WATER IN THE SACRAMENTO-SAN JOAQUIN DELTA

As outlined in detail in preceding reports, this investigation having as its objective, a complete annual determination of the consumptive use of water in the entire Sacramento-San Joaquin Delta, has comprised the 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.

Cooperative Irrigation Investigations

Through the Federal-State cooperation for Irrigation Investigations the experimental work has been conducted by the Division of Irrigation, Bureau of Agricultural Engineering, U. S. Department of Agriculture, and has included probably as its most successful feature and that furnishing most definite and conclusive results, the consumptive use of water determinations for various Delta crops and vegetation grown in tanks. With the close of the 1930 season, the major portion of this investigation was practically completed. That is, the tank work had covered the range of the principal crops grown in the Delta as well as some experimentation with aquatic growths and weeds. At that time, therefore, an analysis and summary of the results were submitted by the Bureau of Agricultural Engineering and used as the basis for the computations of the consumptive use of water in the Sacramento-San Joaquin Delta as presented in Bulletin 27 of the Division of Water

Resources.

However, the period of the investigation with respect to certain of the consumptive use determinations appeared to have been somewhat short as the basis for final conclusions and it was considered desirable to continue the experimental work on these. The items included in this continuation of the work have comprised the maintenance of tule, cattail, and various weed tanks at King Island, tule tanks at Simmons Island, asparagus tanks on the Richmond-Chase tract, evaporation stations at Grand, King and Simmons Islands and Byron, and a general study of the character, occurrence, and extent of water consuming weed growths in the Delta. The work done and the results of the experimental work as continued in 1932 are presented in detail in the report by Major O. V. P. Stout which is given in Appendix A.

Annual Census of Irrigated Crop Acreages and Water Consuming Areas

The detail results of the census of the irrigated crop acreages and water consuming areas of the Delta as conducted by the Water Supervisor's office in 1932, are shown in Table 66. In the course of the Delta investigations it has been found that in general all lands below a certain elevation, whether idle or cropped, receive and consume water derived by seepage from the adjacent channels. It was necessary, therefore, that all such lands should be accounted for in computations for the total consumptive use of water. It was determined that Elevation 5, U.S.G.S. datum, would best represent the elevation below which it would be necessary to take the seepage into account and above which unirrigated and idle lands could be considered as non-water consuming. This required that the census should include a segregation, as above or below Elevation 5, of all unirrigated crops and pasture, idle lands in weeds, and bare lands, and these segregations are indicated in Table 66.

1932 Consumptive Use of Water in the Sacramento-San Joaquin Delta

The figures shown in Table 68 for the total seasonal and annual consumption of water in 1932 by the various Delta crops and water consuming areas were derived by applying the unit figures of Table 67 to the total acreage segregations of Table 66. The unit figures of Table 67 are those which were developed from the experimental data and, with one exception, are those which were used in the computations of Bulletin 27. The use of water by weeds as shown opposite the classification "Idle Land with Weeds" has been increased to correspond with a total annual consumption of 2.15 acre-feet per acre. This change was based on the indications of the later results from the weed tank experiments. It is possible that a continuation of the present experimental work may 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 as previously used.

As shown by Table 68, the seasonal consumptive use of water in 1932 by the Delta irrigated crop area of 336,440 acres amounted to 746,800 acre-feet or 2.22 acre-feet per acre. The seasonal use on the total consumptive area of 447,430 acres (including aquatic growths, bare lands, idle lands in weeds, open water surfaces, etc.), amounted to 1,181,030 acre-feet or 2.64 acre-feet per acre.

In Tables 69 and 70 the total consumptive use of water in 1932 has been segregated to show the use in each river Delta, Table 69

showing that in the Sacramento Delta, and Table 70 that in the San Joaquin Delta. Table 71 shows a general classification of the 1932 irrigated crop lands with respect to peat and sedimentary soils.

TABLE 66

DETAIL OF IRRIGATED AND NON-IRRIGATED CROPS AND ACREAGES IN THE DELTA, 1932

Island or tract	Acreages of irrigated crops and water consuming areas*																		Acreage of nonirrigated crops and nonwater consuming areas			Total acreage‡
	Irrigated crop acreage																					
	Alfalfa	Asparagus	Beans	Beets	Celery	Corn	Fruit	Grain and hay	Onions	Pasture	Potatoes	Seed	Truck and miscellaneous vegetables	Total irrigated crop acreage	Idle lands in weeds below elev. 5.0	Bare lands below elev. 5.0**	Aquatic growths and interior water surfaces	Total water consuming acreage*†	Grain and hay above elev. 5.0	Pasture, idle and bare lands above elev. 5.0**	Levees†	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
Andrus Island—Reclamation Districts Nos. 317, 407, 556	720	1,792	321	1,260	453	786	834	32	30	24		33	500	6,785	224	230	123	7,362			461	7,823
Bacon Island—Reclamation District No. 2028				680	57			1,308	154		2,345		16	4,560	679	117	164	5,520			105	5,625
Baird Ranch—Portion of Reclamation District No. 800						340		500		400				1,240	1,254	75	[1]399	2,968			32	3,000
Bethel Tract—Reclamation District No. 1619		605				270		180		339			410	1,804	938	439	139	3,320			84	3,404
Bigger and Inman Ranch					200					670				870		18	82	970			30	1,000
Bishop Tract—Reclamation District No. 2042		283		410				979	70	142	35	42		1,961	224	32	72	2,289			61	2,350
Bishop Highlands										605				605		5	23	633		360	7	1,000
Black Point Spoil Area																				575		575
Boggs Tract—Reclamation District No. 404	825	60	10			150		580					10	1,635	190	520	68	2,413	50	120	71	2,654
Bouldin Island—Reclamation District No. 756		572	27		929	1,488		1,387	130		764			[2]5,297	613	61	84	[2]6,055			136	6,006
Brack Tract—Reclamation District No. 2033	133	1,805		1,552			60	140						3,690	150		383	4,223		356	79	4,658
Bradford Island—Reclamation District No. 2059	10	405				220				400				1,035	808	38	121	2,002			57	2,059
Brannan Island—Reclamation District No. 2067	515	2,803		793	126	551	314	768	3	34			45	5,952	250	59	223	6,484		462	317	7,263
Byron Tract—Portion of Reclamation District No. 800	240					600		1,400		240	595			3,075	105	26	26	3,232			88	3,320
California Irrigated Farms—Portions of Rec. Dists. 2058 and 2062	4,540		2,920			220	5	600			50		20	8,355	1,298	230	300	10,183			107	[3]10,290
Canal Ranch	145	1,667		360				618						2,790	230	83	178	3,281			70	33,351
Clifton Court Tract—Reclamation District No. 802	180	405				1,670		450		45				2,750	477	20	46	3,293			69	3,362
Collinsville Manor																				433		433
Coney Island						940								940	24	11	45	1,020			40	1,060
Content—(Private Reclamation near)	21	17	47			38	3			40		22	30	218				218	100	86	30	434
Deadhorse Island								195						195			6	201			20	221
Donlan Island—Reclamation District No. 274		170					7							[4]177		40		[4]217			[4]20	230
Drexler Tract	8					1,371		472		598		507		2,956	12	50	110	3,128			74	3,202
Edinger-Johnson Reclamation District—Includes Rec. Dist. 745	70	40	60			25	171	100		70			90	626	75			701		120	65	886
Ehrhardt Club		500	20											520			60	580		34	17	631
Elmwood Tract						600				176				776		4	5	785			32	817
Empire Tract—Reclamation District No. 2029			433		277	1,512		745	242		220			3,429		40	130	3,599			79	3,678
Fabian Tract—Reclamation District No. 773						1,140		4,541						5,681	378	95	136	6,290	590	180	136	7,196
Fay Island			91											91		2	3	96			13	109
Fern Island																				100	23	123
Fink and Winler Ranch—Portion of Recl. Dist. No. 2062	300					90		263						653		12	36	701			59	760
Fox Ranch (George R. Fox)	146							30						176		2		178			5	183
Franks Tract		598		225		890		1,015	15	360	133		10	3,246	24		48	3,318			107	3,425
Grand Island—Reclamation District No. 3	932	2,935	1,586	1,505	1,975	2,630	2,082	895	100	110			567	15,317	286	357	280	16,240			774	1,7014
Hastings Tract—Reclamation District No. 2060	45	1,930	1,720			208		556					2	4,461		80	322	4,863	1,785	181	610	7,439
Headreach Island																				110	26	136
Henning Tract—Portion of Reclamation District No. 2030				200					135		1,500			1,835	518	21	222	2,596			104	2,700
Hog Island																				77	24	101
Holland Tract (Little Holland-Seaborn)			250	500		900		700						2,350	450		20	2,820			40	2,860
Holland Tract—Reclamation District No. 2025	15	59				627		2,392		6				3,099	861	60	170	4,190			85	4,275
Honker Lake Tract						290		740		560				1,590	196	10	22	1,818			72	1,890
Horseshoe Island	140					40								180				180		455	5	640
Hotchkiss Tract—Includes Reclamation District No. 799	620	1,200				175		100		460			225	2,780	718	60	63	3,621			79	3,700
Ida Island	3	18				10								31	3	16		50				50
Jersey Island—Reclamation District No. 830		1,200				800		550						2,550	824	5	62	3,441			117	3,558
Jones Tract (Upper)—Reclamation District No. 2039						2,707		2,751			160	506		6,124	14	24	84	6,246			112	6,358
Jones Tract (Lower)—Reclamation District No. 2038						2,451		2,718			366			5,535	39	65	87	5,726		20	109	5,855
Kimball Island															65			65				65
King Island—Reclamation District No. 2044				981		889		1,064			125			3,059		40	86	3,185			75	3,260
Liberty Reclamation District	10	1,675	525	1,650	425	900		210	435			40	170	6,040	72	13	175	6,300			450	6,750
Mandeville Island—Reclamation District No. 2027			3			431		2,886			1,105			4,425	508	54	180	5,167		166	135	5,468
March Garden and Brookside Tracts	85			5		15	15	35		150			160	465	82	7	4	558			12	570
McCormack Tract		600	375					500						1,475	12	6	18	1,511			65	1,576
McDonald Island—Portion of Reclamation District No. 2030				290				2,194			400			2,884		328	111	3,323			105	3,428
Medford Island—Reclamation District No. 2041					85	605					370	5		1,065	15	9	67	1,156			47	1,203
Merritt Island—Reclamation District No. 150	1,025	160	110	1,289		50	265					1,405	10	4,314	40	50	35	4,439	200	147	200	4,986
Mildred Island—Reclamation District No. 2021								30	52		800			882	269	14	30	1,195			52	1,247
Moreing Ranch (Lewis Moreing)—Portions of Reclamation Districts Nos. 2058 and 2062																	42	42	650	726	52	1,470
Orwood Highlands	160							300		537				997	29	62	47	1,135				1,135
Orwood Tract—Reclamation District No. 2024		115				413	22	392			1,063	35		2,040	162	50	80	2,332			65	2,397
Palm Tract—Reclamation District No. 2036						1,675						286		1,961	433	45	65	2,504			60	2,564
Pierson District—Reclamation District No. 551	325	675	2,310			300	1,385	2,200		75		140	125	7,535	250	240	115	8,140	310	110	410	8,970
Pocket, The (Roberts Island)	40					175		220						435	60	11	14	520			33	553
Porter Estate																	[5]2,200	[5]2,200				[5]2,200
Prospect Island—Reclamation District No. 1667		790	300			1,300			40					[6]2,430	99	30	93	[6]2,652			193	2,505
Quimby Island				140				50	40					230	499	14	25	768			54	822
Randall Island—Reclamation District No. 755	12						370	8				5	5	400		3		403			14	417
Rhode Island						78								78		2	5	85			5	90
Rio Blanco Tract				150	140				30		100			420	147	25	20	612			63	675
Rindge Tract—Reclamation District No. 2037						1,356		3,161						4,517	1,893	100	130	6,640			200	6,840
Roberts Island (Lower Division)—Reclamation District No. 684	1,148	456		175		2,990	2	2,435		520	606	176		8,508	139	840	160	9,647		406	142	10,195
Roberts Island (Middle Division)—Reclamation District No. 524	2,553		240		120	714	8	5,092		845	30		35	9,637	321	423	215	10,596	200	90	114	11,000
Roberts Island (Upper Division)—Reclamation District No. 544	595		727		10	449	21	981	10	150			15	2,958	127	60	80	3,225	4,120		130	7,475
Rough and Ready Island—Reclamation District No. 403	135					700	75	250						[7]1,160	121	45	24	[7]1,350		315	82	1,647
Ryer Island—Reclamation District No. 501	45	7,858	382	1,411	20	426	387						314	10,843	497	230	320	11,890			320	12,210
Sargeant-Barnhart Tract	170	100		20		370		416						1,076		11	66	1,153			25	1,178
Sherman Island—Reclamation District No. 341	225	8,334	20	91	40	146		180		20			70	9,126	224	470	117	9,937			368	10,305
Shima Tract						425		630		571				1,626	105	22	22	1,775			95	1,870
Smith Tract (R. R. and N. A. Smith)	5					100	10	505		200			10	830	742	10	12	1,594	380		51	2,025
Spud Island																				80	23	103
State Farm	135	10	22	13		98	104	520		48			50	1,000				1,000		26		1,026
Staten Island		1,849		860	100	2,340	288	1,910		130	740			8,217	327	189	181	8,914			346	9,260
Stockton Acres—Reclamation District No. 828							5		1				20	26	409			435		200	40	675
Sutter Island—Reclamation District No. 349	69	245	352	330		88	829	140	23	2		170	107	[8]2,355	38	90	84	[8]2,567			192	2,714
Terminous Tract—Reclamation District No. 548	40	3,624	40	200	1,911	250	3	880	140	1,236	925			9,249	612	205	300	10,366			142	10,508
Tule Island																				46	18	64
Twitchell Island—Reclamation District No. 1601		1,210	25			130	30	1,785		40				3,220	126	20	65	3,431			200	3,631
Tyler Island—Reclamation Districts Nos. 136, 364, 532, 563 and 807	203	6,495	280	315		95	260	100			486		115	[9]8,349		126	260	[9]8,735			262	8,947
Union Island—Reclamation Districts Nos. 1 and 2	365	3,955	445	1,450	80	2,970	185	11,177	15		265		10	[10]20,917	200	179	240	[10]21,536	1,380		284	23,000
Veale Tract—Reclamation District No. 2065	18	120				300		400		210				1,048	150	112	12	1,322			41	1,363
Venice Island—Reclamation District No. 2023					450								650	1,100	[11]2,117	50	120	3,387		202	247	3,836
Victoria Island—Reclamation District No. 2040		500		500		4,200		1,150			240		350	6,940	82	58	127	7,207			103	7,310
Webb Tract—Reclamation District No. 2026		400				1,860		1,506	80		260			4,106	1,028	80	208	5,422			100	5,522
West Island							34							34			[12]124	158			22	180
Widdow Island						25					25			50		2	3	55			10	65
Woodward Island						900			140		150			1,190	911	35	43	2,179			66	2,245
Wright Tract	75	60		200		302					650			1,287		3	9	1,299			59	1,358
Reclamation District No. 50—Spoil Area																	[5]2,590	[5]2,590		510	100	3,200
Reclamation District No. 307—Lisbon	250	30	159	2,050			4	1,630				480	790	5,393		75	104	5,572	325	7	182	6,086
Reclamation District No. 348	2,135	1,105	254	250			230	3,876				150	210	8,210		52	80	8,342	727	283	126	9,478
Reclamation District No. 369—Locke							180							180	336	9	14	539			15	554
Reclamation District No. 535	158	22				20	20		5			2	590	817		200	190	1,207	882	2,052	54	4,195
Reclamation District No. 536—Egbert	1,011	2,427				453	6	1,278		700				5,875	2,083	49	34	8,041	250	500	142	8,933
Reclamation District No. 554—Walnut Grove		54		67		60	10	50		9		220	50	520	118	33	6	677			22	699
Reclamation District No. 673—Pocket	149	198	20	520	20		22	20		70		10	943	[13]1,972		90	70	[13]2,132	210	609	178	3,099
Reclamation District No. 744	90	80	130			20	120					660	250	1,350	59	94	45	1,548			70	1,618
Reclamation District No. 746—Bonnie Brae							104							104		5	4	113		11	11	135
Reclamation District No. 765—Glide	700		90	100		20						150	25	1,085		25	45	1,155	25	20	122	1,322
Reclamation District No. 813	300		100	100			130	1,050		400			50	2,130			84	2,214	200	67	70	2,551
Reclamation District No. 824—Freeport	148						3						215	[14]366			6	[14]372	50	26	35	463
Reclamation District No. 900—West Sacramento	3,321	50	100	200		80	350		40			150	1,650	5,941			336	6,277	1,850	2,863	210	11,200
Reclamation District No. 999	50	9,248	1,503	7,779			467		1,369	300	50	650	1,772	[15]23,188	660	105	757	[15]24,710		440	1,600	26,136
Reclamation District No. 1002	20	200	150			350		500						1,220	3,092	849	250	5,411	690	600	160	6,861
Reclamation District No. 1614—Smith							60	580		560			30	1,230	465	12	20	1,727			45	1,772
Totals	25,378	71,709	[16]16,147	28,621	[2]7,418	[17]52,807	9,480	79,996	[18]3,299	12,052	14,558	5,844	[19]10,716	[20]338,025	31,586	8,868	15,311	†[20]393,790	14,974	14,171	†[4]13,565	434,909

*All acreages below elevation 5.0 U.S.G.S. datum are considered as irrigated or consuming water.

**Includes roads, camp areas, interior levees, etc.

†The total levee area includes water consuming acreages estimated at 4,400 willows and 4,600 weeds which should be included in column 19. No survey was made to segregate these items to the individual islands and tracts.

‡ These figures represent gross area, i. e., entire area inside surrounding water channels.

[1] Includes 390 acres rice.

[2] Includes 185 acres celery as second crop after grain.

[3] This is not the total lands of the California Irrigated Farms Company. Approximately 3.400 acres south of Tom Paine Slough is classed in the "Delta Uplands." See Delta Uplands Diversions from Tom Paine Slough.

[4] Includes 7 acres pears on the levee.

[5] Area has been flooded and is subject to tidal flow due to broken levees.

[6] Includes 340 acres asparagus interplanted to 300 beans and 40 onions.

[7] Includes 100 acres corn as second crop after grain.

[8] Includes 35 acres fruit interplanted to 30 truck and 5 corn; and 10 acres beans as second crop after grain.

[9] Includes 50 acres asparagus interplanted to corn.

