STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF WATER RESOURCES

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

REPORT OF

SACRAMENTO-SAN JOAQUIN WATER SUPERVISION FOR 1948

MAY, 1949

TABLE OF CONTENTS

	Page
ALPHABETICAL INDEX TO TABLES	5
LIST OF PLATES	10
ACKNOWLEDGMENT	11
ADVISORY COMMITTEE	12
ORGANIZATION	13
FOREWORD	14
SACRAMENTO SAN-JOAQUIN WATER SUPERVISION	15
Objectives	15
Scope of Work	15
Water Supervision	16
Hydrographic Activities of Cooperating Agencies	19
SHASTA AND FRIANT RESERVOIR OPERATIONS	20
Reservoir Data	20
Shasta Reservoir Operation - 1948	21
Friant Reservoir Operation - 1948	22
RUNOFF AND WATER SUPPLY	22
1948 Water Conferences	23
1948 Inventory of Runoff	23
1948 Runoff Comparisons	23
Primary Irrigation Supplies	24
Accretions to Stream Flow	25
Sacramento Valley Accretions	25
San Joaquin Valley Accretions	27
Stream Flow Measurements	28
Preliminary Data from Cooperating Agencies	29
Stream Flow Bulletins	29
Notes on Certain Gaging Stations	29
Sacramento River at Sacramento	29
Minor Tributaries to Sacramento River	30
Red Bank Creek near Foothills	30
Craig Creek near Mouth	30
Butler Slough near Mouth	30
Antelope Creek near Mouth	30
Irrigation Drain into Antelope Creek	30
North Fork of Mill Creek near Mouth	31
Mill Creek near Mouth	31
Champlin Slough near Mouth	31
Toomes Creek near Mouth	31
Deer Creek near Mouth	31
Chico Creek near Mouth	31
Sacramento River at Ord Ferry	31
Automatic Radio Stream Gage Transmission	31
Precipitation	32
USE OF WATER FOR IRRIGATION	32
Irrigation Diversions	33
Irrigated Acreage	35
1948 Sacramento-San Joaquin Delta Crop Survey	35
Gross Duty of Water	36
Use of Water in Delta	36
SALINITY INVESTIGATIONS	37
Purpose	37
Scope	37
Complete or Partial Analyses of Surface Flows	38
New Salinity Observation Stations	38
Sacramento River Water Moves Southward	38
Station Maintenance and Records	41
Daily Salinity Observations	41
Salinity Bulletins	41
Area of Salinity Encroachment	42
TIDE GAGES	42
TABLES	45 through 158
Summary - Runoff Percentage, Stream Flow, Accretions and Irrigated Acreage	45 through 49
Daily Stream Flows	50 through 98
Diversions and Irrigated Acreage	99 through 141
Salinity Observations	141 through 158
POCKET	Inside Back Cover
Delta Irrigated Acreage - 1948, and	
Map Showing Location of Gaging Stations and of Points of Diversion.	

ALPHABETICAL INDEX TO TABLES

Page

ACCRETIONS 46, 48
Comparative Seasonal Total Flows in Sacramento River 45

ACREAGE IRRIGATED
Annual - 1939 to 1948 49
Delta Crop Survey - 1948 . . . . . In Back Pocket
From a specific stream . . . . . See specific stream name
From each point of diversion . . . . . See "Diversions"
Rice Acreage, Annual 140
Seasonal Comparative - Each Stream System 49
Seasonal, Sacramento and San Joaquin Valley 49, 99
Summary by Sacramento River Sections 99, 140
Water Utilization Summary 99

AMERICAN RIVER
Accretions 46
Acreage Irrigated 49, 99, 119
Diversions 99, 119, 137
Duty of Water 99, 119
Stream Flow 45, 46, 79

ANALYSIS OF WATER 151

ANNUAL RUNOFF IN PERCENT OF 50-YEAR NORMAL 45

ANTELOPE CREEK NEAR MOUTH - Stream Flow 46, 60

BACK BORROW PIT
Accretions 46
Acreage Irrigated 49, 99, 112
Diversions 99, 112
Stream Flow 46, 67, 68, 69

BATTLE CREEK NEAR COTTONWOOD - Stream Flow 46, 58

BEAR RIVER NEAR WHEATLAND - Stream Flow 46, 76

BUTLER SLOUGH NEAR MOUTH - Stream Flow 46, 59

BUTTE CREEK AND BUTTE SLOUGH
Accretions 46
Acreage Irrigated 49, 99, 114
Diversions 99, 101
Duty of Water 99
Stream Flow 46, 65, 70

CACHE CREEK AT YOLO - Stream Flow 46, 80

CALAVERAS RIVER AT JENNY LIND - Stream Flow 48, 83

CHAMPLIN SLOUGH NEAR MOUTH - Stream Flow 46, 62

CHICO CREEK NEAR MOUTH - Stream Flow 46, 63

COLUSA TROUGH
Accretions 46
Acreage Irrigated 49, 99, 111
Diversions 99, 111
Duty of Water 99
Return Water 46
Stream Flow 46, 67, 68, 69

COSUMNES RIVER - Stream Flow at
McConnell 48, 81
Michigan Bar 48, 81

COTTONWOOD CREEK NEAR COTTONWOOD - Stream Flow 46, 57

COTTONWOOD CREEK NEAR FRIANT - Stream Flow 48, 85

CRAIG CREEK NEAR MOUTH - Stream Flow 46, 59

DEER CREEK NEAR MOUTH (Near Vina) - Stream Flow 46, 63

DEER CREEK NEAR SMARTVILLE - Stream Flow 46, 75

DELTA - Sacramento-San Joaquin River
Acreage Irrigated . . . . . 36, In Back Pocket
Analysis of Water 151
Runoff to Delta 45
Salinity 141, 142, 143, 149, 150, 151

DELTA UPLANDS FROM CACHE SLOUGH - Diversions 113

DISCHARGE - Flow of Streams . . . . . See "Stream Flow"

ALPHABETICAL
INDEX TO TABLES (CONTINUED)

Page

DIVERSIONS
Accretions, Relation to 46, 48
At each point of diversion on
American River 116
Back Borrow Pit 112
Butte Creek, Lower, and Butte Slough 114
Colusa Trough 111
Delta Uplands from Cache Slough 113
Feather River 117
Fresno Slough and Fresno Slough By-Pass 130
Knights Landing Ridge Cut 113
Merced River 132
Old San Joaquin River (Delta Uplands) 120
Sacramento River 103
San Joaquin River, Lower (Delta Uplands) 121
San Joaquin River (Vernalis to Fremont Ford) 123
San Joaquin River (Fremont Ford to Friant) 124
Stanislaus River 135
Sutter By-Pass and Sacramento Slough 115
Tom Paine Slough (Delta Uplands) 120
Tuolumne River 134
Yolo By-Pass 113
Yuba River 118
Average Monthly - Sacramento-San Joaquin Valley 136
Irrigation Districts - 1947
Merced Irrigation District 141
Modesto Irrigation District 141
Oakdale Irrigation District 141
South San Joaquin Irrigation District 141
Monthly, Comparative Seasonal
American River 137
Feather River 136
Merced River 139
Old San Joaquin River 137
Sacramento River 136
San Joaquin River, Lower (Delta Uplands) 138
San Joaquin River (Vernalis to Fremont Ford) 138
Stanislaus River 139
Tom Paine Slough (Delta Uplands) 138
Tuolumne River 139
Yuba River 137
Return Flows, Relation to 46, 48
Seasonal, Comparative
By months . . . . . See "Diversions, Monthly"
For Sacramento River Sections 46, 99, 140
Summary, Monthly, Sacramento-San Joaquin Valley 46, 48, 136

DRAINAGE PLANT DISCHARGE
Recl. Dist. No. 70 Drain to Sacramento River 66
Recl. Dist. No. 108 Drain to Sacramento River 67
Recl. Dist. No. 1000 (No. 3) Drain to Sacramento River 78
Recl. Dist. No. 1000 (2nd Bannon) Drain to Sacramento River 78
Recl. Dist. No. 1001 Drain to Cross Canal 77
Recl. Dist. No. 1500 Drain to Sacramento Slough 71

DRY CREEK NEAR GALT - Stream Flow 46, 82

DRY CREEK NEAR MODESTO - Stream Flow 48, 96

DUTY OF WATER
Seasonal by Rivers
American River 99
Feather River 99
Sacramento River 99
Sacramento-San Joaquin Valley 99
Yuba River 99
Water Utilization Summary 99

FEATHER RIVER
Accretions 46
Acreage Irrigated 49, 99, 117
Diversions 99, 117, 136
Duty of Water 99
Stream Flow 45, 46, 72, 73, 74