[10] Includes 200 acres beans as second crop after grain.

[11] This area comprising 1,700 acres prepared for celery and 417 acres planted to onions was flooded on June 3, 1932, due to a break in the levee. The break was closed on June 26th and unwatering was completed August 20th

[12] Drainage pumps not operated to keep out water in 1932.

[13] Includes 30 acres asparagus interplanted to tomatoes.

[14] Includes 20 acres double cropped truck.

[15] Includes 414 acres beans as second crop after truck and 200 acres double cropped truck.

[16] Includes interplantings and second crop, 924 acres.

[17] Includes interplantings and second crop, 155 acres.

[18] Includes interplantings, 40 acres.

[19] Includes interplantings and second crop, 280 acres.

[20] Includes interplantings and second crop, 1,584 acres.

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SACRAMENTO, 1933

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TABLE 67

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

Crop or Classification	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	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	(.06)	(.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 an 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.

CONSUMPTIVE USE OF WATER IN THE SACRAMENTO-SAN JOAQUIN DELTA - 1932
ACRE-FEET

CROP OR CLASSIFICATION	1/ ACREAGE	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	TOTAL SEASONAL USE	TOTAL ANNUAL USE
ALFALFA	25378	(1520)	(2030)	2540	7610	10150	12690	16490	13960	12690	5080	(2540)	(1780)	81210	89080
ASPARAGUS 2/	71709	3570	3570	3600	3600	5740	10090	28830	49010	39590	30120	8620	7160	193500	193500
BEANS 3/	16147	(940)	(1260)	(1270)	(2600)	(3310)	2380	3800	9190	5860	(1430)	(1100)	(790)	21230	33930
BEETS	28621	(1720)	(2290)	(2290)	3720	9160	14600	17460*	15170*	5720*	(3720)	(2860)	(2000)	65830	80710
CELERY 4/	7418	(300)	(300)	(300)	(690)	(870)	760	740	1490	1860	2220	1490	370	8930	11390
CORN 5/	52807	(2110)	(2120)	(2120)	(4260)	(5340)	12660	44840	44310*	21100*	5280	(5270)	(3700)	128190	153110
FRUIT 6/	9480	(380)	(380)	(380)	1710	3040	4760	5410	3820	2180	670	(660)	(470)	21590	23860
GRAIN AND HAY 7/	79996	(3180)	(3180)	5560	47700	65990	15900	(11130)	(18280)	(16700)	(11130)	(5560)	(3980)	135150	208290
ONIONS 8/	3299	(130)	(130)	260	420	880	1600	1400	650	(520)	(420)	(330)	(230)	5210	6970
PASTURE	12052	960	1210	2410	3010	3010	3010	3020	3010	2410	1810	1210	960	26030	26030
POTATOES	14558	(870)	(1160)	(1170)	(2330)	2180	5530	7570	4370	2180	(1310)	(1020)	(730)	21830	30420
SEED	5844	(350)	(470)	(470)	580	1460	2920	2920	2920	2050	580	(580)	(420)	13430	15720
TRUCK 9/	10716	(610)	(820)	1030	1050	2620	5110	4570	4620	3100	1550	1020	(720)	24670	26820
TOTAL IRRIGATED CROPS 10/	338025	16640	18920	23400	79280	113750	92010	148180	170800	115960	65320	32260	23310	746800	899830
TULES 11/	8300	1330	750	2490	6140	9130	10620	12700	10960	9790	8130	4900	2990	79930	79930
WILLOWS 12/	5600	280	170	500	1230	1850	2130	2580	2240	1960	1620	1010	560	16130	16130
BARE LANDS 13/ 14/	8870	350	350	360	710	890	1160	1240	1150	980	790	620	450	9050	9050
IDLE LAND WITH WEEDS 14/ 15/	38310	2620	3350	3720	7070	8970	12830	13720	11100	7280	5750	4590	3060	84060	84060
OPEN WATER SURFACES 16/	49910	3990	6490	11480	16970	29950	37930	41920	38930	29950	16470	6990	3990	245060	245060
TOTAL CONSUMPTIVE AREA 17/	447430	25210	30030	41950	111400	164540	156680	220340	235180	165920	98080	50370	34360	1181030	1334060
UNIT CONSUMPTION-AC.FT./ACRE:															
TOTAL CONSUMPTIVE AREA	447430	.06	.07	.09	.25	.37	.35	.49	.52	.37	.22	.11	.08	2.64	2.98
IRRIGATED CROP AREA 17/	336440	.05	.06	.07	.23	.34	.27	.44	.51	.34	.19	.10	.07	2.22	2.67

NOTE: FIGURES IN BRACKETS ( ) REPRESENT 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.

1/ DATA FROM TABLE 66.

2/ FIGURES INCLUDE ALLOWANCE FOR GREATER USE BY AREAS INTERCROPPED WITH BEANS, CORN, ONIONS AND TRUCK.

3/ FIGURES INCLUDE USE BY AREAS DOUBLE CROPPED AFTER GRAIN AND TRUCK BUT DO NOT INCLUDE USE BY INTERCROPPED ASPARAGUS ACREAGE (SEE 2/).

4/ FIGURES INCLUDE USE BY AREAS DOUBLE CROPPED AFTER GRAIN.

5/ FIGURES INCLUDE USE BY AREAS DOUBLE CROPPED AFTER GRAIN BUT DO NOT INCLUDE USE BY INTERCROPPED ASPARAGUS AND FRUIT (SEE 2/ AND 6/).

6/ FIGURES INCLUDE ALLOWANCE FOR GREATER USE BY AREAS INTERCROPPED WITH TRUCK AND CORN.

7/ FIGURES DO NOT INCLUDE USE BY DOUBLE CROPPED AREAS (SEE 3/, 4/, AND 5/.

8/ FIGURES DO NOT INCLUDE USE BY INTERCROPPED ASPARAGUS (SEE 2/).

9/ FIGURES INCLUDE USE BY AREAS OF DOUBLE CROPPED TRUCK BUT DO NOT INCLUDE USE BY INTERCROPPED ASPARAGUS AND FRUIT NOR BY AREA DOUBLE CROPPED TO BEANS. (SEE 2/, 3/, AND 6/).

10/ INCLUDES 1584 ACRES OF SECOND CROP AND INTERPLANTINGS.

11/ INTERIOR, 3000 ACRES AND EXTERIOR CHANNELS, 5300.

12/ INTERIOR, AS A PORTION OF LEVEE ACREAGE, 4400 ACRES; EXTERIOR CHANNELS 1200.

13/ INCLUDES ROADS, CAMP AREAS, INTERIOR LEVEES, ETC.

14/ BELOW ELEVATION 5.0 U.S.G.S. DATUM. NON IRRIGATED AND IDLE LANDS ABOVE THIS ELEVATION ARE NOT CONSIDERED AS CONSUMING WATER.

15/ ACREAGE INCLUDES 31590 INTERIOR, 4600 AS A PORTION OF LEVEE AREA, 1800 OAKS AND BRUSH IN EXTERIOR CHANNELS, AND 320 FOR A GROUP OF SMALL ISLANDS NOT INCLUDED IN TABLE 66. CONSUMPTIVE USE FIGURES TAKE ACCOUNT OF VENICE ISLAND AREA WHICH WAS FLOODED TEMPORARILY, AS FOLLOWS: JAN. TO MAY INCL. 1700 CELERY AND 417 ONIONS; JUN. TO AUG. 15TH, 2117 OPEN WATER; AUG. 15TH TO DEC. INCL. 2117 IDLE LAND WITH WEEDS.

16/ INCLUDES INTERIOR WATER SURFACES, 7500 ACRES; FLOODED RECLAMATIONS, 4420; RICE ON BAIRD TRACT, 390; OPEN EXTERIOR CHANNELS WITHIN THE DELTA, 36500; AND OPEN CHANNELS BETWEEN DELTA BOUNDARY AND STREAM GAGING STATIONS (RECORDING FLOW TO THE DELTA) 1100 ACRES.

17/ IN TOTAL AREA FIGURE THE ACREAGE OF IRRIGATED CROPS HAS BEEN CORRECTED FOR SECOND CROP AND INTERPLANTINGS (SEE 10/).

TABLE 69

CONSUMPTIVE USE OF WATER IN THE SACRAMENTO DELTA, 1932
ACRE-FEET

CROP OR CLASSIFICATION	ACRE-AGE	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	TOTAL SEASONAL USE	TOTAL ANNUAL USE
ALFALFA	9593	(580)	(770)	960	2880	3840	4790	6230	5280	4800	1920	(960)	(670)	30700	33680
ASPARAGUS 1/	33118	1650	1650	1670	1680	2660	4670	13350	22720	18340	13900	3990	3300	89580	89580
BEANS 2/	8086	(460)	(620)	(630)	(1220)	(1580)	1240	1880	4510	2880	(700)	(540)	(390)	10510	16650
BEETS	18319	(1100)	(1460)	(1470)	2380	5860	9340	11170*	9710*	3660*	(2380)	(1830)	(1280)	42120	51640
CELERY	2641	(100)	(100)	(110)	(210)	(260)	260	270	530	660	790	530	130	3170	3950
CORN 3/	7997	(320)	(320)	(320)	(640)	(800)	1920	6790	6710*	3200*	800	(800)	(560)	19420	23180
FRUIT 4/	7787	(310)	(310)	(310)	1410	2500	3920	4450	3140	1790	550	(540)	(390)	17760	19620
GRAIN AND HAY 5/	7442	(300)	(300)	520	4460	6170	1490	(1040)	(1710)	(1560)	(1040)	(520)	(370)	12640	19480
ONIONS	2015	(80)	(80)	160	260	530	970	850	400	(310)	(260)	(200)	(140)	3170	4240
PASTURE	1750	140	180	350	440	440	440	440	440	350	260	170	140	3790	3790
POTATOES	95		(10)	(10)	(20)	10	40	50	30	10	(10)	(10)		140	200
SEED	4117	(250)	(330)	(330)	410	1030	2060	2060	2060	1440	410	(410)	(290)	9470	11080
TRUCK 6/	8035	(450)	(610)	760	780	1950	3770	3360	3410	2290	1150	750	(540)	18220	19820
TOTAL IRRIGATED CROPS 7/	110995	5740	6740	7600	16790	27630	34910	51940	60650	41290	24170	11250	8200	260690	296910
TULES 8/	1910	310	170	570	1410	2100	2440	2920	2520	2260	1870	1130	690	18390	18390
WILLOWS 9/	2000	100	60	180	440	660	760	920	800	700	580	360	200	5760	5760
BARE LANDS 10/ 11/	1860	70	70	80	150	190	240	260	240	200	170	130	90	1890	1890
IDLE LAND WITH WEEDS 11/ 12/	7790	550	700	780	1480	1870	2420	2570	2180	1480	1170	930	620	16750	16750
OPEN WATER SURFACES 13/	16800	1340	2190	3860	5710	10080	12770	14110	13110	10080	5540	2350	1350	82490	82490
TOTAL CONSUMPTIVE AREA 14/	140300	8110	9930	13070	25980	42530	53540	72720	79500	56010	33500	16150	11150	385970	422190
UNIT CONSUMPTION, AC.FT./ACRE															
TOTAL CONSUMPTIVE AREA	140300	.06	.07	.09	.18	.30	.38	.52	.57	.40	.24	.12	.08	2.75	3.01
IRRIGATED CROP AREA 14/	109950	.05	.06	.07	.15	.25	.32	.47	.55	.38	.22	.10	.07	2.37	2.69

NOTE: FIGURES IN BRACKETS ( ) REPRESENT 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.

1/ FIGURES INCLUDE ALLOWANCE FOR GREATER USE BY AREAS INTERCROPPED WITH BEANS, ONIONS, AND TRUCK.

2/ FIGURES INCLUDE USE BY AREAS DOUBLE CROPPED AFTER GRAIN AND TRUCK BUT DO NOT INCLUDE USE BY INTERCROPPED ASPARAGUS (SEE 1/).

3/ FIGURES DO NOT INCLUDE USE BY INTERCROPPED FRUIT (SEE 4/).

4/ FIGURES INCLUDE ALLOWANCE FOR GREATER USE BY AREAS INTERCROPPED WITH CORN AND TRUCK.

5/ FIGURES DO NOT INCLUDE USE BY DOUBLE CROPPED AREAS (SEE 2/.

6/ FIGURES INCLUDE USE BY AREAS OF DOUBLE CROPPED TRUCK BUT DO NOT INCLUDE USE BY INTERCROPPED ASPARAGUS AND FRUIT NOR BY AREA DOUBLE CROPPED TO BEANS. (SEE 1/, 2/, AND 4/.).

7/ INCLUDES 1049 ACRES OF SECOND CROP AND INTERPLANTINGS.

8/ INTERIOR, 1310 ACRES AND EXTERIOR CHANNELS 600.

9/ INTERIOR, AS A PORTION OF LEVEE ACREAGE, 1900 ACRES; EXTERIOR CHANNELS 100.

10/ INCLUDES ROADS, CAMP AREAS, INTERIOR LEVEES, ETC.

11/ BELOW ELEVATION 5.0 U.S.G.S. DATUM. NON-IRRIGATED AND IDLE LANDS ABOVE THIS ELEVATION ARE NOT CONSIDERED AS CONSUMING WATER.

12/ ACREAGE INCLUDES 5260 INTERIOR, 2340 AS A PORTION OF LEVEE AREA, 100 OAKS AND BRUSH IN EXTERIOR CHANNELS, AND 90 FOR A SMALL AREA NOT INCLUDED IN TABLE 66.

13/ INCLUDES INTERIOR WATER SURFACES, 2500 ACRES; FLOODED RECLAMATIONS 2100; OPEN EXTERIOR CHANNELS WITHIN THE DELTA, 11200; AND OPEN CHANNELS BETWEEN DELTA BOUNDARY AND STREAM GAGING STATION, 1000 ACRES.

14/ IN TOTAL AREA FIGURE THE ACREAGE OF IRRIGATED CROPS HAS BEEN CORRECTED FOR SECOND CROP AND INTERPLANTINGS (SEE 7/).

TABLE 70

CONSUMPTIVE USE OF WATER IN THE SAN JOAQUIN DELTA, 1932
ACRE-FEET

CROP OR CLASSIFICATION	ACREAGE	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	TOTAL SEASONAL USE	TOTAL ANNUAL USE
ALFALFA	15785	(940)	(1260)	1580	4730	6310	7900	10260	8680	7890	3160	(1580)	(1110)	50510	55400
ASPARAGUS 1/	38591	1920	1920	1930	1920	3080	5420	15480	26290	21250	16220	4630	3860	103920	103920
BEANS 2/	8061	(480)	(640)	(640)	(1380)	(1730)	1140	1920	4680	2980	(730)	(560)	(400)	10720	17280
BEETS	10302	(620)	(830)	(820)	1340	3300	5260	6290*	5460*	2060*	(1340)	(1030)	(720)	23710	29070
CELERY 2/	4777	(200)	(200)	(190)	(480)	(610)	500	470	960	1200	1430	960	240	5760	7440
CORN 3/	44810	(1790)	(1800)	(1800)	(3620)	(4540)	10740	38050	37600*	17900*	4480	4470	(3140)	108770	129930
FRUIT	1693	(70)	(70)	(70)	300	540	840	960	680	390	120	(120)	(80)	3830	4240
GRAIN AND HAY 4/	72554	(2880)	(2880)	5040	43240	59820	14410	(10090)	(16570)	(15140)	(10090)	(5040)	(3610)	122510	188810
ONIONS	1284	(50)	(50)	100	160	350	630	550	250	(210)	(160)	(130)	(90)	2040	2730
PASTURE	10302	820	1030	2060	2570	2570	2570	2580	2570	2060	1550	1040	820	22240	22240
POTATOES	14463	(870)	(1150)	(1160)	(2310)	2170	5490	7520	4340	2170	(1300)	(1010)	(730)	21690	30220
SEED	1727	(100)	(140)	(140)	170	430	860	860	860	610	170	(170)	(130)	3960	4640
TRUCK	2681	(160)	(210)	270	270	670	1340	1210	1210	810	400	270	(180)	6450	7000
TOTAL IRRIGATED CROPS 5/	227030	10900	12180	15800	62490	86120	57100	96240	110150	74670	41150	21010	15110	486110	602920
TULES 6/	6390	1020	580	1920	4730	7030	8180	9780	8440	7530	6260	3770	2300	61540	61540
WILLOWS 7/	3600	180	110	320	790	1190	1370	1660	1440	1260	1040	650	360	10370	10370
BARE LANDS 8/ 9/	7010	280	280	280	560	700	920	980	910	780	620	490	360	7160	7160
IDLE LAND WITH WEEDS 9/ 10/	30520	2070	2650	2940	5590	7100	10410	11150	8920	5800	4580	3660	2440	67310	67310
OPEN WATER SURFACES 11/	33110	2650	4300	7620	11260	19870	25160	27810	25820	19870	10930	4640	2640	162570	162570
TOTAL CONSUMPTIVE AREA 12/	307130	17100	20100	28880	85420	122010	103140	147620	155680	109910	64580	34220	23210	795060	911870
UNIT CONSUMPTION—AC.FT./ACRE															
TOTAL CONSUMPTIVE AREA	307130	.05	.06	.09	.28	.40	.34	.48	.51	.36	.21	.11	.08	2.59	2.97
IRRIGATED CROP AREA 12/	226490	.05	.05	.07	.28	.38	.25	.42	.49	.33	.18	.09	.07	2.15	2.66

NOTE: FIGURES IN BRACKETS ( ) REPRESENT 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.

1/ FIGURES INCLUDE ALLOWANCE FOR GREATER USE BY AREA INTERCROPPED WITH CORN.

2/ FIGURES INCLUDE USE BY AREAS DOUBLE CROPPED AFTER GRAIN.

3/ FIGURES INCLUDE USE BY AREA DOUBLE CROPPED AFTER GRAIN BUT DO NOT INCLUDE USE BY INTERCROPPED ASPARAGUS (SEE 1/).

4/ FIGURES DO NOT INCLUDE USE BY DOUBLE CROPPED AREAS (SEE 2/ AND 3/).

5/ INCLUDES 535 ACRES OF SECOND CROP AND INTERPLANTINGS.

6/ INTERIOR, 1690 ACRES AND EXTERIOR CHANNELS 4700.

7/ INTERIOR, AS A PORTION OF LEVEE ACREAGES, 2500 ACRES; EXTERIOR CHANNELS, 1100.

8/ INCLUDES ROADS, CAMP AREAS, INTERIOR LEVEES, ETC.

9/ BELOW ELEVATION 5.0 U.S.G.S. DATUM. NON-IRRIGATED AND IDLE LANDS ABOVE THIS ELEVATION ARE NOT CONSIDERED AS CONSUMING WATER.

10/ ACREAGE INCLUDES 26330 INTERIOR, 2260 AS A PORTION OF LEVEE AREA, 1700 OAKS AND BRUSH IN EXTERIOR CHANNELS, AND 230 FOR A GROUP OF SMALL ISLANDS NOT INCLUDED IN TABLE 66. CONSUMPTIVE USE FIGURES TAKE ACCOUNT OF VENICE ISLAND AREA WHICH WAS FLOODED TEMPORARILY, AS FOLLOWS: JAN. TO MAY, INCL., 1700 CELERY AND 417 ONIONS; JUN. TO AUG. 15TH 2117 OPEN WATER; AUG. 15TH TO DEC. INCL. 2117 IDLE LAND WITH WEEDS.

11/ INCLUDES INTERIOR WATER SURFACES, 5000 ACRES; FLOODED RECLAMATIONS 2320; RICE ON BAIRD TRACT 390; OPEN EXTERIOR CHANNELS WITHIN THE DELTA, 25300; AND OPEN CHANNELS BETWEEN DELTA BOUNDARY AND STREAM GAGING STATION, 100 ACRES.

12/ IN TOTAL AREA FIGURE THE ACREAGE OF IRRIGATED CROPS HAS BEEN CORRECTED FOR SECOND CROP AND INTERPLANTINGS (SEE 5/).

TABLE 71

GENERAL SOIL CLASSIFICATION OF THE IRRIGATED CROP LANDS IN THE DELTA, 1932

Crop	Peat Soil Acreage Irrigated	Sedimentary Soil. Acreage Irrigated	Total
Alfalfa	4476	20902	25378
Asparagus	29992	41717	71709
Beans	1624	14523	16147
Beets	8530	20091	28621
Celery	4823	2595	7418
Corn	36017	16790	52807
Fruit	714	8766	9480
Grain and Hay	41639	38357	79996
Onions	1376	1923	3299
Pasture	5566	6486	12052
Potatoes	13768	790	14558
Seed	1570	4274	5844
Truck	1941	8775	10716
Totals	152036	185989	338025

CHAPTER VI

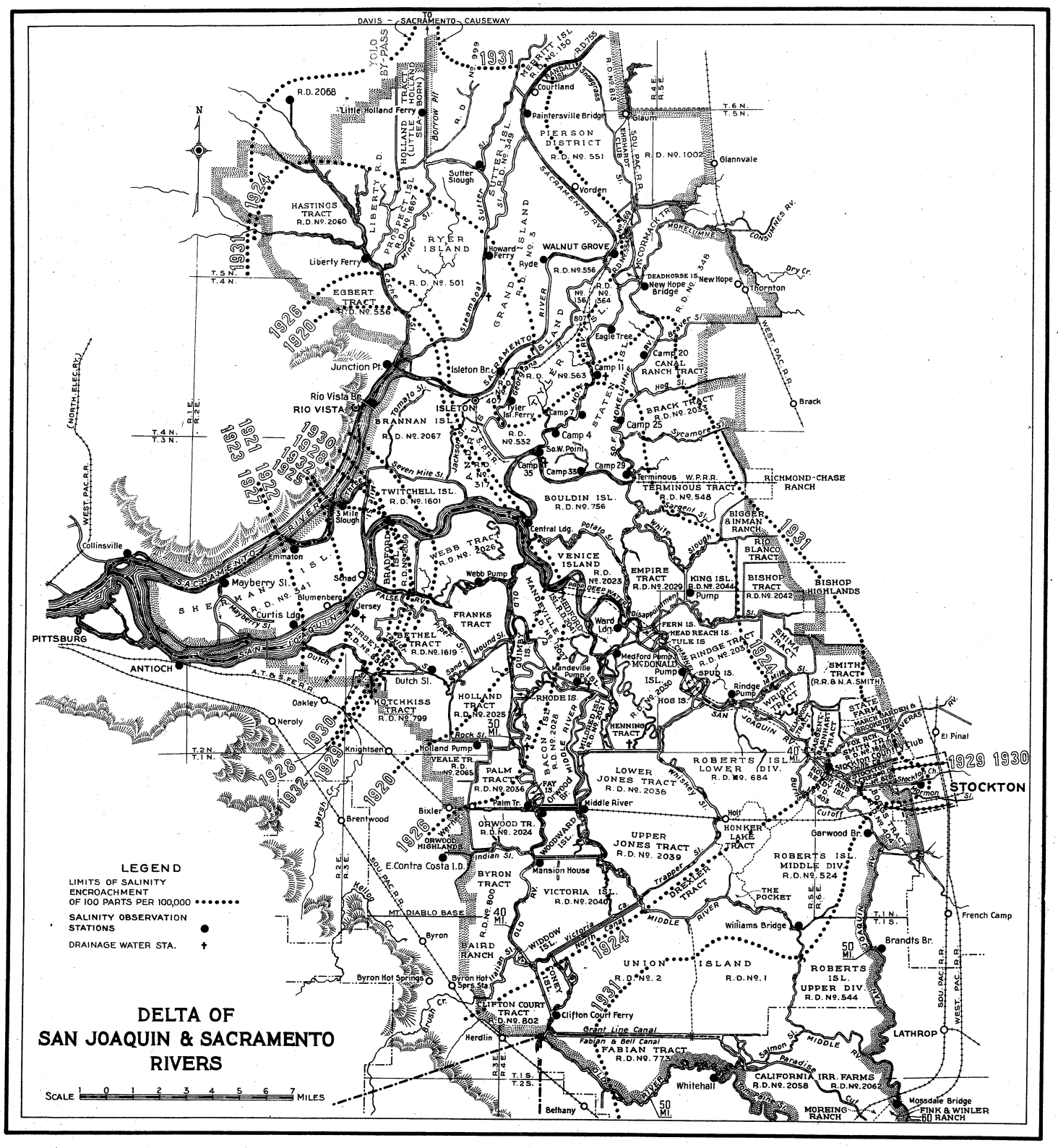
SALINITY INVESTIGATION

Purpose

The purpose of the salinity investigation, as outlined in previous reports, has been to record the occurrence and extent of the encroachment into upper Bay and Delta channels of salinity 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.

Scope

The scope of this investigation each season 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 that the advance and retreat of the salinity from early Summer to late Fall would be completely recorded. In 1932 the Summer stream flow to the Delta did not fall below 3000 second-feet and the location of the line representing salinity encroachment of 100 parts of chlorine per 100,000 parts of water was, correspondingly, well down in the lower Delta and in



MAXIMUM SEASONAL SALINITY ENCROACHMENT OF 100 PARTS OF CHLORINE PER 100,000 PARTS OF WATER, SACRAMENTO-SAN JOAQUIN DELTA, 1920 - 1932

PLATE 3

practically the same location as in 1928, 1929, and 1930. This is indicated on Plate 3 which shows the limit of encroachment into the Delta of 100 part salinity in the years 1920 to 1932, inclusive. Twenty Bay and Delta sampling stations are maintained permanently throughout the year as well as six stations at which drainage water is sampled, and in 1932 nine additional river channel stations were established and maintained for the duration of the season in order to completely record the encroachment and recession.

Station Maintenance and Records

As in the past, the salinity sampling at all regular stations 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 would be taken at approximately one and one-half hours after the same high tide. 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 chemical laboratory of the Division of Highways. The record of the tests of all samples taken in 1932 is given in Table 74, and Table 73 gives the location and description of each station.

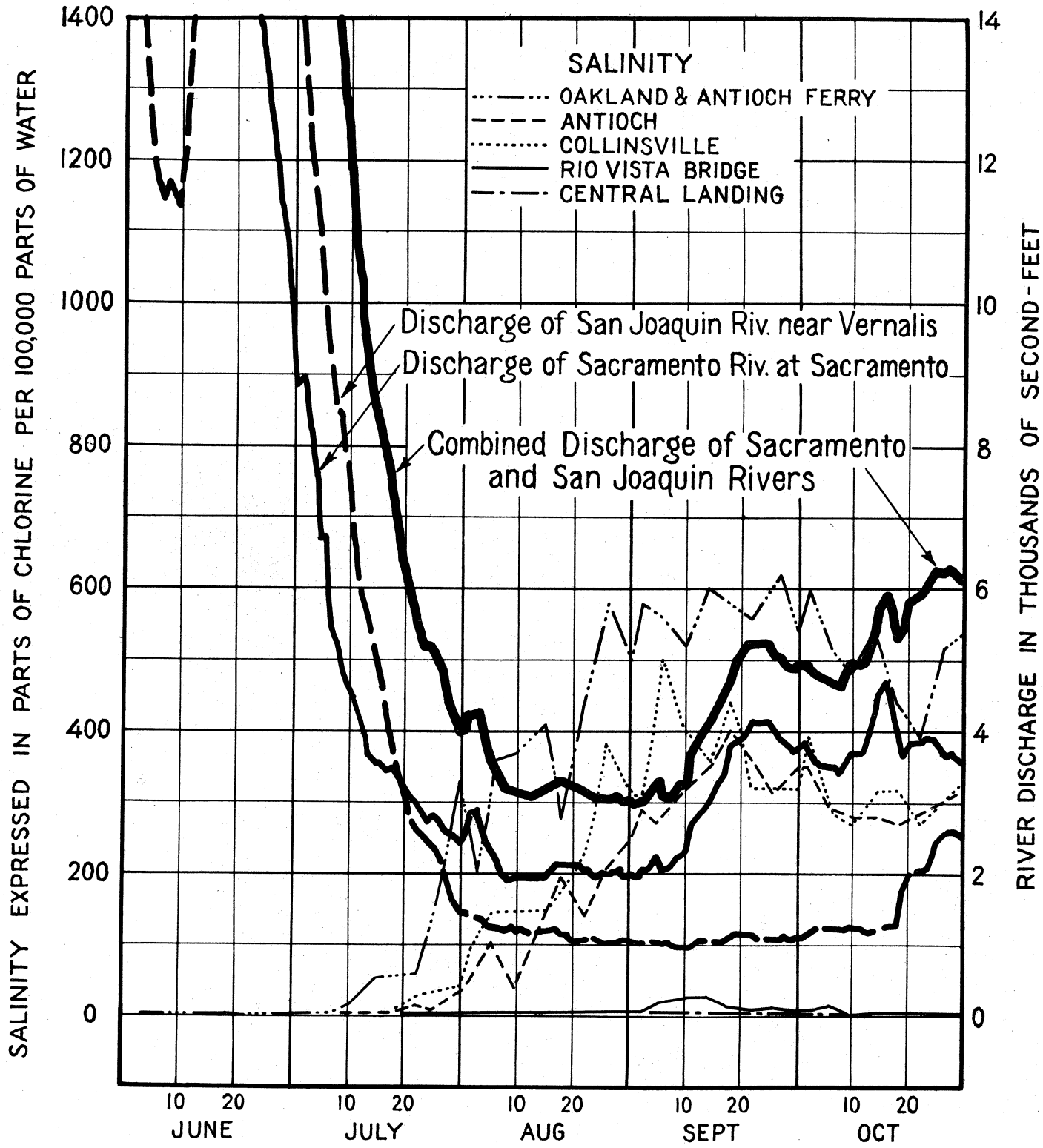
The maximum salinity as recorded at the stations operated in 1932 is shown in Table 72. For comparative purposes, this table shows also the maximum salinity recorded at these stations in previous years beginning with 1924. A comparison of the Summer stream flow to the Delta in 1932 and the corresponding salinity at certain of the lower Delta stations is shown on Plate 4.

Drainage and Groundwater Salinity

Begun in May, 1929, in connection with the special salinity invest-

igation which was the basis for Bulletin 27, the sampling of drainage water on five islands in the Delta has been continued to date in order to show the variation of salinity in the drainage water with that in the channels surrounding the islands, over a considerable period including both years of high and low salinity encroachment. The record of the drainage water sampling in 1932 is given in Table 74 and Plate 5 shows a comparison of the observed drainage and channel salinity from January 1931 to date, for Jersey, Mandeville and Staten Island stations. These graphs indicate a definite reflection in the drainage water of the variation in channel salinity but it appears that after the seasonal recession of the channel salinity in the late Fall and early Winter there is a considerable period extending even to May or June of the following year during which the salinity of the drainage water remains almost as high as that during the previous period of high channel salinity. In other words, it apparently requires five or six months following the period of high channel salinity before the salinity of the drainage water reflects and corresponds to that of the channel water.

It appears that little definite information has been developed conerning the effect upon the groundwater of high salinity in the channels surrounding an island, particularly when at certain periods, water of high salinity has been diverted for irrigation. In order, therefore, to make some determination of this effect, a program of regular sampling of groundwater at holes on Sherman Island, at the lower point of the Delta, and on Grizzly Island in Suisun Bay, was begun in April, 1931, and has been continued to date. The location of the sampling holes is indicated by the sketch maps shown on Plate 6 and the results of the sampling are given in Tables 75 and 76. Plate 6 shows also, for each island, a comparison of the



COMPARISON OF RIVER DISCHARGE AND SALINITY AT BAY AND DELTA STATIONS
1932

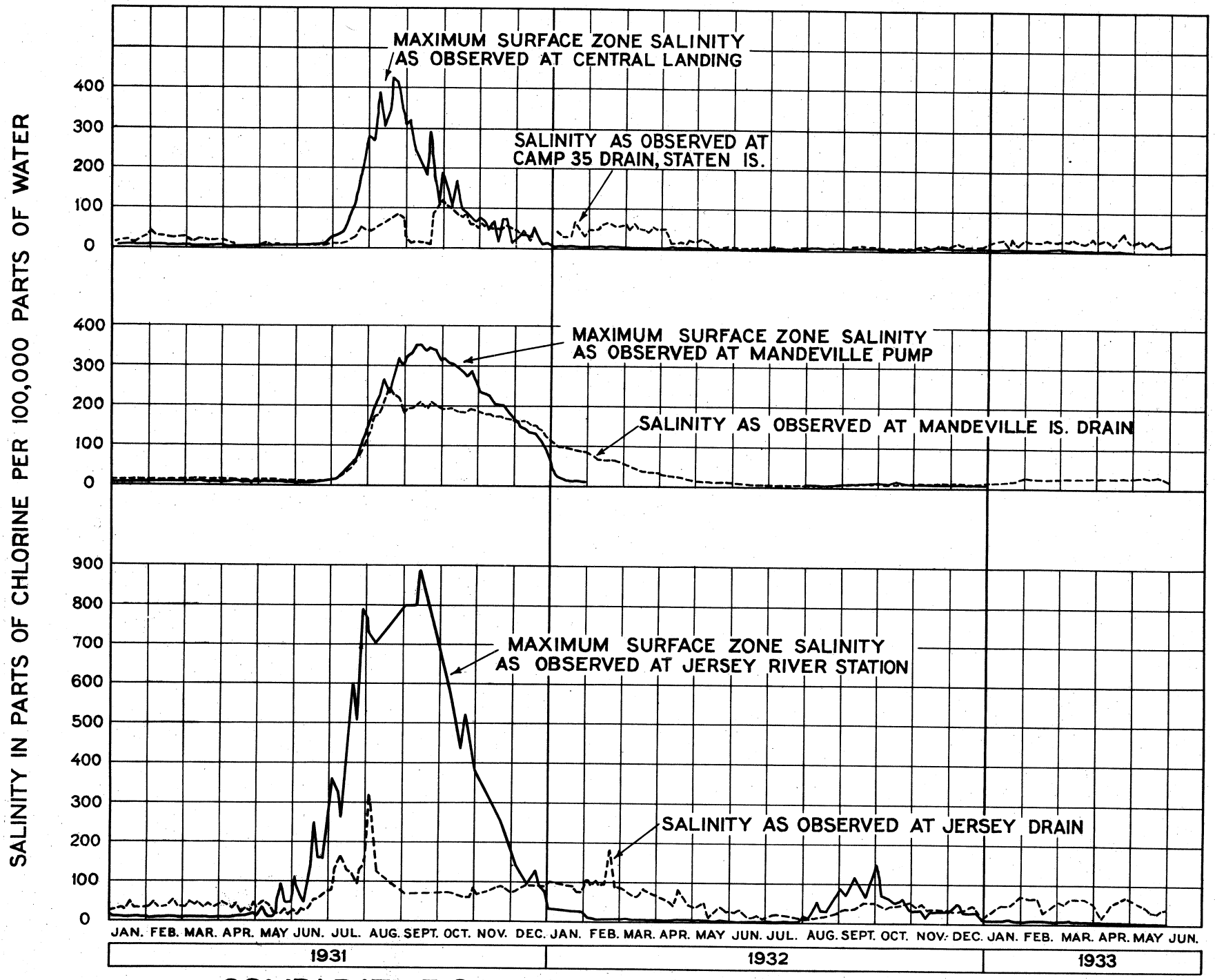
PLATE 4

observed ground and drainage water salinity with the salinity in the river channels adjacent to the islands. There appears to be a wide variation in the salinity as observed at the different holes but a more or less uniform agreement with respect to the major trends and seasonal variations. An endeavor was made to eliminate the effect of surface water by casing the holes with stovepipe during the rainy season, and on the suspicion that there might be a concentration of salinity in the holes, the expedient was begun in May, 1932, of bailing them out at each visit and sampling both before bailing and after the hole had refilled. It will be noted that in some instances there was a considerable difference in the salinity before and after bailing but that the average or general trend remains evident. With the groundwater salinity there is apparently the same characteristic as in the case of the drainage water. That is, the marked lag in the reflection of the degree and variation of salinity in the river channels, and the sustained period of higher salinity throughout the Winter and Spring when the channel salinity is low.