FRESNO SLOUGH BY-PASS
Diversions 130
Stream Flow 86

FRIANT RESERVOIR
Daily Content in Acre-Feet 84
Inflow in Daily Second Feet 84

GROSS DUTY OF WATER 99

ALPHABETICAL
INDEX TO TABLES (CONTINUED)

Page

INVENTORY OF MONTHLY STREAM FLOW
Sacramento Valley Streams 46
San Joaquin Valley Streams 48

IRRIGATION DRAIN INTO ANTELOPE CREEK - Stream Flow 60

KNIGHTS LANDING RIDGE CUT
Acreage Irrigated 49, 99, 113
Diversions 99, 113
Duty of Water 99
Stream Flow 46, 68

LAIRD SLOUGH - SAN JOAQUIN RIVER NEAR GRAYSON - Stream Flow 48, 90

MERCED RIVER
Accretions 48
Acreage Irrigated 49, 99, 132
Diversions 99, 132, 136, 139
Duty of Water 99
Return Water Flows 48
Stream Flow 45, 48, 92, 93

MERCED IRRIGATION DISTRICT - Diversions 1947 141

MERCED RIVER SLOUGH - Stream Flow 48, 93

MILL CREEK NEAR MOUTH - Stream Flow 46, 61

MODESTO IRRIGATION DISTRICT - Diversions 1947 141

MOKELUMNE RIVER AT WOODBRIDGE - Stream Flow 48, 82

MUD SLOUGH BRANCHES OF SAN JOAQUIN RIVER AT FREMONT FORD - Stream Flow 48, 89

NORMAL
Precipitation 32
Runoff 45

NORTH FORK OF MILL CREEK NEAR MOUTH - Stream Flow 46, 61

OAKDALE IRRIGATION DISTRICT - Diversions 1947 141

OLD SAN JOAQUIN RIVER (Delta Uplands)
Acreage Irrigated 49, 99, 120
Diversions 99, 120, 137
Duty of Water 99

PRECIPITATION, Monthly at
Colusa 32
Fresno 32
Marysville 32
Merced 32
Modesto 32
Red Bluff 32
Sacramento 32

RED BANK CREEK AT FOOTHILLS - Stream Flow 46

RUNOFF . . . . . See "Stream Flow"

SACRAMENTO RIVER
Accretions 26, 46
Acreage Irrigated 49, 99, 103
Diversions 99, 103, 136, 140
Duty of Water 99
Return Water Flows 26, 46
Stream Flow . . . . . 45, 46, 49 through 57

SACRAMENTO SLOUGH . . . . . See "Sutter By-Pass"

SALINITY INVESTIGATIONS
Analyses, Complete or Partial by U. S. Bureau of Reclamation 151
Daily Salinity Observations 149
Delta Salinity 143
Description of Salinity Stations 142
Maximum Recorded Salinity, 1938 to 1948 141
Relation of 10-day Flow to Affected Area 150
Salinity Observations in 1948 143

SAN JOAQUIN RIVER
Accretions 48
Acreage Irrigated 49, 99, 120, 121, 123, 124
Diversions 99, 120, 121, 123, 124, 137, 138
Duty of Water 99
Return Water Flows 48
Stream Flow . . . . . 45, 48, 84 through 91

ALPHABETICAL
INDEX TO TABLES (CONTINUED)

Page

SHASTA RESERVOIR
Daily Content in Acre-Feet 50
Inflow in Daily Second Feet 50

SOUTH SAN JOAQUIN IRRIGATION DISTRICT - Diversions 1947 141

STANISLAUS RIVER
Accretions 48
Acreage Irrigated 49, 99, 135
Diversions 99, 135, 139
Duty of Water 99
Return of Water Flows 48
Stream Flow 45, 48, 97, 98

STONY CREEK NEAR HAMILTON CITY - Stream Flow 46, 64

STOCKTON DIVERTING CANAL AT STOCKTON - Stream Flow 48, 83

STREAM FLOW - Monthly Summary for All Streams 46, 48
Average Minimum 10-day Flow to Delta 150
Comparative Monthly Water Supply 46, 48
Daily Mean Second Feet and Monthly Acre-Feet in
American River at Fair Oaks 79
American River at Sacramento (H Street Bridge) 79
Antelope Creek near Mouth 60
Battle Creek near Cottonwood 58
Bear River near Wheatland 76
Butler Slough near Mouth 59
Butte Slough to Sacramento River 65
Butte Slough to Sutter By-Pass 70
Cache Creek at Yolo 80
Calaveras River at Jenny Lind 83
Chico Creek near Mouth 63
Colusa Basin Drain at Knights Landing 69
Colusa Trough at College City 68
Colusa Trough at Colusa-Williams Highway 67
Colusa Weir to Butte Basin 65
Cosumnes River at McConnell 81
Cosumnes River at Michigan Bar 81
Cottonwood Creek near Friant 85
Cottonwood Creek near Cottonwood 57
Craig Creek near Mouth 59
Deer Creek near Mouth (Near Vina) 63
Deer Creek near Smartville 75
Dry Creek near Galt (Dustin Road) 82
Dry Creek near Modesto (Clauss Road) 96
Feather River at
Gridley (near) 73
Nicolaus 74
Oroville (above) 72
Shanghai Bend (below) 74
Yuba City 73
Fremont Weir to Yolo By-Pass 70
Fresno Slough By-Pass 86
Friant Reservoir Inflow 84
Irrigation Drain into Antelope Creek 60
Knights Landing Ridge Cut 68
Merced River at
Cressey 92
Snelling (below) 92
Stevinson (near) 93
Yosemite Valley Railroad Crossing 92
Merced River Slough 93
Mill Creek near Mouth (near Los Molinos) 61
Mokelumne River at Woodbridge 82
Moulton Weir to Butte Basin 64
North Fork of Mill Creek near Mouth (near Los Molinos) 61
Recl. Dist. No. 70 Drain to Sacramento River 66
Recl. Dist. No. 108 Drain to Sacramento River 67
Recl. Dist. No. 1000 (No. 3) Drain to Sacramento River 78
Recl. Dist. No. 1000 (2nd Bannon) Drain to Sacramento River 78
Recl. Dist. No. 1001 Drain to Cross Canal 77
Recl. Dist. No. 1500 Drain to Sacramento Slough 71
Red Bank Creek at Foothills 58
Sacramento River at
Balls Ferry 52
Butte City 54
Colusa 55
Hamilton City 53
Keswick 51
Knights Landing 56
Ord Ferry 54
Red Bluff 52
Redding 51
Sacramento 57
Verona 56
Vina Bridge 53
Wilkins Slough 55

ALPHABETICAL
INDEX TO TABLES (CONTINUED)

Page

STREAM FLOW (Continued)
Daily Mean Second Feet and Monthly Acre-Feet (Continued)
Sacramento Slough to Sacramento River . . . 72
Sacramento Weir to Yolo By-Pass . . . 77
San Joaquin River at
Delta Bridge (Turner Island Bridge)(near Los Banos) . . . 88
Dos Palos (near) . . . 87
El Nido (near) . . . 88
Fremont Ford . . . 89
Friant (below) . . . 85
Grayson - Laird Slough . . . 90
Hetch Hetchy Crossing . . . 91
Mendota (near) . . . 87
Mud Slough Branches at Fremont Ford . . . 89
Newman (near) . . . 90
Vernalis (near) . . . 91
Whitehouse . . . 86
Shasta Reservoir Inflow . . . 50
Stanislaus River at
Mouth . . . 98
Orange Blossom Bridge . . . 97
Ripon Bridge . . . 98
Riverbank . . . 97
Stockton Diverting Canal at Stockton . . . 83
Stony Creek near Hamilton City . . . 64
Sycamore Slough at Knights Landing . . . 69
Tisdale Weir to Sutter By-Pass . . . 66
Toomes Creek near Mouth . . . 62
Tuolumne River at
Hickman Bridge . . . 95
La Grange . . . 94
Modesto . . . 95
Roberts Ferry . . . 94
Tuolumne City . . . 96
Wadsworth Canal to Sutter By-Pass . . . 71
Yolo By-Pass near Woodland . . . 80
Yuba River at Marysville . . . 76
Yuba River at Narrows Dam . . . 75
Flow Rating Table, Sacramento River Gaging Stations . . . 49
Full Natural, Major Streams to Central Valley . . . 45
Inventory of Monthly . . . 46, 48
Monthly Flow, Summary . . . 46, 48

SUTTER BY-PASS AND SACRAMENTO SLOUGH
Accretions . . . 46
Acreage Irrigated . . . 49, 99, 115
Diversions . . . 99, 115
Duty of Water . . . 99
Stream Flow . . . 46, 70, 71, 72

TOM PAINE SLOUGH (Delta Uplands)
Acreage Irrigated . . . 49, 99, 120
Diversions . . . 99, 120
Duty of Water . . . 99