Tide Gages

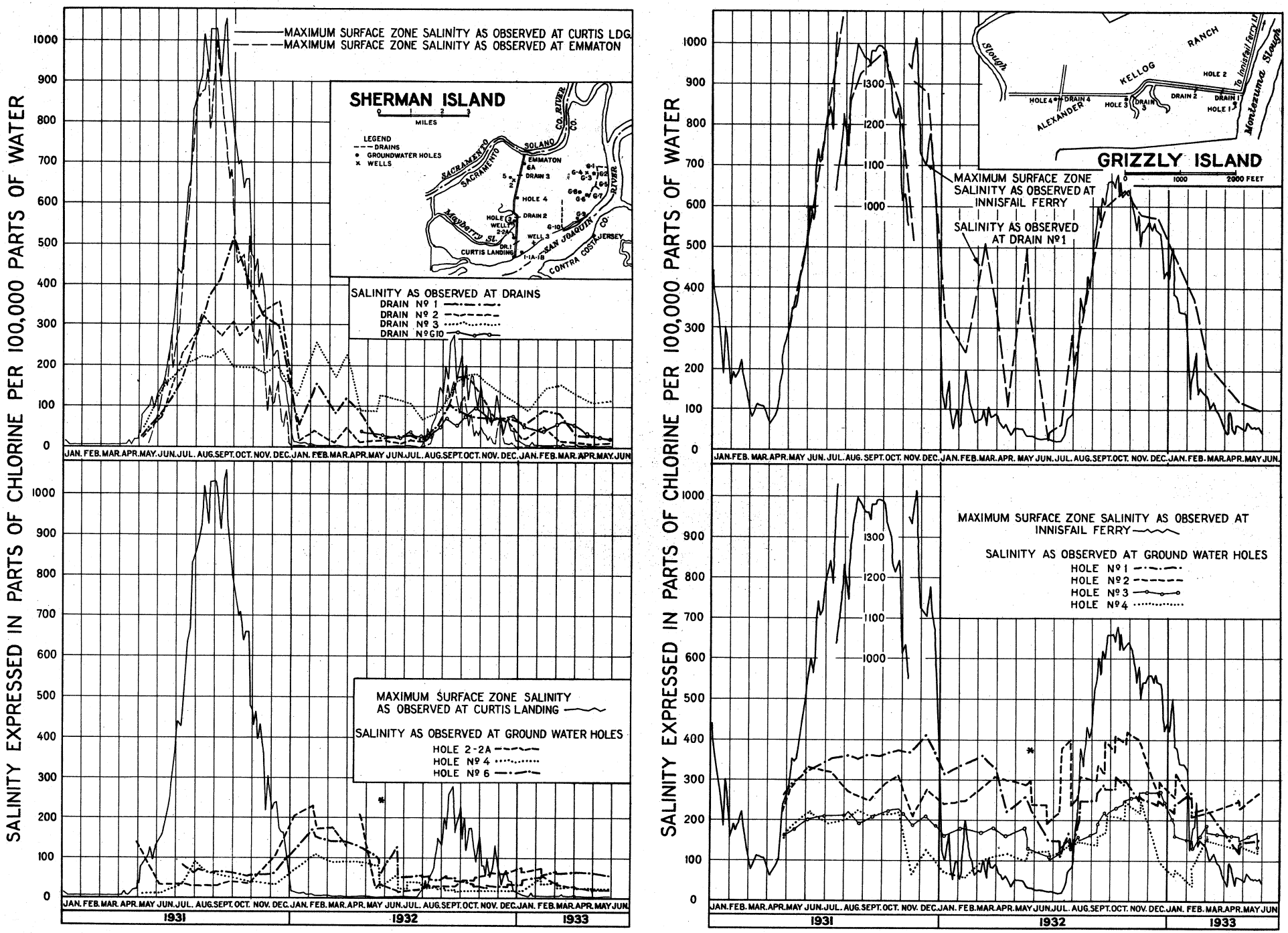
In the analysis of the relation between salinity, stream flow and tidal action as presented in Bulletin 27, the comprehensive information covering the tidal variations throughout the Delta as obtained from the records of the tide gages was indispensable. The record of these gages has therefore been continued as an essential requirement in connection with any further such analysis for subsequent salinity, stream flow and tidal conditions. Of the stations which supplied data used in the investigation for Bulletin 27, four are being maintained by the U. S. Army Engineers, one each by U. S. Coast and Geodetic Survey, U. S. Navy, East Contra Costa Irrigation District and Staten Island Land Company, and the remaining

stations, eight in number, are being maintained by the Water Supervisor. The latter are located at Sacramento, Walnut Grove, San Joaquin end of Georgiana Slough, Sacramento and San Joaquin ends of Three Mile Slough, Antioch, Collinsville, and Mossdale Bridge (San Joaquin River).



COMPARATIVE SALINITY OF RIVER AND DRAINAGE WATER

PLATE 5



* Subsequent to this date the water was bailed out of the ground water holes at each visit and samples were taken both before bailing and after the hole had refilled.

COMPARATIVE SALINITY OF RIVER, DRAINAGE AND GROUND WATER SHERMAN AND GRIZZLY ISLANDS

PLATE 6

TABLE 72

MAXIMUM RECORDED SALINITY AT BAY AND DELTA STATIONS
1924 TO 1932, INCLUSIVE

YEAR	1924	1925	1926	1927	1928	1929	1930	1931	1932
SEASONAL RUN-OFF TO SAN FRANCISCO BAY IN PER CENT OF NORMAL*	28	83	57	114	80	42	63	29	78
STATION (1)	MAXIMUM RECORDED SALINITY IN PARTS OF CHLORINE PER 100,000								
				SAN FRANCISCO, SAN PABLO AND SUISUN BAYS					
POINT ORIENT			2020	1880	1870	1830	1780	1870	1720
POINT DAVIS			1850	1510	1610	1660	1620	1810	1520
BULLS HEAD POINT			1690	1330	1410	1370	1380	1690	1320
BAY POINT			1400	950	1170	1050	1060	1540	1010
O AND A FERRY	1345	762	1100	510	750	830	800	1390	620
INNISFAIL FERRY						870	810	1400	680
				NORTH SAN PABLO BAY					
SONOMA CREEK BRIDGE						1600	1670	1660	1420
GRANDVIEW							1610	1870	1460
VALLEJO							1340	1700	1300
CUTTINGS WHARF							1320	1800	1200
				SACRAMENTO RIVER DELTA					
COLLINSVILLE	1150	448	1020	370	590	680	570	1260	500
EMMATON	802	136	540	65	156	310	250	1000	166
THREE MILE SLOUGH BRIDGE	692	81	430	25	109	205	150	860	90
RIO VISTA BRIDGE	608	21	256	12	44	67	52	740	28
JUNCTION POINT						17	26	620	(2) 7
ISLETON BRIDGE	310	12	68		13	6	10	635	(2) 6
SACRAMENTO						8	5	10	6
				SAN JOAQUIN RIVER DELTA					
ANTIOCH	1080	356	920	179	450	600	470	1240	400
CURTIS LANDING						450		1060	280
JERSEY	708	81	470	53	192	365	220	910	150
WEBB PUMP	414	24	147	16	46	80	61	680	35
CENTRAL LANDING	288	10	98		19	20	15	425	8
DUTCH SLOUGH								510	37
HOLLAND PUMP	308	18	148		34	42	23	325	11
MANDEVILLE PUMP			84		25	25	17	350	18
RINDGE PUMP	126	35	50		28	28	16	198	16
MIDDLE RIVER	186	13	69		21	17	13	270	12
STOCKTON						200	120	132	72
MOSSDALE BRIDGE	14					16	10	12	14

* NORMAL TAKEN AS 40-YEAR MEAN (1889-1929) OF NATURAL RUN-OFF AT FOOTHILL STATIONS OF MAJOR STREAMS TRIBUTARY TO SAN FRANCISCO BAY.

(1) FOR LOCATION AND DESCRIPTION SEE TABLE 73.

(2) MAXIMUM SALINITY OBTAINED FROM FIRST SAMPLE TAKEN IN SEASON.

TABLE 73

SALINITY STATIONS AT WHICH OBSERVATIONS WERE TAKEN DURING 1932

STATION	MILES FROM GOLDEN GATE	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 SAN FRANCISCO BAY, EAST SHORE, ½ MILE SOUTH OF PT. 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.
BULLS HEAD 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 AND 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 1 MILE EAST OF JUNCTION WITH CUTOFF SLOUGH, NEAR NORTH END OF GRIZZLY ISLAND.
				NORTH SAN PABLO BAY
SONOMA CREEK BRIDGE*	26.4	3	10	SONOMA CREEK ENTRANCE AT DRAWBRIDGE.
GRAND VIEW*	27.0	3	10	PETALUMA CREEK, STATE HIGHWAY DRAWBRIDGE NEAR TOWN OF GRAND VIEW.
VALLEJO*	29.1	3	35	NAPA RIVER AT SEARS POINT TOLL ROAD BRIDGE, ABOUT ONE MILE FROM MARE ISLAND NAVY YARD CAUSEWAY.
CUTTINGS WHARF*	36.7	4	00	NAPA RIVER, RIGHT BANK, OPPOSITE NORTH END OF BULL ISLAND, NEAR CARNEROS STATION ON SOUTHERN PACIFIC RAILROAD.
				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 BR.	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.
ISLETON BRIDGE	68.7	6	30	SACRAMENTO RIVER, ONE MILE UPSTREAM FROM ISLETON.
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 FK.
CAMP 33, STATEN ISLAND†	80.2	7	30	SOUTH FORK, MOKELUMNE RIVER, NORTH BANK, 2 MILES ABOVE NORTH FORK JUNCTION.
CAMP 7, STATEN ISLAND†	81.8	7	40	NORTH FORK, MOKELUMNE RIVER, SOUTH BANK, APPROXIMATELY 3 MILES ABOVE SOUTH FORK JUNCTION
CAMP 11, STATEN ISLAND†	83.1	7	45	NORTH FORK MOKELUMNE RIVER, EAST BANK, 4 MILES ABOVE SOUTH FORK JUNCTION.
CAMP 29, STATEN ISLAND†	83.4	7	50	SOUTH FORK, MOKELUMNE RIVER, NORTH BANK, OPPOSITE TERMINOUS.
EAGLE TREE †	85.8	8	05	STATEN ISLAND, NORTH FORK, MOKELUMNE RIVER, SOUTH BANK, 1 3/4 MILES BELOW MILLERS FERRY BRIDGE.
CAMP 25, STATEN ISLAND†	86.4	8	.05	SOUTH FORK, MOKELUMNE RIVER, WEST BANK, 1 MILE ABOVE SYCAMORE SLOUGH JUNCTION.
NEW HOPE BRIDGE †	87.0	8	10	NORTH END STATEN ISLAND NEAR UPPER JUNCTION OF NORTH AND SOUTH FORKS MOKELUMNE RIVER.
CAMP 20, STATEN ISLAND†	88.9	8	30	SOUTH FORK, MOKELUMNE RIVER, WEST BANK, ½ MILE BELOW BEAVER SLOUGH JUNCTION.

* PERMANENT STATIONS MAINTAINED THROUGHOUT THE YEAR.
† OBSERVATIONS ONLY IN FIRST MONTHS OF 1932 TO RECORD COMPLETE RECESSION OF 1931 SALINITY.

TABLE 73 (CONTINUED)

SALINITY STATIONS AT WHICH OBSERVATIONS WERE TAKEN DURING 1932

STATION	MILES FROM GOLDEN GATE	TIME INTERVAL BETWEEN HIGH TIDE AT GOLDEN GATE AND TIME FOR TAKING SAMPLES AT STATION		LOCATION
		HOURS	MINS.	
				SAN JOAQUIN RIVER 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 3/4 MILE ABOVE ANTIOCH TOLL BRIDGE.
JERSEY*	61.4	6	20	SAN JOAQUIN RIVER, LEFT BANK, 1 MILE BELOW MOUTH OF FALSE RIVER.
WEBB PUMP	72.0	7	00	FALSE RIVER, 2 MILES BELOW OLD RIVER JUNCTION.
CENTRAL LANDING*	72.0	7	00	MOKELUMNE RIVER AT CENTRAL LANDING, BOULDIN ISLAND.
DUTCH SLOUGH	73.0	7	05	AT BETHEL ISLAND BRIDGE.
WARD LANDING †	79.6	7	35	SAN JOAQUIN RIVER NEAR JUNCTION WITH LITTLE CONNECTION SLOUGH ON THE SOUTHWEST SIDE OF EMPIRE TRACT.
HOLLAND DAM†	80.1	7	40	ROCK SLOUGH, BELOW DAM AT SOUTHEAST CORNER HOLLAND TRACT, DAM COMPLETED ABOUT JUN. 1, 193
HOLLAND PUMP	80.6	7	40	ROCK SLOUGH, NORTH BANK, 1½ MILES WEST OF OLD RIVER JUNCTION.
MANDEVILLE PUMP	83.0	7	50	CONNECTION SLOUGH, NORTH BANK, 1 MILE WEST OF MIDDLE RIVER, ON SOUTH END OF MANDEVILLE IS.
KING ISLAND PUMP†	84.2	8	00	HONKER CUT AT EMPIRE TRACT - KING ISLAND FERRY.
RINDGE PUMP*	86.1	8	10	SAN JOAQUIN RIVER, NORTH BANK, 1 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.
STOCKTON COUNTRY CLUB†	90.8	8	45	ON LINDLEY CUT-OFF (SAN JOAQUIN RIVER), NORTH BANK, ABOUT 3/4 MILE ABOVE BURNS CUT-OFF JUNCTION.
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.
MOSSDALE BRIDGE*	108.5	10	50	SAN JOAQUIN RIVER AT LINCOLN HIGHWAY CROSSING, ABOUT 3 MILES SOUTHWEST OF LATHROP.
				DRAINAGE WATER STATIONS
JERSEY DRAIN*	61.4	—	—	JERSEY ISLAND DRAINAGE PUMP ON SAN JOAQUIN RIVER, ABOUT 1 MILE BELOW FALSE RIVER.
GRAND ISLAND DRAIN STEAMBOAT SLOUGH*	68.2	—	—	GRAND ISLAND DRAINAGE PUMP ON STEAMBOAT SLOUGH, ABOUT 3 MILES FROM JUNCTION POINT.
CAMP 35 DRAIN, STATEN ISLAND	78.7	—	—	STATEN ISLAND, DRAINAGE PUMP ON SOUTH FORK MOKELUMNE RIVER, 1 MILE FROM JUNCTION WITH NORTH FORK MOKELUMNE RIVER.
MC DONALD DRAIN	82.7	—	—	MC DONALD ISLAND DRAINAGE PUMP ON EMPIRE SLOUGH ABOUT 3/4 MILE WEST OF WHISKEY SLOUGH JUNCTION.
BACON ISLAND DRAIN*	82.9	—	—	BACON ISLAND DRAINAGE PUMP ON OLD RIVER NEAR JUNCTION WITH ROCK SLOUGH.
MANDEVILLE DRAIN*	83.0	—	—	MANDEVILLE ISLAND DRAINAGE PUMP ON CONNECTION SLOUGH, ABOUT 1 MILE FROM MIDDLE RIVER.
CAMP 11 DRAIN, STATEN ISLAND*	83.1	—	—	STATEN ISLAND DRAINAGE PUMP ON NORTH FORK MOKELUMNE RIVER, 4 MILES ABOVE JUNCTION WITH SOUTH FORK MOKELUMNE RIVER.

* PERMANENT STATIONS MAINTAINED THROUGHOUT THE YEAR.

† OBSERVATIONS ONLY IN FIRST MONTHS OF 1932 TO RECORD COMPLETE RECESSION OF 1931 SALINITY.

TABLE 74

SALINITY OBSERVATIONS, SACRAMENTO-SAN JOAQUIN DELTA AND UPPER BAYS, 1932
Samples taken by local observers approximately one and one-half hours after high high tide.
Salinity expressed in parts of chlorine per 100,000 parts of water

Station	JANUARY							
	2	6	10	14	18	22	26	30
	San Francisco, San Pablo and Suisun Bays							
Point Orient	1100	1055	1040	1300	1080	1360	1100	1500
Point Davis		205		570	680	ab 800	540	660
Bullshead Point	121	71	110	188	302	b 130	310	330
Bay Point	22		15		286		ab 36	125
O and A Ferry	13	11	10	8	11	7	9	7
Innisfail Ferry	127	98	100	164	72	50	95	98
	North San Pablo Bay							
Sonoma Creek Bridge	b 320		187		380		300	
Grandview			320		440		510	
Vallejo	c 146	c 109	c 198		b 400		e	370
Cuttings Wharf		c 40			7			
	Sacramento River Delta							
Collinsville	9	6	8	9	6	6	a 6	8
Emmaton		3	a 4	4	ab	3	a 2	3
Sacramento	1	1	1	1		2	1	1
	Mokelumne River Delta							
Southwest Point		3	a 3	5	5	5	a 4	3
Camp 11 Staten Island			ab 3	e 8	e 4	e 3	ae 4	e 1
Camp 29 Staten Island		7	a 6	10	6	10	a 6	6
New Hope Bridge	1	1	a 1	1	1	1	a 1	1
Camp 20 Staten Island		3	a 2	2		2	a 2	1

a, b, c, d, e, f, See footnotes last page of this table.

TABLE 74 (CONTINUED)

SALINITY OBSERVATIONS, SACRAMENTO-SAN JOAQUIN DELTA AND UPPER BAYS, 1932
Samples taken by local observers approximately one and one-half hours after high high tide.
Salinity expressed in parts of chlorine per 100,000 parts of water

Station	JANUARY (CONTINUED)							
	2	6	10	14	18	22	26	30
	San Joaquin River Delta							
Antioch	21:	13:	11:	13:	8:	10:a	9:	8:
Curtis Landing	29:ab	16:a	14:	:	12:	12:	8:	9:
Jersey	33:	:	:	:	13:	13:a	12:ab	11:
Webb Pump	47:	21:	16:	16:	13:	11:	12:	10:
Central Landing	9:	2:a	3:	3:	4:	4:a	3:	2:
Dutch Slough	:	:	:	:	:	21:a	20:	19:
Ward Landing	18:	13:	11:	10:	11:	11:	10:	10:
Holland Pump	27:	17:a	15:	12:	21:	9:a	10:	9:
Holland Dam	61:	42:a	33:	32:	29:	20:ab	18:	18:
Mandeville Pump	39:	24:a	16:	15:	13:	12:a	13:	12:
King Island Pump	43:	24:	24:	27:	28:	13:	13:	15:
Rindge Pump	5:	6:	4:	6:	7:	8:a	5:	6:
Orwood Bridge	19:c	9:	7:b	5:	6:	7:	6:	6:
East Contra Costa I.D.	32:	29:a	16:	19:	16:	:a	13:	21:
Middle River P.O.	27:	10:	5:	9:	10:	6:a	8:	:
Mansion House	15:	:a	6:	6:	5:	8:a	5:	3:
Stockton Country Club	5:	3:a	3:	3:	5:	4:a	4:	3:
Clifton Court Ferry	5:	3:	2:	3:	2:a	4:	1:	2:
Stockton	39:	39:	34:	:	29:	30:	29:	:
Mossdale Bridge	2:	2:ab	3:	2:	2:	3:a	1:	1:
	Drainage Water Stations							
Jersey Drain	104:	:	:	:	93:	86:	77:b	75:
Grand Island Dr. (Steamboat)	15:e	11:e	15:e	18:e	16:e	20:e	24:e	33:
Camp 35 Drain (Staten Is.)	:	41:	32:	:	31:	69:	49:	32:
McDonald Drain	:	:	:	:	:	:	:	68:
Bacon Island Drain	49:	43:	45:	39:	36:	32:	36:	33:
Mandeville Drain	107:	99:	95:	95:	93:	91:	89:	85:
Camp 11 Drain (Staten Is.)	:	25:	24:	:	23:	24:	15:	22:

a, b, c, d, e, f, See footnotes last page of this table.

TABLE 74 (CONTINUED)

SALINITY OBSERVATIONS, SACRAMENTO-SAN JOAQUIN DELTA AND UPPER BAYS, 1932
Samples taken by local observers approximately one and one-half hours after high high tide.
Salinity expressed in parts of chlorine per 100,000 parts of water

Station	FEBRUARY						
	2	6	10	14	18	22	26
	San Francisco, San Pablo and Suisun Bays						
Point Orient	1260		870	1080	1380	1220	1300
Point Davis					800	630	620
Bulls Head Point	500	320	40:a	100	640:ab	160	270
Bay Point	90	90:a	7	5:e	220	80:a	16
O and A Ferry	:ab 9	7	3	5	5	4:a	4
Innisfail Ferry	54	62:a	200	150	110	100	66
	North San Pablo Bay						
Sonoma Creek Bridge	480		260		270		450
Grandview	630		370		460	:a	440
Vallejo		330:ae	250	:a	550	:c	430
Cuttings Wharf	130		9		270		130
	Sacramento River Delta						
Collinsville	6	4	3	11	3	2	4
Emmaton	8:a	4:a	1		3	2	2
Sacramento	1	1	1	1	1	1	1
	Mokelumne River Delta						
Southwest Point					2		
Camp 33 Staten Island				:e	4		
Camp 7 Staten Island					2		
Camp 11 Staten Island					2		
Camp 29 Staten Island				:e	5		
Eagle Tree					1		
Camp 25 Staten Island				:e	5		
New Hope Bridge					1		
Camp 20 Staten Island				:e	1		
	San Joaquin River Delta						
Antioch	7	7	6	5	5	5	5
Jersey	9	8	6	6	6	6:a	5
Webb Pump	10	9	8				
Central Landing	2	2	4	4	3		
Zuckerman Pump	3	3	3	4			
Rindge Pump	4	5	1	5	1:a	3	4
Middle River P.O.	9	5	8	3	1	2	2
Stockton	:a 24	26	32:a	20	34	18	29
Mossdale Bridge	1	1	1	1	1		
	Drainage Water Stations						
Jersey Drain	106	94	103	98	97	186	87
Grand Is. Dr. (Steamboat)	15	15	17	26	17	21	28
Camp 35 Dr. Staten Is.	47	50	51	62	64	60	58
Bacon Island Drain	29	37	36	34	30	29	28
Mandeville Drain	81	78	67	66	65		67
Camp 11 Dr. Staten Is.	49	49	36	82	83	76	78
McDonald Dr. (Henning)	31	39	28				

a, b, c, d, e, f, See footnotes last page of this table.

TABLE 74 (CONTINUED)

SALINITY OBSERVATIONS, SACRAMENTO-SAN JOAQUIN DELTA AND UPPER BAYS, 1932
Samples taken by local observers approximately one and one-half hours after high high tide.
Salinity expressed in parts of chlorine per 100,000 parts of water

Station	MARCH							
	2	6	10	14	18	22	26	30
	San Francisco, San Pablo and Suisun Bays							
Point Orient	1220	1320	1300	1320	1240:b	1320	1280	1220
Point Davis	670	650	640	720	660:b	640	700:a	620
Bulls Head Point	260	240	180	350	270		100:ab	110
Bay Point	76	:a	16	66	:b	12:a	6	
O and A Ferry	6	4		2	2:a	2	1	3
Innisfail Ferry	76	76	101	56	108	84	82	90
	North San Pablo Bay							
Sonoma Creek Bridge	510	:a	440		660			
Grandview	670	:a	620		690		860	
Vallejo	:b 410	:ae	420		520	:a	90	
Cuttings Wharf	300		120		360		210:a	290
	Sacramento River Delta							
Collinsville	3	3	2	1	2:a	2	1	1
Emmaton		1	2		1:a	1		2
Sacramento	1:a	1	1	1	1:b	1	1	1
	San Joaquin River Delta							
Antioch	4	3	4	3	4:a	2	2	3
Jersey	6	5		4	4:b	3:a	3	
Central Landing	3	2	1	1	2		2	1
Rindge Pump	4	2	4	4	5:b	5	4	8
Middle River P.O.	7:ab	5	3		5:b	2	6	6
Stockton		47	37	47	46:b	41	39	
Mossdale Bridge	2	1	4	3	3:b	2	6	6
	Drainage Water Stations							
Jersey Drain	72	69		61	76:b	88	79	
Grand Is.Dr.(Steamboat)	:e 15:e	15	11:e	10:e	18:e	11:e	8:e	8
Camp 35 Drain (Staten Is.)	65	52	62	50	50	46	58	53
Bacon Island Drain	20	22	26	19	21	24	16	24
Mandeville Drain	58	55	48	40	40	38	36	34
Camp 11 Drain (Staten Is.)	84	71	77	48	72	58	89	81

a, b, c, d, e, f, See footnotes last page of this table.

TABLE 74 (CONTINUED)

SALINITY OBSERVATIONS, SACRAMENTO-SAN JOAQUIN DELTA AND UPPER BAYS, 1932
Samples taken by local observers approximately one and one-half hours after high high tide.
Salinity expressed in parts of chlorine per 100,000 parts of water

Station	APRIL								
	2	6	10	14	18	22	26	30
	San Francisco, San Pablo and Suisun Bays							
Point Orient	b 1160	b 1020		1240	b 1360	b 1400	1240	1220
Point Davis		b 520	420		ae 680		b	760
Bulls Head Point	b 120	120	130	152	238	380	160 a	220
Bay Point	a 30	a 4		26 a	14 a	20 a	9	
O and A Ferry	ab 2	a 1	4	4 a	1	3	2 b	2
Innisfail Ferry	a 70	a 66 b	56	a	62 a	45	34 a	51
	North San Pablo Bay							
Sonoma Creek Bridge	a 710		360	a	650		800	
Grandview	b 760		680	a	760	a	880	
Vallejo	b 300	ae	330			ab	280	
Cuttings Wharf	b 250		160	ab	180		290	
	Sacramento River Delta							
Collinsville	a 2	a 1	1 a	1 a	1 a	1	2	1
Emmaton	a 1			1 a	1 a	1	1 a	1
Sacramento	ab 1	b 1	1	1 b	1 b	1	1 a	1
	San Joaquin River Delta							
Antioch	a 2	a 2	1	3 a	3 a	3	3 a	2
Jersey		a	3	3 b	4		3	
Central Landing	a 1	a 1	3	3 a	2		2	
Rindge Pump	b 6	b 6	6	4 b	3 b	3	2 a	3
Middle River P.O.	b 5	b 4	ab 6	5 a	2 b	2	2	
Mossdale Bridge	a 4	b 2	a 1	3 b	1	ab 1	1	1
	Drainage Water Stations							
Jersey Drain			55	40 b	81		50	
Grand Is. Dr. (Steamboat)	9	9	9	8	16	9	7	7
Camp 35 Dr. (Staten Is.)		52	14		19	16	25	
Bacon Island Drain	9	9	8	12	6	4	5	5
Mandeville Drain	30	28	24	25	25	22	17	15
Camp 11 Dr. (Staten Is.)		83	76		46	51	51	

a, b, c, d, e, f, See footnotes last page of this table.

TABLE 74 (CONTINUED)

SALINITY OBSERVATIONS, SACRAMENTO-SAN JOAQUIN DELTA AND UPPER BAYS, 1932
Samples taken by local observers approximately one and one-half hours after high high tide.
Salinity expressed in parts of chlorine per 100,000 parts of water

Station	MAY							
	2	6	10	14	18	22	26	30
	San Francisco, San Pablo and Suisun Bays							
Point Orient	b 980	b 1220	920	840	b	880	940	1020
Point Davis	b	760	330	a 340	b 470	c 265	540	340
Bulls Head Point	380	340	80	a 100	100	50	b	296
Bay Point	ab 22	a 9	a 2	a 2	ab	3	a 2	a 3
O and A Ferry	a	1	2	a 1	ab 1	b 2	1	b 1
Innisfail Ferry	54	a 50	a 54	a 47	a 35	a	31	a 30
	North San Pablo Bay							
Sonoma Creek Bridge	780			a	400			460
Grandview	a 820	a	760	a	660		600	
Vallejo	ae	280	ae 180	ab	60	ac	244	
Cuttings Wharf	b 320		330	ab	270		190	
	Sacramento River Delta							
Collinsville	a 1	a 1	1	a 1	a	1	a 1	1
Emmaton	a 1		1	a 1	a 1	b 1		
Sacramento	b 1	b 1	1	ab 1	b 1	b 1	b 1	b 1
	San Joaquin River Delta							
Antioch	a 3	a 3	1	a 2	a 2	a 2	a 1	a 1
Jersey	a 4		2	a 2	a 1	1	a 1	a 1
Central Landing	a 1	b 2	2	a 1	a 1	b 1	a 1	a 1
Rindge Pump	b 5	b 4	2	a 2	b 1	b 1	a	1
Middle River P.O.	a 3	b 2	ab 4		b	3		
Mossdale Bridge	b	2	1	a 1	b 1	a	1	b 1
	Drainage Water Stations							
Jersey Drain	39		47	9	22	b 40	34	27
Grand Is.Dr.(Steamboat)	c 14	c 7	c	11	c 6	c 30	c 9	
Camp 35 Dr. (Staten Is.)	20	24	21	5	2	2	b 7	6
Bacon Island Drain	4	5	5	4	3	2	1	1
Mandeville Drain	16	15	14	13	15	14	11	9
Camp 11 Drain (Staten Is.)	43	48	47	12	7	3	7	1

a, b, c, d, e, f, See footnotes last page of this table.

TABLE 74 (CONTINUED)

SALINITY OBSERVATIONS, SACRAMENTO-SAN JOAQUIN DELTA AND UPPER BAYS, 1932
Samples taken by local observers approximately one and one-half hours after high high tide.
Salinity expressed in parts of chlorine per 100,000 parts of water

Station	JUNE 2	6	10	14	18	22	26	30
	San Francisco, San Pablo and Suisun Bays							
Point Orient		b 1180	1120	1240 b	1240	1140	1100	1260
Point Davis	b 480 a	540		880 b	660	580 a	440	720
Bulls Head Point	b 160 b	80	76	450 b	380	130	240 a	120
Bay Point	a 3 a	4 a	6 a	9	b	8 a	7 a	10
O and A Ferry	b 2 b	2	1	1 b	6 a	1	2 b	3
Innisfail Ferry	a 28 a	25 a	27 a	26 a	26 a	21 a	21 a	22
	North San Pablo Bay							
Sonoma Creek Bridge	b 620		460	b	400		520	
Grandview	a 620	a	700	b	740		700	
Vallejo	ab 190	a	330	490 b	360		340	
Cuttings Wharf	b 220		280	b	240		320	
	Sacramento River Delta							
Collinsville	a	1 a	1 a	1 a	1 a	1 a	1 a	1
Emmaton	a	2	a	1 a	1	b	1 a	1
Sacramento	b 1 b	1 a	1	1 b	1	1 a	1 a	1
	San Joaquin River Delta							
Antioch	a 1 a	1 a	1 a	2 a	1	2 a	1 a	1
Jersey	b	1 a	1 a	2 a	1	1 a	1 a	1
Central Landing	a 1 a	2 a	1 a	1 a	1	1 ab	1 a	1
Rindge Pump	b 1 b	1 a	2 a	1 b	1	1 a	1 a	1
Middle River P.O.	b	1 a	2 a	2 a	1	1 a	1 a	1
Stockton	b 53 b	54				62 b	71 b	71
Mossdale Bridge	b 1 b	1 a	1 a	1 b	1	a	1	
	Drainage Water Stations							
Jersey Drain	b	28	30	16	17	19	11	
Grand Is. Dr. (Steamboat)	e 11 e	8 e	8 e	6 e	9 e	8 e	12 e	9
Camp 35 Dr. (Staten Is.)	4	7	3	3	5	2	1	4
Bacon Island Drain	1	2	2	3	1	1	3	2
Mandeville Drain	12	9	9	6	5	5	3	4
Camp 11 Drain (Staten Is.)	7	7	8	3	3	1	2	1

a, b, c, d, e, f, See footnotes last page of this table.

TABLE 74 (CONTINUED)

SALINITY OBSERVATIONS, SACRAMENTO-SAN JOAQUIN DELTA AND UPPER BAYS, 1932
Samples taken by local observers approximately one and one-half hours after high high tide.
Salinity expressed in parts of chlorine per 100,000 parts of water

Station	JULY							
	2	6	10	14	18	22	26	30
	San Francisco, San Pablo and Suisun Bays							
Point Orient	b 350	b 1180	1280	1360	b 1480		1500	1500
Point Davis	b 600	b 660	700	940	940	980		b 1180
Bulls Head Point	b 210	b 280	300	b 630	b 670	580	780	920
Bay Point	a	24	ab 47	a 134	a 300	320	a 265	a 510
O and A Ferry	e 3	b 3	14	b 54	b 54	59	162	280
Innisfail Ferry	23	b 19	16	a 24	a 30	a 44	76	a 84
	North San Pablo Bay							
Sonoma Creek Bridge	b 480		600	a	760		800	
Grandview	b 620		620	a	900		880	
Vallejo	400					b	900	
Cuttings Wharf	ab 350		380	b	550		540	
	Sacramento River Delta							
Collinsville	a 1	b 1	a 1	a 2	a 6	24	a	41
Emmaton	a 1			a	1	2	2	a 2
Three Mile Slough Bridge						2	1	b 3
Rio Vista Bridge						1	ab 3	b 3
Sacramento	b 1	b 1	a 1	b 1	b 2	a 1	a 1	b 2
	San Joaquin River Delta							
Antioch	a 1	a 1	2	a 2	a 6	14	a 10	a 32
Curtis Landing							4	b 27
Jersey		b 1	a 1		a	2	a 2	
Webb Pump						3	b 2	b 1
Central Landing	a 1	a 1	a 1	a 2	a 3	a 3	a 3	a 1
Holland Pump						2	b 2	b 3
Mandeville Pump							a 2	a 3
Rindge Pump	b 1	b 1	a 4	a 4	b 6		a 8	a 7
Middle River P.O.		b 1	a 1	a 2	b 2			
Stockton	b 64	a 72	a 71					68
Mossdale Bridge	b 1	b 1		2	b 2		a 5	a 7
	Drainage Water Stations							
Jersey Drain		b 18	20			18	9	
Grand Is. Dr. (Steamboat)	b 4	b 6	b 7	b 5	b 5	b 7	b 8	
Camp 35 Drain (Staten Is.)	7	9	3	3		3	5	4
Bacon Island Drain	2	1	2	2	3	3		2
Mandeville Drain		4	3	4	5	4	5	3
Camp 11 Dr. (Staten Is.)	2	1	b 2	3		2	3	2

a, b, c, d, e, f, See footnotes last page of this table.

TABLE 74 (CONTINUED)

SALINITY OBSERVATIONS, SACRAMENTO-SAN JOAQUIN DELTA AND UPPER BAYS, 1932
Samples taken by local observers approximately one and one-half hours after high high tide.
Salinity expressed in parts of chlorine per 100,000 parts of water

Station	AUGUST							
	2	6	10	14	18	22	26	30
	San Francisco, San Pablo and Suisun Bays							
Point Orient	b 1580	1620	1620 b	1540	1580	1520	1600	
Point Davis	b 1120	1300	1240 a	1320	1160 a	1100 a	1360 b	1400
Bulls Head Point	b 860	940	1120 b	1040	800	1000	1180 b	1040
Bay Point	ab 540	640 a	420 a	680	a	640 a	780 a	820
O and A Ferry	b 200	360	370 b	410 a	280	440	580 b	500
Innisfail Ferry	a 168	234	380 a	330		430 a	400 a	440
	North San Pablo Bay							
Sonoma Creek Bridge	b 900		1060		1020		1160	
Grandview	a 920		1120	a	1120		1140	
Vallejo		960 b	1000	b	1040		1120	
Cuttings Wharf	b 540	590					800	
	Sacramento River Delta							
Collinsville	92 a	144	ab	150 a	180 a	230 a	380 a	320
Emmaton	a 4	12			40	52 a	46 a	70
Three Mile Slough Bridge	b 5 a	6	13 a	18	a	17 b	37 a	46
Rio Vista Bridge	b 2	4 b	4 b	4	4	4 b	7 b	7
Sacramento	b 4 a	3 a	6 b	3	3 a	4 b	4 b	3
	San Joaquin River Delta							
Antioch	a 52	104 a	38 a	134	190 a	140 a	210 a	250
Curtis Landing	a 24 a	45 a	26 a	60 a	78	127 a	150 a	130
Jersey	b 21 a	12	b	59 a	29 a	29 a	45	
Webb Pump	b 3	2 b	8 b	8	6	10 b	15 b	16
Central Landing	a 3 a	3 b	3 b	2	a	4 a	5 a	6
Dutch Slough						10 b	7 b	10
Holland Pump	b 3	2 a	2		a	5 a	4	5
Mandeville Pump	b 4 a	4 a	3 b	4	a	6 a	5 b	5
Rindge Pump	b 8 a	10 a	15 b	10	a	15		
Middle River P.O.	b 3	a	5 b	7	a	6 a	6 bd	7
Stockton					66 b	60		64
Mossdale Bridge	b 9 a	9 a	14 b	10	a	12 a	10 b	9
	Drainage Water Stations							
Jersey Drain	b 12	14	b	15	19	19	22	
Grand Is. Dr. (Steamboat)	e 6 e	7 e	9 e	4 e	5 e	9 e	9 e	8
Camp 35 Drain (Staten Is.)	5	4	7	5	4	7	4	7
Bacon Island Drain	4	4	3			5	5	7
Mandeville Drain	b 4	3	5 b	4		5	5 b	6
Camp 11 Drain (Staten Is.)	1	4	5	3	6	3	4	2
McDonald Drain (Henning)		2	2	6				

a, b, c, d, e, f, See footnotes last page of this table.