TOOMES CREEK NEAR MOUTH - Stream Flow . . . 62

TUOLUMNE RIVER
Accretions . . . 48
Acreage Irrigated . . . 49, 99, 134
Diversions . . . 99, 134, 136, 139
Duty of Water . . . 99
Return Water Flows . . . 48
Stream Flow . . . 45, 48, 94, 95, 96

TURLOCK IRRIGATION DISTRICT - Diversions 1947 . . . 141

USE OF WATER . . . See "Duty of Water"

WADSWORTH CANAL
Acreage Irrigated . . . 49, 99, 115
Diversions . . . 99, 115
Stream Flow . . . 46, 71

WATER ANALYSES . . . 151

WATER UTILIZATION, SUMMARY . . . 99

WEIRS, Daily Mean Flow Over, in Second Feet
Colusa Weir to Butte Basin . . . 65
Fremont Weir to Yolo By-Pass . . . 70
Moulton Weir to Butte Basin . . . 64
Sacramento Weir to Yolo By-Pass . . . 77
Tisdale Weir to Sutter By-Pass . . . 66

ALPHABETICAL
INDEX TO TABLES (CONTINUED)

Page

YOLO BY-PASS
- Acreage Irrigated 49, 99, 113
- Diversions 99, 113
- Duty of Water 99
- Stream Flow 46, 68, 70, 80

YUBA RIVER
- Accretions 46
- Acreage Irrigated 49, 99, 118
- Diversions 99, 118, 136, 137
- Duty of Water 99
- Stream Flow 45, 46, 75, 76

LIST OF PLATES

Plate — Page

1 Area Covered by Sacramento-San Joaquin Water Supervision 17

2 Shasta Reservoir Operation - 1948, and Friant Reservoir Operation - 1948 . . . . . Opposite 22

3 Sacramento-San Joaquin Water Supervision (Showing location of Points of Diversion, Salinity Observation Stations and Stream Gaging Stations) . . . . . In Back Pocket

4 Maximum Seasonal Salinity Encroachment - Sacramento-San Joaquin Delta 39

IN BACK POCKET

Plate 3 - Map of Sacramento-San Joaquin Valley
Showing - Locations of Gaging Stations, Points of Diversion and Salinity Observation Stations.

Table 148 - Delta Crop Survey Tabulation for 1948
Showing - Acreages of Irrigated Crops and Non-Irrigated Areas.

ACKNOWLEDGMENT

Valuable assistance has been rendered by many individuals and by many public and private agencies in the conduct of the field work and the preparation of data for this report of the Sacramento-San Joaquin Water Supervision activities.

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

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

The United States Geological Survey, Department of Interior, has extended valuable cooperation in gathering and assembling stream flow data.

The City of San Francisco Public Utilities Commission, Hetch Hetchy Water Supply, in the San Joaquin Valley, and the United States Bureau of Reclamation, in both the Sacramento and San Joaquin Valleys, have made available a large amount of stream flow data.

The Modesto, Oakdale, and Turlock irrigation districts and the United States Bureau of Reclamation have assisted in observing and maintaining recording gages in the San Joaquin Valley area.

The United States Bureau of Reclamation provided the funds necessary to maintain the regular program of salinity observations in the Sacramento-San Joaquin Delta during 1948.

ADVISORY COMMITTEE

PERMANENT COMMITTEE OF THE SACRAMENTO-SAN JOAQUIN RIVER PROBLEMS CONFERENCE

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

Herbert E. White, Chairman, Sacramento

E. L. Adams, Chico

William Durbrow, Grass Valley

Manley S. Harris, San Francisco

Warren H. McBryde, San Francisco

R. V. Meikle, Turlock

F. T. Robson, Vina

ORGANIZATION

C. H. Purcell	Director of Public Works
Edward Hyatt	State Engineer
A. D. Edmonston	Assistant State Engineer

The activity covered by this report
is under the direction
of

T. B. Waddell — Principal Hydraulic Engineer

The preparation of this report and
the collection and compilation of the supporting
data were under the supervision
of

Irvin M. Ingerson — Senior Hydraulic Engineer

Field and Office Personnel

Carl A. Werner — Associate Hydraulic Engineer
In charge of stream flow measurements and computations

Arthur M. Baker — Assistant Hydraulic Engineer
In charge of diversion measurements and computations