TABLE 74 (CONTINUED)

SALINITY OBSERVATIONS, SACRAMENTO-SAN JOAQUIN DELTA AND UPPER BAYS, 1932
Samples taken by local observers approximately one and one-half hours after high high tide.
Salinity expressed in parts of chlorine per 100,000 parts of water

Station	SEPTEMBER							
	2	6	10	14	18	22	26	30
	San Francisco, San Pablo and Suisun Bays							
Point Orient	a 1700	1680	1660 b	1720	1720	1620	1660	1680
Point Davis	1360 a	1360	1520		1440	1440 a	1420	1460
Bulls Head Point	1080	1180	1320 a	1020	1200	1120 b	1180	1060
Bay Point	880 a	800 a	940 a	880	960 a	760 a	880	940
O and A Ferry	580	560 a	520 a	600	580	560 b	620	540
Innisfail Ferry	520	540	600 a	560	620 a	600 a	660	
	North San Pablo Bay							
Sonoma Creek Bridge	1280	a	1320		1300		1380	
Grandview	1200		1260		1340		1340	
Vallejo		ab	1220 ac	1300				1200
Cuttings Wharf	960		1040		960	b	1120	1200
	Sacramento River Delta							
Collinsville	300	500 a	400 a	360 a	440 a	320 a	320	320
Emmaton	108	144 a	120		166	114 a	84	116
Three Mile Slough Br.	59 a	50 a	90 b	74	84	64 a	50	54
Rio Vista Bridge	7 d	20 b	28 b	28	14	10 b	12	9
Junction Point					7	6 a	4	3
Isleton Bridge					6	3 b	3 ab	3
Sacramento	ab 5 a	3 b	4 b	4 a	3 a	1 b	2	1
	San Joaquin River Delta							
Antioch	290 a	270 a	320 a	350	400	360 a	310 a	350
Curtis Landing	200 a	170 a	260		280 a	160 a	200	230
Jersey	89 a	68	b	120	a	60		106
Webb Pump	18	28 b	30 b	30	35 a	23 b	26	24
Central Landing	6 a	7 a	8 a	6 a	8 a	8		5
Dutch Slough	11	24 b	17 b	22	37	26 b	16	23
Holland Pump	6 a	6 b	7 b	7	8 a	7 a	10	10
Mandeville Pump	a	8 a	10 b	8	11	10	11	12
Rindge Pump	ab 14 a	16 a	14 b	16 a	15 a	16 a	13	
Middle River P.O.	7	12 a	9 b	8	a	11 a	11	9
Stockton	ab	56 b	64		58 b	50 b	58	50
Mossdale Bridge	ab 10	a	9 b	9	a	6 a	7	7
	Drainage Water Stations							
Jersey Drain	31	38	b	39		51		50
Grand Is.Dr. (Steamboat)	5	10	7	9	8	8	11	10
Camp 35 Dr. (Staten Is.)	7	4	7	11	11	8	9	8
Bacon Island Drain	6	8	8 b	9	8 f	10	9	
Mandeville Drain		7	b	10	10	9	11	10
Camp 11 Dr. (Staten Is.)	2	3	3 b	3	3	6	5	6

a, b, c, d, e, f, See footnotes last page of this table.

TABLE 74 (CONTINUED)

SALINITY OBSERVATIONS, SACRAMENTO-SAN JOAQUIN DELTA AND UPPER BAYS, 1932
Samples taken by local observers approximately one and one-half hours after high high tide.
Salinity expressed in parts of chlorine per 100,000 parts of water

Station	OCTOBER							
	2	6	10	14	18	22	26	30
	San Francisco, San Pablo and Suisun Bays							
Point Orient	1680	1680	1640	1680	1640	1660		
Point Davis	1500	1360	1280	1340		1280		1340
Bullshead Point	1200	1180	880	1040:a	980	1060:a	1020	1200
Bay Point	1010:a	860	800:ab	800	780:ad	820	820	880
O and A Ferry	600	520	480	540	440:a	390	520:a	540
Innisfail Ferry	660:a	640	680	620	660	620		640
	North San Pablo Bay							
Sonoma Creek Bridge	1320		1320		1420			
Grandview	1340		1360		1460		1420	
Vallejo	:d	1180			:bd	1120	:c	1180
Cuttings Wharf					1160		1160	
	Sacramento River Delta							
Collinsville	:a 390:a	300	270	320:a	320:a	270		330
Emmaton	128:a	76	56	82	28:a	42	34	51
Three Mile Slough Br.	:a 48:a	37	40	39:a	17:a	22		41
Rio Vista Bridge	9	13	3	4	2	2		2
Junction Point	5:a	4	3	3	2:a	2		1
Isleton Bridge	3	3:a	3	2	1	2:a	1	1
Sacramento	1:a	1		:a	1:a	1:a	1:a	1
	San Joaquin River Delta							
Antioch	350	290	280	280	270			320
Curtis Landing	:a 150:a	200:a	116	176	176:a	128	92	156
Jersey	150:a	66	62:ab	56	:a	57:ab	60:a	39
Webb Pump	31	24	16				13	13
Central Landing			4	:a	2:a	1	5:a	4
Dutch Slough	26	22	22		20	22		16
Holland Pump	10:a	10	10	11	11:a	11	10	9
Mandeville Pump	:a	12	11	18:a	13:a	11	12:a	11
Rindge Pump	:a 15:a	15:a	14	14:a	13:a	13		10
Middle River P.O.	12:a	10	11:ab	11:a	11:a	11		12
Stockton	:b	52	64	70				
Mossdale Bridge	:a	9	7	7:a	9:a	2	:a	4
	Drainage Water Stations							
Jersey Drain	48	41	39	41		42	54	56
Grand Is.Dr.(Steamboat)	:f	10:f	10:f	6:f	7:f	21:f	14:f	14
Camp 35 Dr.(Staten Is.)	7		6	5	8	7	5	7
Bacon Island Drain	10	10	11	11	13		14	11
Mandeville Drain		11	12	13	13	13	13	14
Camp 11 Dr.(Staten Is.)	7	3	1	7	8	7	7	7

a, b, c, d, e, f, See footnotes last page of this table.

TABLE 74 (CONTINUED)

SALINITY OBSERVATIONS, SACRAMENTO-SAN JOAQUIN DELTA AND UPPER BAYS, 1932
Samples taken by local observers approximately one and one-half hours after high high tide
Salinity expressed in parts of chlorine per 100,000 parts of water

Station	NOVEMBER							
	2	6	10	14	18	22	26	30
	San Francisco, San Pablo and Suisun Bays							
Point Orient	1700	1660	1620	1640	1640	1500	1640	1640
Point Davis	1380	1240	1260		1160	1340	1460	1300
Bullshead Point	1200	960	1080:a	940	1020	860	1040	1140
Bay Point	a 760	760	800	780	680	800	880	
O and A Ferry	440	340	360	370:a	340	420:ab	390:a	320
Innisfail Ferry	620	600	540	580	500	540	540	560
	North San Pablo Bay							
Sonoma Creek Bridge	1340		1320		1280		1280	
Grandview	1420		1420		1460		1460	
Vallejo		1100	1140:a	1040		1100:b	1140	1080
Cuttings Wharf	1160		1140		1100		1100	
	Sacramento River Delta							
Collinsville	350			220:a	160	210	290	350
Emmaton	40	33	19	30:a	11	12	48	78
Three Mile Slough Br.	42	11	13:a	12	8:ab	7	19:a	13
Rio Vista Bridge	3:b	2	1	1	1	1	1	1
Junction Point	a 1							
Isleton Bridge	1							
Sacramento	a 1	1	1:a	1:a	1	1:a	1:a	1
	San Joaquin River Delta							
Antioch	d 230	ab 110	172	190	190	200	260	160
Curtis Landing	a 80	80	58	100:a	52	68	132:a	70
Jersey	a 30		35:a	15:a	30			
Webb Pump	14	11	10	9	9	8	8	12
Central Landing		4	3:a	3:a	4	7:a	3:a	4
Dutch Slough	a 15:abd	9		15:a	12	12:b	11:ad	11
Holland Pump	9	6	8	7	7	8	6	6
Mandeville Pump		10	9:a	8:a	9	8	8:a	8
Rindge Pump	a 7	6	6:a	6:a	6	8	7:a	9
Middle River P.O.	a 9	8:a	7:a	6:a	6	6	6:a	6
Stockton	37:a	31:ab	46	37	40	42	41	38
Mossdale Bridge	a 3	4	:a	5:a	5	5	5:a	6
	Drainage Water Stations							
Jersey Drain	47		40	47	35			
Grand Is.Dr.(Steamboat)	e 19	:e	25:e	8:e	4:e	8:e	6:e	4
Camp 35 Drain (StatenIs.)	7	13	14	5	5	9	16	15
Bacon Island Drain	10	10	10	10	7	9	8	10
Mandeville Drain		14	16	16	17	16	15	14
Camp 11 Dr. (Staten Is.)	9	9	14	11	20	20	17	20

a, b, c, d, e, f, See footnotes last page of this table.

TABLE 74 (CONTINUED)

SALINITY OBSERVATIONS, SACRAMENTO-SAN JOAQUIN DELTA AND UPPER BAYS, 1932
Samples taken by local observers approximately one and one-half hours after high high tide.
Salinity expressed in parts of chlorine per 100,000 parts of water

Station	DECEMBER							
	2	6	10	14	18	22	26	30
	San Francisco, San Pablo and Suisun Bays							
Point Orient	1580	1680	1560		1520	1420	1700	1560
Point Davis	1180	1260	1360	1300		1200	1200	
Bullshead Point	1000	1060	a	980	900 b	800	920 ab	820
Bay Point	a 700	800	760	780 a	640	720	660	600
O and A Ferry	380	320	380	500	360	370	350	320
Innisfail Ferry *	a 560 b	540	560	540 a	540 a	520	420 a	440
	North San Pablo Bay							
Sonoma Creek Bridge		1260	1260		1220		a	1080
Grandview	1380		1420		1360		1280	
Vallejo			b	980 b	1020			
Cuttings Wharf	1120		1080		1020		1020	
	Sacramento River Delta							
Collinsville	280		260	300 a	150	170	124	108
Emmaton	36	11	10	10	14		4	4
Three Mile Slough Br.	a 14 ab	5	6	8	5	5 ab	3 a	3
Rio Vista Bridge	1	1	1 a	1	1 a	1	1	1
Sacramento	a 1	1 ab	1 a	1 a	1	1 ab	1 a	1
	San Joaquin River Delta							
Antioch	190	170	180	190	120	110	96	68
Curtis Landing	a 62	34	62 a	74	43	43	19	19
Jersey	36		52	24			29 a	6
Webb Pump	8	8	8	7	6	6		
Central Landing		2		4	1		4	2
Dutch Slough			15	11	9	11	9	10
Holland Pump	7	8	7	8 a	9	8	8 a	8
Mandeville Pump			13 a	11 a	9	8	8 a	8
Rindge Pump	a 12	11	11	a	12	13	11 a	11
Middle River P.O.		7	8	7 a	8	8	a	10
Stockton	80			40 a	41 b	40 a	34	33
Mossdale Bridge	a 6	6	a	7 a	7		5 a	4
	Drainage Water Stations							
Jersey Drain	35		29	27			46	13
Grand Is.Dr.(Steamboat)	b 7 b	23 b	15 b	12 b	6	b	6 b	4
Camp 35 Dr.(Staten Is.)	17	20	15	12	12	10	17	18
Bacon Island Drain	10	13	12	11	10	16	13	13
Mandeville Drain			14	14	11	15	15	14
Camp 11 Dr.(Staten Is.)	18	13		17	17	15	20	23

(a) Low high tide.
(b) Taken on following day.
(c) Taken two days later.
(d) Over one hour off scheduled time.
(e) Taken on preceding day.
(f) Taken two days earlier.

*Samples during December taken one mile east of Innisfail Ferry. At Alexander KelloggRanch Headquarters.

TABLE 75

SALINITY OF GROUND AND DRAINAGE WATER, SHERMAN ISLAND, 1931, 1932 AND 1933
SALINITY EXPRESSED IN PARTS OF CHLORINE PER 100,000 PARTS OF WATER

DATE	GROUND WATER HOLE NUMBER 1/													DRAIN NUMBER 1/								WELL NUMBER 1/			
	1*	1A*	1B*	2	2A	3	4	5	6A	G3	G6	G8	G9	1	2	3	G1	G2	G5	G7	G10	1 2/	2 3/	3 4/	G4 5/
1931																									
APRIL 28	200	–	–	140	–	130	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	55	–	–	–
MAY 6	310	–	–	–	–	105	9	135	–	–	–	–	–	22	19	47	–	–	–	–	–	–	–	–	–
JUNE 5	340	–	–	32	–	96	12	138	–	–	–	–	–	78	68	150	–	–	–	–	–	46	8	20	–
JULY 8	250	–	–	35	–	110	30	190	80	–	–	–	–	165	230	200	–	–	–	–	–	48	–	–	–
JULY 30	220	–	–	30	–	85	88	180	60	–	–	–	–	320	280	230	–	–	–	–	–	–	–	–	–
AUG. 7	210	–	–	30	–	87	82	195	70	–	–	–	–	310	330	225	–	–	–	–	–	–	–	–	–
AUG. 24	150	–	–	30	–	–	65	180	60	–	–	–	–	375	300	220	–	–	–	–	–	–	–	–	–
SEP. 8	157	–	–	31	–	58	58	184	64	–	–	–	–	410	270	240	–	–	–	–	–	–	–	–	–
SEP. 29	152	–	–	40	–	59	50	192	60	–	–	–	–	520	310	196	–	–	–	–	–	–	–	–	–
OCT. 27	–	–	–	36	–	54	42	169	55	–	–	–	–	395	299	194	–	–	–	–	–	55	3	–	–
NOV. 18	151	–	–	–	–	59	38	153	57	–	–	–	–	322	339	182	–	–	–	–	–	–	–	–	–
DEC. 9	C 130	–	–	C 102	–	C 64	36	C 154	C 60	–	–	–	–	300	460	200	–	–	–	–	–	48	1	–	–
1932																									
JAN. 5	282	–	–	201	–	112	–	318	110	–	–	–	–	51	15	125	–	–	–	–	–	–	–	–	–
FEB. 5	390	–	–	230	–	122	104	230	170	–	–	–	–	150	40	260	–	–	–	–	–	–	–	–	–
FEB. 12	400	–	–	170	–	72	106	310	150	–	–	–	–	160	32	250	–	–	–	–	–	–	2	–	–
MAR. 8	400	–	–	175	–	100	90	390	140	–	–	–	–	80	10	170	–	–	–	–	–	44	–	–	–
MAR. 29	420	–	–	130	–	100	90	–	140	–	–	–	–	120	48	230	–	–	–	–	–	43	–	–	–
APR. 19	420	–	–	6/	–	110	C 90	–	130	–	–	–	–	90	12	90	–	–	–	–	–	–	–	–	–
APR. 22	420	140	–	–	C 210	–	–	20	–	99	122	65	28	–	–	–	31	34	35	27	37	–	3	–	6
MAY 18	420	110	–	–	22	102	82	178	102	100	98	57	29	28	17	88	31	31	34	26	31	44	–	–	5
MAY 25	B 400	B 100	–	–	B 26	B 104	B 84	B 180	B 96	B 120	B 98	B 61	B 29	–	–	–	–	–	–	–	–	–	–	–	–
MAY 25	–	–	–	–	A 29	A 114	–	–	–	A 109	–	A 57	A 30	–	–	–	–	–	–	–	–	44	3	–	–
MAY 26	A 260	A 86	–	–	A 35	A 116	A 26	A 194	A 56	107	116	54	30	22	16	129	30	33	36	–	29	–	–	–	–
JUN. 22	B 240	B 88	–	–	B 20	B 114	B 60	B 240	B 124	–	B 83	8/ 16	B 30	32	12	104	14	19	29	27	25	45	–	–	–
JUN. 23	A 190	A 72	A 24	–	A 17	A 112	A 24	A 130	–	7/	A 106	8/ 18	A 28	–	–	–	–	–	30	30	26	–	–	–	–
JUN. 23	–	–	–	–	–	–	–	7/ 270	A 52	85	–	–	–	28	10	117	11	24	–	–	–	–	–	–	–
JUL. 7	B 200	B 70	B 25	–	B 18	B 116	B 26	B 148	B 54	B 98	B 86	B 27	–	27	16	106	19	21	26	29	37	–	–	–	–
JUL. 8	A 210	A 64	A 24	–	A 17	A 114	A 42	A 136	A 54	A 102	A 104	A 31	A 28	–	–	–	19	18	26	28	26	–	–	–	5
JUL. 28	B 210	B 52	B 23	–	B 21	B 112	B 37	B 150	B 56	B 90	B 68	B 31	B 29	18	14	70	28	24	12	9	24	–	–	–	–
JUL. 29	7/ 36	A 54	A 22	–	A 22	A 108	A 26	A 150	A 52	A 84	A 50	A 24	A 30	19	15	64	23	21	15	13	20	–	–	–	–
AUG. 10	B 54	B 48	B 23	–	BR 27	B 110	BR 30	B 138	B 56	B 82	B 45	B 20	B 30	33	27	77	24	25	21	29	29	–	–	–	–
AUG. 11	A 54	A 47	A 20	–	A 35	A 59	A 26	A 138	A 48	A 84	A 36	A 22	A 31	–	–	–	–	–	–	–	–	–	–	–	–
AUG. 23	B 55	B 39	B 18	–	B 29	B 48	B 28	B 132	B 46	B 74	B 32	B 22	B 29	–	–	–	27	–	–	29	–	–	–	–	–
AUG. 24	A 52	A 39	A 17	–	A 24	A 84	A 23	A 132	A 50	A 78	A 25	A 30	A 31	53	59	86	–	31	36	–	46	–	–	–	–
SEP. 7	B 58	B 36	B 15	–	B 31	B 82	B 26	B 136	B 50	B 74	B 29	8/ 87	B 30	–	–	–	–	–	–	–	–	–	–	–	–
SEP. 8	A 57	A 36	A 14	–	A 29	A 62	A 19	A 132	A 52	A 72	A 22	8/ 76	A 31	110	108	130	58	56	29	29	70	–	–	–	–
SEP. 20	B 60	B 32	B 15	–	B 29	B 44	B 21	B 133	B 52	B 68	B 20	B 62	B 29	–	–	–	–	–	–	–	–	–	–	–	–
SEP. 21	A 56	A 32	A 13	–	A 31	A 38	A 18	A 156	A 44	A 52	A 17	A 62	A 29	92	170	162	40	38	32	27	52	–	–	–	–
OCT. 5	B 61	B 32	B 14	–	B 46	B 37	B 19	B 134	B 42	B 50	B 18	B 64	B 28	–	–	–	–	–	–	–	–	–	–	–	–
OCT. 6	A 61	A 32	A 12	–	A 47	A 36	A 19	A 140	A 42	A 54	A 18	A 62	A 29	82	176	180	36	47	43	29	75	–	–	–	–
OCT. 20	B 63	B 30	B 13	–	B 46	B 34	B 19	B 130	B 32	B 60	B 13	B 62	B 29	–	–	–	–	–	–	–	–	–	–	–	–
OCT. 21	A 62	A 32	A 15	–	A 54	A 36	A 20	A 134	A 36	A 54	A 15	A 62	A 32	74	152	182	30	42	37	28	96	–	–	–	–
NOV. 16	B 69	B 30	B 14	–	B 59	B 39	B 20	B 122	B 28	A 68	A 14	A 22	A 28	–	–	–	–	–	–	–	–	–	–	–	–
NOV. 17	A 65	A 30	A 14	–	A 64	A 41	A 19	A 122	A 31	A 70	A 19	A 42	A 29	72	80	150	31	31	32	33	66	–	–	–	–
DEC. 15	B 84	B 34	B 11	–	B 60	B 41	B 19	B 122	B 30	B 93	B 17	8/ 23	B 28	–	–	–	–	–	–	–	–	–	–	–	–
DEC. 16	A 78	A 31	A 11	–	A 64	A 47	A 16	A 122	A 35	A 96	A 16	8/ 24	A 31	70	58	120	23	31	33	35	73	–	–	–	–

1/, 2/, 3/, 4/, 5/, 6/, 7/, 8/, *, A/B), C, R, SEE FOOTNOTES PAGE 133.

TABLE 75 (CONTINUED)

SALINITY OF GROUND AND DRAINAGE WATER, SHERMAN ISLAND, 1931, 1932 AND 1933
SALINITY EXPRESSED IN PARTS OF CHLORINE PER 100,000 PARTS OF WATER

DATE	GROUND WATER HOLE NUMBER 1/													DRAIN NUMBER 1/								WELL NUMBER 1/			
	1*	1A*	1B*	2	2A	3	4	5	6A	G3	G6	G8	G9	1	2	3	G1	G2	G5	G7	G10	1 2/	2 3/	3 4/	G4 5/
1933																									
JAN. 11	B 126	B 36	B 14	–	B 78	B 71	B 20	B 128	B 34	B 88	B 83	8/	5 B	28	–	–	–	–	–	–	–	–	–	–	–
JAN. 12	A 102	A 32	A 13	–	A 64	A 72	A 20	A 124	A 46	A 92	A 81	8/	7 A	29	56	22	92	35	35	31	29	50	–	–	–	–
FEB. 7	B 280	B 54	B 124	–	B 73	B 85	B 51	B 216	B 54	B 52	–	8/	21 B	127	–	–	–	–	–	–	–	–	–	–	–
FEB. 0	A 230	A 176	A 46	–	A 59	A 85	A 36	A 144	A 60	A 59	–	8/	22 A	54	90	51	148	40	40	35	31	40	–	–	–
MAR. 2	B 230	B 93	B 44	–	B 38	B 84	B 40	B 126	7/ 68	B 64	–	8/	22 B	38	–	–	–	–	–	–	–	–	–	–	–
MAR. 3	A 220	A 78	A 35	–	A 36	A 84	A 26	A 122	A 65	A 63	7/ 51	8/	24 A	35	84	18	156	37	38	30	30	63	–	–	–
MAR. 30	B 230	B 98	B 38	–	B 27	B 82	B 29	B 126	B 67	–	B 46	–	22 B	28	–	–	–	–	–	–	–	–	–	–	–
MAR. 31	A 210	A 90	A 34	–	A 28	A 80	A 25	A 126	A 66	7/ 73	A 52		25 A	28	30	15	132	36	38	29	27	52	–	–	–
APR. 25	B 300	B 110	B 42	–	B 22	B 86	B 26	B 122	B 64	B 74	B 46	B	27 B	28	–	–	–	–	–	–	–	–	–	–	4
APR. 26	A 280	A 106	A 37	–	A 22	A 86	A 23	A 124	A 58	A 73	–	A	30 A	28	24	12	112	32	30	31	31	24	–	–	–
MAY 25	B 350	B 138	B 42	–	B 21	B 106	B 21	B 124	B 57	–	–	B	32 B	28	–	–	–	–	–	–	–	–	–	–	–
MAY 26	A 330	A 114	A 34	–	A 19	A 104	A 17	A 124	A 50	–	–	A	34 A	28	23	14	112	40	38	30	32	23	–	–	–

1/ SEE LOCATION SKETCH PLATE 6.
2/ ARTESIAN WELL 640 FEET DEEP.
3/ ARTESIAN WELL 480 FEET DEEP.
4/ PUMPING WELL 530 FEET DEEP.
5/ PUMPING WELL 73 FEET DEEP.
6/ HOLE DESTROYED. NEW HOLE DUG 50 FEET WEST. SEE 2A.
7/ HOLE DESTROYED. NEW HOLE DUG AT APPROXIMATELY SAME LOCATION.
8/ HOLE IS LOCATED IN SHALLOW DITCH ORDINARILY DRY. THERE WAS SOME DRAINAGE WATER STANDING IN THE DITCH AT THIS SAMPLING.
* HOLES 1, 1A AND 1B ARE ALL WITHIN A FIVE FOOT RADIUS.
A, B) BEGINNING MAY 25, 1932 THE WATER WAS BAILED OUT OF THE GROUND WATER HOLES AT EACH VISIT AND SAMPLES WERE TAKEN BOTH BEFORE BAILING AND AFTER THE HOLE HAD REFILLED. "B" DENOTES SAMPLE BEFORE BAILING AND "A" AFTER HOLE HAD REFILLED.
C HOLE CASED WITH STOVEPIPE TO EXCLUDE SURFACE WATER.
R CASING REMOVED FROM HOLE.

TABLE 76

SALINITY OF GROUND AND DRAINAGE WATER, GRIZZLY ISLAND, SUISUN BAY, 1931, 1932 AND 1933
SALINITY EXPRESSED IN PARTS OF CHLORINE PER 100,000 PARTS OF WATER

DATE	GROUND WATER HOLE NUMBER 1/					DRAIN NUMBER 1/			
	1	2	3 2/	3A 2/	4	1	2	3	4
1931									
APRIL 28	260	220	165	–	155	260	240	230	245
MAY 6	285	280	170	–	180	DRY	DRY	DRY	DRY
JUNE 5	320	330	200	–	220	540	DRY	DRY	320
JULY 8	350	320	210	–	190	DRY	DRY	DRY	DRY
JULY 30	355	330	210	–	200	1100	DRY	1200	770
AUGUST 7	360	270	220	–	200	1250	DRY	DRY	850
AUGUST 24	350	260	190	–	225	1325	DRY	1300	930
SEPT. 8	360	250	200	–	210	–	–	–	–
SEPT. 29	360	282	215	–	214	1380	1360	1400	1330
OCTOBER 27	372	309	229	–	220	1240	DRY	DRY	DRY
NOV. 18	366	206	187	–	69	905	790	830	620
DEC. 9	410	C 275	210	–	130	880	DRY	DRY	DRY
1932									
JANUARY 5	312	242	161	–	75	323	DRY	270	226
FEB. 12	340	250	180	–	60	240	DRY	320	300
MARCH 8	360	280	170	–	102	510	DRY	420	410
MARCH 29	330	310	180	–	112	360	DRY	DRY	200
APRIL 19	220	300	160	–	118	110	DRY	240	180
MAY 18	260	290	180	140	100	500	DRY	220	188
MAY 26	B 230	B 300	B 160	B 130	B 120	340	DRY	240	170
MAY 26	A 230	A 240	A 130	A 130	A 120	–	–	–	–
MAY 26	–	–	A 130	A 130	–	–	–	–	–
JUNE 22	B 160	B 240	B 110	B 100	B 124	3/ 26	3/ 40	3/ 30	3/ 50
JUNE 24	A 150	A 192	A 102	A 112	A 114	44	92	52	86
JULY 8	B 150	B 220	B 118	B 108	B 120	65	48	132	148
JULY 9	A 110	A 380	A 122	A 122	A 130	59	44	136	148
JULY 28	B 170	B 400	B 154	B 152	B 138	284	86	260	220
JULY 29	A 130	A 240	A 128	A 128	A 132	204	72	260	240
AUGUST 10	B 200	B 260	B 160	B 160	B 150	290	190	360	290
AUGUST 11	A 250	A 310	A 150	A 150	A 150	–	–	–	–
SEPT. 7	B 250	B 300	B 170	B 170	B 140	–	–	–	–
SEPT. 8	A 270	A 340	A 190	A 160	A 160	540	590	540	510
SEPT. 20	B 290	B 320	B 220	B 190	B 170	–	–	–	–
SEPT. 21	A 280	A 400	A 210	A 200	A 210	600	600	600	560
OCTOBER 5	B 280	B 370	B 230	B 220	B 210	–	–	–	–
OCTOBER 6	A 310	A 410	A 230	A 220	A 210	620	640	640	620
OCTOBER 20	B 290	B 390	B 240	B 230	B 200	–	–	–	–
OCTOBER 21	A 300	A 420	A 250	A 240	A 250	640	660	660	720
NOV. 16	B 260	B 400	B 260	B 250	B 220	–	–	–	–
NOV. 17	A 250	A 400	A 270	A 250	A 250	580	600	760	740
DEC. 15	B 240	B 250	B 270	B 260	B 120	–	–	–	–
DEC. 16	A 250	A 300	A 290	A 250	A 100	570	460	600	780
1933									
JANUARY 11	B 220	B 260	B 190	B 180	B 66	–	–	–	–
JANUARY 12	A 240	A 320	A 160	A 170	A 80	480	480	680	360
FEB. 7	B 270	B 240	B 150	B 140	B 40	–	–	–	–
FEB. 8	A 220	A 210	A 130	A 110	A 88	370	410	300	240
MARCH 2	B 230	B 220	B 190	B 160	B 164	–	–	–	–
MARCH 3	A 230	A 220	A 170	A 180	A 152	210	360	330	300
APRIL 25	B 120	B 250	B 160	B 150	B 130	–	–	–	–
APRIL 26	A 146	A 230	A 150	A 160	A 140	120	290	160	220
MAY 25	B 152	B 270	B 170	B 170	B 120	–	–	–	–
MAY 26	A 140	A 270	A 140	A 140	A 134	100	125	170	140

1/ SEE LOCATION SKETCH, PLATE 6.
2/ HOLES 3 AND 3A ARE ABOUT THREE FEET APART.
3/ WATER IN DRAINS STANDING HIGHER THAN USUAL.
A, B BEGINNING MAY 26, 1932, THE WATER WAS BAILED OUT OF THE GROUND WATER HOLES AT EACH VISIT AND SAMPLES WERE TAKEN BOTH BEFORE BAILING AND AFTER THE HOLE HAD REFILLED. "B" DENOTES SAMPLE BEFORE BAILING AND "A" AFTER HOLE HAD REFILLED.
C HOLE CASED WITH STOVEPIPE TO EXCLUDE SURFACE WATER.

APPENDIX A

COOPERATIVE IRRIGATION INVESTIGATIONS IN THE SACRAMENTO-SAN JOAQUIN DELTA IN 1932*

BY
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Cooperative irrigation investigations directed primarily to the determination of the consumptive use of water in the Sacramento-San Joaquin Delta, begun in 1924, have been carried on on a reduced scale since 1930. This is a progress report undertaken to set forth the principal results and some of the detail of operations in 1932.

TANK EXPERIMENTS

Tank experiments in the earlier years of the investigation had for their object the determination of the consumptive use of water by crop plants. Asparagus is the only crop plant which has continued to be the subject of experiments of this kind. This is because its acreage in the Delta exceeds that of any other crop, and because it requires several years to grow to maturity. All other tank work in 1932 related to plants which serve little or no useful purpose, including various kinds of weeds, and aquatic plants. It appears that the general run of non-economic growths, in proportion to the area of land occupied by them, use considerably more water than is used by the general run of crop plants.

Tules and Cat-tails

Two tanks of cat-tails and two of tules were set in a patch of these plants at Camp 3, King Island, in the Summer of 1930. Plants from the roots of the original transplanting were grown in 1931 and 1932, with results for 1932 as shown in Table 77. It was noted on February 11 that there were

*Prepared under the direction of W. W. McLaughlin, Chief, Division of Irrigation, Bureau of Agricultural Engineering, U. S. Department of Agriculture.

no live or green stalks of plants in any of the tanks or in the patch, so there must have been no transpiration. By March 9 there were green stalks from one to two feet high above the ground surface in the tanks. On March 19 the patch was burned over by the farmer, and the next day the upper parts of the live stalks in the tanks were cut off. The water was pumped out of the tanks about the middle of April, and fresh water put in. As the season advanced it was noted that the cat-tails in Tank No. 1 were under size as compared with the adjacent plants in the patch. There is reason to believe that crowding of the roots in the soil of the tank may account for the backward growth. The tules in Tank No. 4 were blown down in June, and although they were restored to upright position, they did not thrive thereafter. Cat-tails in Tank No. 2 and tules in Tank No. 3 seemed normal as compared with plants in the patch. There were some green stalks in the tanks until they were killed by freezing in mid-December.

Early in the season of 1932 it became manifest that the tules which had been set in the four tanks at Simmons Island in the Summer of 1930 lacked the vigor for a normal growth. This was doubtless due to concentration of sea salt in the water of the tanks, left behind as the water was transpired and evaporated. On May 6 and 7, therefore, these tules were removed and representative plants from the surrounding patch were substituted and record begun. High tides and high water from the rivers caused the tanks to be flooded several times in 1932, so that it was necessary to resort to interpolation to a regrettable extent in order to fill out the record. As a consequence, precision can not be claimed for the results presented in Table 78, but it is believed that they are essentially correct.

Weeds on King Island

Twenty tanks were set about April 1 in an east-west line on the

TABLE 77

MONTHLY USE OF WATER BY CAT-TAILS AND TULES GROWN IN TANKS AT CAMP 3, KING ISLAND, 1932

Tank Number	Plant	Water Surface Above Ground Surface Feet	Use of Water - Acre-feet per Acre												
			Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Year
1	Cat-tails	0.0	.08	.10	.43	.48	.58	.99	.75	.27	.29	.30	.19	.10	4.56
2	Cat-tails	1.0	.17	.27	.49	.50	1.02	.95	1.35	.93	.72	.57	.35	.18	7.50
3	Tules	1.0	.10	.20	.55	.83	1.50	1.20	1.36	.91	.75	.80	.35	.08	8.63
4	Tules	0.0	.14	.15	.33	.56	.89	.59	.53	.26	.27	.20	.08	.05	4.05

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TABLE 78

MONTHLY USE OF WATER BY TULES GROWN IN TANKS ON SIMMONS ISLAND, NEAR PORT CHICAGO (BAY POINT), 1932

Tank Number	Water Surface Above Ground Surface feet	Use of Water - Acre-feet per Acre								
		May 7-31	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	May 7-Dec. 31
1	0.0	.51	.67	.91	.96	.87	.67	.47	.13	5.19
2	1.0	.75	.98	1.03	.77	.52	.47	.48	.11	5.11
3	1.0	.41	.48	.72	.80	.63	.56	.54	.09	4.23
4	0.0	.62	.59	.82	.70	.51	.61	.45	.11	4.41

west side of King Island, on the south side of the drainage canal and about 150 yards east of the drainage pumping station. These tanks consist each of an inner or soil cylinder, 5 feet long and 23-1/16 inches in diameter, with perforated detachable bottom, set in a water-tight outer cylinder about 27 inches in diameter. The soil cylinders had been used previously. The outer cylinders were new. Pop corn was planted in the tank plot and grew to such size that it afforded the tank plants somewhat more than normal protection from wind and sun in the latter part of the season. Water for the tanks was taken from shallow wells dug in the plot, and from the drainage canal. The surrounding field crop was barley. The tanks were numbered from west to east.

In transplanting, use was made of a device by means of which the young plants were taken up with a cylinder of the field soil, one foot long and of diameter only slightly less than the diameter of the soil tank, so that the top foot of soil in the tank was that in which the plants had started their growth in the field. The soil in all cases was the peat which forms the surface of King Island.

Seedling smartweeds, most of them not more than 4 inches high, were set on April 12 in Tanks Nos. 2-6-10-14-18. They were taken from a field in which there was a dense stand of the plants. The mature plants were harvested on October 6. Rather uniform results were obtained, so that the range in values necessary for correlation of use of water with yield of plant was not obtained. Taking the group as a whole, 656 pounds of water were used for each pound of dry plant produced, exclusive of roots. Results are presented in Table 79.

Prickly lettuce seedlings were set on April 20 in Tanks Nos. 3-7-11-15-20. The ruling height of plant was 6 to 8 inches, except in Tank No. 20, where there was a dense stand of plants 4 inches or less in height. Mature plants in Tank No. 15 were harvested on September 13. The other tanks were

harvested on September 28. The range of results obtained afforded a correlation giving the equation $U = 0.546\ Y + 1.27$, where U is use of water, in acre-feet per acre, and Y is yield of air-dry aerial portion of plants, in tons per acre. Table 80 sets forth the results for prickly lettuce.

Cockleburs were grown from the seed planted in Tanks Nos. 4-8-12-16-19 on April 13. Harvest was on November 8. The range of results obtained was not great. By plotting use and yield on the same sheet with prickly lettuce it may be seen that by changing the constant term in the equation for prickly lettuce we shall have $U = 0.55\ Y + 1.75$ fitting fairly well the results for cockleburs. Table 81 gives these results.

Tank No. 1 contained a nettle plant which came up from the root of the year before. It was about 2 feet high when transplanted from the field to the tank on April 6. Very small seedling nettles, distinctly infant plants, were set in tanks Nos. 5-9-13-17 on the same date. The experience with nettles in the season of 1932 indicates that tank life does not agree with them. The season seemed to be a particularly favorable one for the plants growing at large. Those in the tanks were of inferior size and appearance. Excluding the plant in Tank No. 1, grown from a root, and those in Tank No. 17, which shared their water supply with a fireweed, it is found that the equation $U = 1.48\ Y + 1.27$ is fairly consistent for the other tanks. However, inasmuch as the range of results is small and the plants were not properly representative of those growing at large, the equation is of somewhat doubtful value. Table 82 gives the results with nettles. The harvest of nettles was a progressive operation, as leaves and stalks kept maturing or dying throughout all of the latter part of the season. The final harvest of the 1932 growth was on December 30, after the leaves and stalks had all been killed by freezing.

TABLE 79

USE OF WATER BY SMARTWEED GROWN IN TANKS AT KING ISLAND, 1932

TANK NUMBER	DEPTH TO WATER TABLE FEET	WATER USED ACRE-FEET PER ACRE	YIELD TONS PER ACRE
2	2.5	10.04	19.90
6	3.5	9.48	18.01
10	3.0	8.49	18.59
14	2.0	9.84	23.62
18	1.5	10.65	20.52
MEANS		9.70	20.13

TABLE 80

USE OF WATER BY PRICKLY LETTUCE GROWN IN TANKS AT KING ISLAND, 1932

TANK NUMBER	DEPTH TO WATER TABLE FEET	WATER USED ACRE-FEET PER ACRE	YIELD TONS PER ACRE
3	2.5	5.87	7.30
7	3.0	6.00	8.66
11	2.0	4.61	6.07
15	1.5	3.60	4.45
20	3.5	8.31	12.88
MEANS		5.68	7.87

TABLE 81

USE OF WATER BY COCKLEBURS GROWN IN TANKS AT KING ISLAND, 1932

TANK NUMBER	DEPTH TO WATER TABLE FEET	WATER USED ACRE-FEET PER ACRE	YIELD TONS PER ACRE
4	1.5	7.24	7.98
8	3.5	5.21	8.16
12	3.0	4.82	5.72
16	2.5	5.21	6.57
19	2.0	4.61	4.98
MEANS		5.42	6.68

TABLE 82

USE OF WATER BY NETTLES GROWN IN TANKS AT KING ISLAND, 1932

TANK NUMBER	WATER USED ACRE-FEET PER ACRE	YIELD TONS PER ACRE	REMARKS
1	5.67	8.24	THE NETTLE IN TANK NO. 1 WAS GROWN FROM ROOT. PLANTS IN OTHER TANKS WERE SEEDLINGS.
5	4.00	1.88	
9	5.15	2.55	
13	4.14	1.97	
17	5.92	2.59	TANK NO. 17 SUPPORTED ALSO A FIREWEED WHICH YIELDED AT THE RATE OF 1.43 TONS PER ACRE.
MEANS (TANKS NOS. 5,9,13)	4.43	2.13	

As soon as practicable after weeds were harvested the tanks were put to further use. Wild mustard seed sown in some of the tanks did not germinate. Wild radish came up, but was frozen. Kelp roots lived and sent up shoots to be included in the work of 1933. A tuft of water grass was set in Tank No. 15 on September 14, and in the next 55 days, with water table at 2 feet, used 0.62 acre-foot of water per acre.

Bare Soil, King Island

Tanks Nos. 10 and 18 were bare of vegetation during the late Fall, Winter and early Spring. The water table in Tank No. 10 ranged from 4.80 to 3.96 feet below the top of the tank. The corresponding range in Tank No. 18 was from 4.54 to 3.65 feet. It is computed that the losses by evaporation in the seven-month period from October 8, 1932, to May 10, 1933, amounted to 0.43 acre-feet per acre in Tank No. 10 and 0.63 acre-foot per acre in Tank No.18.

Asparagus

The asparagus tanks at the Richmond-Chase tract, three miles east of Terminous, were in service and under observation in 1932. The crowns were set early in the year 1927. The data contributed by operations in 1932 are given in Table 83. The yield of tops was less than in 1931, but the yield of spears was very much greater.

TABLE 83

USE OF WATER, WEIGHT OF TOPS AND YIELD OF SPEARS, ASPARAGUS TANKS, RICHMOND-CHASE TRACT, NEAR TERMINOUS, 1932

Tank Number	Sex of Plant. 1/	Depth to Water Table. 2/	Water Used in 1932	Weight of Tops in 1932. 3/	Water Used in 1931. 4/	Weight of Spears in 1932
		Feet	Ac.Ft. per Acre	Grams	Ac.Ft. per Acre	Grams
1	P	2	3.13	377	3.75	1555
2	S	2	3.64	548	4.90	2559
3	P	2	2.81	478	4.28	2520
4	P	2	2.90	465	4.10	2271
5	P	3	1.37	78	1.65	1384
6	S	3	2.55	268	3.44	2402
7	P	3	2.18	157	3.30	1858
8	S	3	2.35	461	5.40	2043
9	P	4	2.24	455	4.08	3440
10	S	4	1.69	224	2.97	2435
11	P	4	3.04	588	5.01	2849
12	S	4	1.53	208	2.80	1497

1/ P signifies pistillate, S staminate.

2/ Nominal approximate depths. Occasionally exceeded by nearly 2 feet in the first and second groups of tanks.

3/ Exclusive of berries.

4/ Given for consideration with weight of spears in 1932.

METEOROLOGICAL

Meteorological observations were made for various periods of time in 1932 at four points in the Delta. The station at King Island is located in the west end of the weed tank plot. It is equipped with a Weather Bureau Class A evaporation pan, a standard rain gage, an anemometer, a thermograph, sling psychrometer, and ordinary minimum and water thermometers. The maximum thermometer was broken and not replaced. At Byron there is the same equipment as at King Island. The station is on the north edge of town, on the premises of F. W. Weihe, Southern Pacific station agent. The Grand Island station is on an embankment built up to the height of the levee on the right bank of the Sacramento River about five miles upstream from Walnut Grove, on the premises of R. J. Coggeshall. The equipment includes the same items as at King Island and Byron, and also a maximum thermometer. Near by, at the foot of the levee, is another instrument shelter, which contains instruments for observations under other auspices. Evaporation at Simmons Island was measured in 1932 in the U. S. Engineering Department pan used in previous years, and also in a Weather Bureau Class A pan installed in June. The rain gages at Simmons Island were continued in service. Rainfall records kept by the Holland Land Company at its headquarters near Clarksburg, by the Richmond-Chase Company at its ranch near Terminous, and by J. D. Thorp at the King-Bishop bridge across channel from the east side of King Island, have been furnished.

Table 84 presents the several rainfall records, Table 85 the records of monthly evaporation, Table 86 the monthly wind travel and Table 87 the records of monthly average daily maximum and minimum temperatures. The daily records of air temperature, water temperature and psychrometer readings are available, but will not be reported here.

TABLE 84

RAINFALL AT STATIONS IN THE SACRAMENTO-SAN JOAQUIN DELTA IN 1932

KING BISHOP BRIDGE		KING ISLAND CAMP 3		RICHMOND-CHASE TRACT		HOLLAND LAND CO. HDQTRS. CLARKSBURG		SIMMONS ISLAND		GRAND ISLAND		BYRON	
DATE	RAINFALL INCHES	DATE	RAINFALL INCHES	DATE	RAILFALL INCHES	DATE	RAINFALL INCHES	DATE	RAINFALL INCHES	DATE	RAINFALL INCHES	DATE	RAINFALL INCHES
JAN. 2	.34	JAN. 6	(.38)	JAN. 2	.30	JAN. 1	.42	JAN. 1 TO FEB. 9	(3.97)	NOV. 5	.02	NOV. 30	.12
14	.18	15	(.50)	13	.10	13	.19	18	(.10)	30	.33	TOTAL NOVEMBER	.12
16	.24	30	(.23)	TOTAL JANUARY	.40	15	.35	25	(.04)	TOTAL NOVEMBER	.35	DEC. 1	.07
18	.09	TOTAL JANUARY	1.11	FEB. 2	.86	16	.08	TOTAL JAN.&FEB.	4.11	DEC. 17	.30	17	.24
27	.06	FEB. 9	(3.34)	5	.43	19	.20	MAR. 17	(.53)	19	.29	19	.14
29	.08	22	(.05)	6	1.05	26	.06	24	(.01)	20	.56	20	.41
31	.17	TOTAL FEBRUARY	3.39	8	.44	27	.06	TOTAL MARCH	.54	21	.30	21	.28
TOTAL JANUARY	1.16	MAR. 9	(.05)	9	1.09	31	.08	APR. 15	(.08)	22	.15	22	.04
FEB. 1	.10	16	(.33)	TOTAL FEBRUARY	3.87	TOTAL JANUARY	1.44	21	(.51)	23	.60	23	.41
2	.12	21	(.09)	MARCH 9	.10	FEB. 1	.25	30	(.20)	TOTAL DECEMBER	2.20	TOTAL DECEMBER	1.59
3	.13	30	(.05)	15	.39	2	.37	TOTAL APRIL	.79				
4	.30	TOTAL MARCH	.52	TOTAL MARCH	.49	5	.25	MAY 7	(.21)				
5	.03	APR. 28	(.47)	APR. 15	.15	6	.63	31	(.10)				
8	.31	TOTAL APRIL	.47	23	.38	7	.31	TOTAL MAY	.31				
9	.76	MAY 4	(.69)	24	.21	8	.06	NOV. 5	(.14)				
TOTAL FEBRUARY	1.75	31	.11	25	.09	9	.73	30	(.42)				
MAR. 9	.11	TOTAL MAY	.80	TOTAL APRIL	.03	16	.05	TOTAL NOVEMBER	.56				
14	.30	NOV. 30	.17	MAY 3	.35	TOTAL FEBRUARY	2.65	DEC. 8	(.03)				
18	.16	TOTAL NOVEMBER	.17	31	.14	MAR. 9	.12	17	(.33)				
24	.05	DEC. 1	.09	TOTAL MAY	.49	15	.17	22	(.81)				
TOTAL MARCH	.62	16	.04	NOV. 30	.21	19	.10	29	(.55)				
APR. 13	.03	17	.16	TOTAL NOVEMBER	.21	23	.07	TOTAL 29 DAYS IN DEC.	1.72				
20	.04	19	.24	DEC. 17	.30	28	.01	TOTAL YEAR TO DEC. 29	8.03				
24	.32	20	.42	19	.24	TOTAL MARCH	.47						
25	.03	21	.29	20	.64	APR. 14	.17						
TOTAL APRIL	.42	22	.14	21	.34	20	.05						
MAY 2	.36	23	.38	22	.19	23	.29						
3	.11	TOTAL DECEMBER	1.76	23	.25	24	.35						
29	.04	TOTAL YEAR	8.22	TOTAL DECEMBER	1.96	26	.09						
31	.12			TOTAL YEAR	8.25	TOTAL APRIL	.95						
TOTAL MAY	.63					MAY 3	.16						
JULY 12	.02					21	.05						
TOTAL JULY	.02					31	.19						
NOV. 30	.09					TOTAL MAY	.40						
TOTAL NOVEMBER	.09					NOV. 2	.01						
DEC. 17	.16					30	.38						
19	.74					TOTAL NOV.	.39						
21	.31					DEC. 17	.28						
23	.54					19	.52						
TOTAL DECEMBER	1.75					20	.30						
TOTAL YEAR	6.44					21	.20						
						22	.21						
						23	.51						
						29	.04						
						TOTAL DEC.	2.06						
						TOTAL YEAR	8.36						

NOTE: FIGURES IN PARENTHESES ARE FOR ACCUMULATED RAIN SINCE LAST PREVIOUS OBSERVATION. THEY COVER A PERIOD OF SEVERAL DAYS, USUALLY ABOUT A WEEK, IN EACH CASE.

TABLE 85

MONTHLY EVAPORATION AT STATIONS IN THE SACRAMENTO-SAN JOAQUIN DELTA, 1932
(Evaporation in Feet)

Month	U. S. Weather Bureau Class A Pans				U.S. Engrg. Department Pan
	King Island	Byron	Grand Island	Simmons Island	Simmons Island
Apr.	.046 1/				
May	.596				
Jun.	.821			.813 5/	.944
Jul.	.803	.098 2/		.977	1.014
Aug.	.757	.733		.885	.941
Sep.	.565	.458	.229 4/	.656	.756
Oct.	.461	.340	.499	.523	.654
Nov.	.258	.154	.230	.253	.302
Dec.	.128	3/	.159	.140	.136

1/ 3 days. April 28-30.
2/ 3 days. July 29-31.
3/ No serviceable record obtained. Ice.
4/ 14 days. September 17-30.
5/ Record June 16-30. Evaporation June 1-15 estimated proportional to that from U. S. Engineering Department pan.

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TABLE 86

MONTHLY TRAVEL OF WIND AT STATIONS IN THE SACRAMENTO-SAN JOAQUIN DELTA, 1932
(Travel in Miles)

Month	King Island	Byron	Grand Island
Apr.			
May	1352 1/		
Jun.	1836		
Jul.	1324	216 2/	
Aug.	1281	1919	
Sep.	1430	808	762 3/
Oct.	1868	1168	1855 4/
Nov.	1226	1231	1126 4/
Dec.	1798	1047	1379

1/ 21 days, May 11-31.
2/ 3 days, July 29-31.
3/ 15 days, Sep. 16-30.
4/ No reading of anemometer between Oct. 29 and Nov. 4th. Accumulated wind travel apportioned to the two months.

TABLE 87

MONTHLY AVERAGE DAILY MAXIMUM AND MINIMUM TEMPERATURES AT STATIONS IN THE SACRAMENTO-SAN JOAQUIN DELTA, 1932
(Temperature in degrees, Fahrenheit)

Month	King Island		Byron		Grand Island	
	Average Maximum Daily Temperature	Average Minimum Daily Temperature	Average Maximum Daily Temperature	Average Minimum Daily Temperature	Average Maximum Daily Temperature	Average Minimum Daily Temperature
Apr.						
May	79.1 1/	46.9 1/				
Jun.	86.6	50.6				
Jul.	88.7	47.8				
Aug.	89.5 2/	46.6	92.7			
Sep.	92.2	47.9	93.9 3/	49.9 4/	90.2 6/	49.4 6/
Oct.	79.2	41.1	80.0 5/	44.5	81.8 7/	44.0 7/
Nov.	73.7	36.7	74.2	39.7	71.9 8/	39.1 8/
Dec.	54.3	26.6	51.9	27.5	49.9	28.9

1/ 27 days. May 5-31.
2/ Maximum temperature from thermograph for 11 days in August, and from September 14 until end of year.
3/ 13 days. Sep. 1-13.
4/ 28 days. Sep. 3-30.
5/ 21 days. Oct. 9-31.
6/ 13 days. Sep. 18-30.
7/ 28 days. Oct. 1-28.
8/ 27 days. Nov.3-30, except Nov. 5.

WEED CENSUS

Work of the nature of a weed census or weed survey has been done as opportunity in the way of time and location offered. The accumulated volume of notes along this line is now considerable, but it needs to be rounded out and the analysis and application made. Data applicable in this connection were secured also in connection with the Delta crop census of 1932.

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF WATER RESOURCES

GAGING STATIONS OF THE SACRAMENTO-SAN JOAQUIN VALLEY

JANUARY 1, 1932

SCALE 0 5 10 15 20 25 30 35 40 MILES

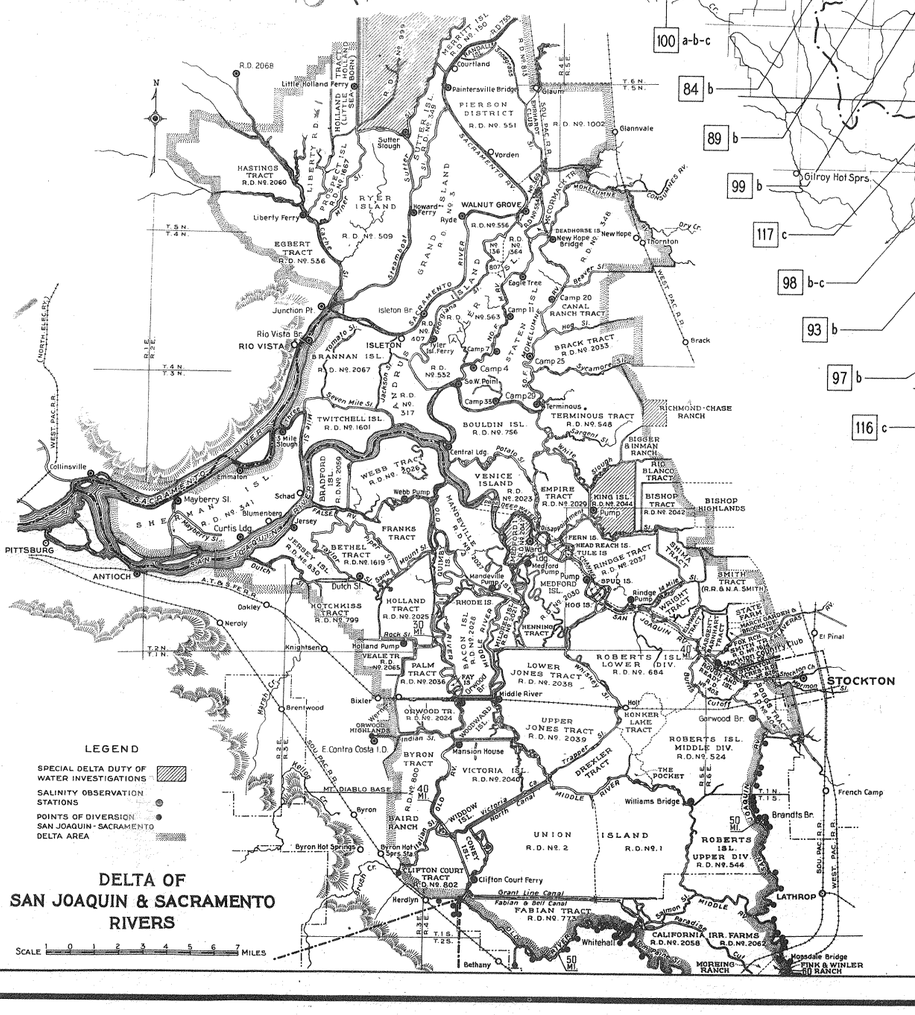
LEGEND

CHARACTER OF STATIONS

- (32) GAGE HEIGHTS ONLY
- [15] DAILY DISCHARGE
- △12 GAGE HEIGHTS ONLY AND DAILY DISCHARGE IN ALTERNATE PERIODS
- ◇56 DISCHARGE MEASUREMENTS ONLY

THE ENCLOSED NUMBER REFERS TO DESIGNATION IN THE TABULATION "GAGING STATIONS OF THE SACRAMENTO - SAN JOAQUIN VALLEY" WHICH THIS MAP ACCOMPANIES.

RELATION TO WORK PROJECTS

- a FLOOD MEASUREMENT PROGRAM
- b SACRAMENTO-SAN JOAQUIN WATER SUPERVISOR PROGRAM
- c U.S. GEOLOGICAL SURVEY, FEDERAL-STATE COOPERATION
- d U.S. ENGINEERS OR PRIVATE AGENCIES

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