Assistants

Earl D. Stafford	Associate Hydraulic Engineer
Don S. Hays	Assistant Hydraulic Engineer
C. H. Epperson	Sub-Foreman, F.C.C.& M.
Franz M. Kuchta	Junior Civil Engineer
John F. Wright	Junior Civil Engineer
Joseph L. Clausse	Assistant Hydrographer
Grant C. Ardell	Senior Engineering Aid
Kenneth E. Morgan	Senior Engineering Aid
B. H. Hoffmaster	Junior Engineering Aid
G. A. Cort	Junior Engineering Aid
Arthur L. Winslow, Jr.	Junior Engineering Aid
Arthur B. Myers	Junior Hydrographer
Erle W. Danley, Jr.	Junior Hydrographer
William D. Harrison	Junior Hydrographer
Raymond R. Peters	Junior Hydrographer
W. J. Sebrell	Junior Hydrographer
B. B. Bruggman	Hydrographic Aid
Gladys M. Phillips	Senior Stenographer Clerk
Marie Page	Senior Clerk

In addition to the foregoing
Franklin C. Craig, Associate Engineer, U. S. Geological Survey
worked directly with and was assisted by personnel of the
Division of Water Resources on stream flow measurements and computations

---

T. R. Merryweather
Administrative Assistant

FOREWORD

A contract has been entered into between the United States and the Department of Public Works which provides for the performance by the Division of Water Resources of certain hydrographic work which has been formerly performed by the U. S. Bureau of Reclamation and the continuation of the Sacramento-San Joaquin Water Supervision activities of the Division of Water Resources. This contract, designated as U. S. Bureau of Reclamation Contract No. 175r-1596 and Division of Water Resources Contract No. 3-170, was executed on December 30, 1948 and became effective October 1, 1948.

The work which will be performed by the Division of Water Resources under this contract includes the collection of data on stream flows and diversions for the Sacramento and San Joaquin rivers and their tributaries formerly obtained by both agencies and in addition data formerly obtained by the Bureau of Reclamation on flows and diversions for the Tule River, measurements of inflows to Tulare Lake and quality and temperatures of water. The contract also sets up a program in which the Bureau of Reclamation receives periodic hydrographic reports from the Division of Water Resources for the former's use in the operation of the Central Valley Project.

REPORT OF SACRAMENTO-SAN JOAQUIN WATER SUPERVISION FOR 1948

SACRAMENTO-SAN JOAQUIN WATER SUPERVISION

Water supervision activities, resulting from the efforts of the first Sacramento-San Joaquin River Problems Conference and its Permanent Committee working with the former Division of Water Rights, were inaugurated in 1924. A complete description of the origin, history and conduct of the work is found in the 1924 and 1926 Biennial Reports of the former Division of Water Rights, in Bulletin Number 4 of that Division, and in Bulletin Number 23 of the succeeding Division of Water Resources. The latter bulletin brings together all data and measurements obtained in the first five-year period, 1924 to 1928, inclusive. Annual Water Supervision reports for subsequent years are in separately bound books similar to this report.

Objectives

At the outset, the objective of the work of Water Supervision in the valley floor areas along the Sacramento and San Joaquin river system was to afford relief to water users from the difficulties of obtaining irrigation supplies occasioned by uncoordinated diversions during years of substantially subnormal runoff. The situation called for a voluntary regulation of diversions in order to alleviate as far as possible the damage from the serious shortages in the water supplies needed for irrigation, municipal consumption, salinity control in the Sacramento-San Joaquin Delta, and navigation purposes. Equitable coordination of diversions was accomplished primarily through the Water Supervision program.

There is no agreement between the water users under which a watermaster might distribute the natural water supply equitably to those entitled to receive it, but it appears inevitable that such an agreement, embracing a definite schedule of relative water rights, will be developed. Its realization will require, however, reliable data, covering a long period of years, on the actual diversions and uses of water, stream flows, stream accretions and salinity encroachment into the Sacramento-San Joaquin Delta. Looking toward that end, it has been the objective of the Division of Water Resources through its Water Supervision work, to collect and record all of the basic hydrographic data necessary to formulate an intelligent and practicable agreement defining the respective water rights of the parties affected in the area covered.

Scope of Work

The area embraced by the Sacramento-San Joaquin Water Supervision work lies on the Sacramento and San Joaquin Valley floors. It specifically covers all of the lands irrigated from the Sacramento River between Redding and Sacramento, including those irrigated from the Colusa Trough, Back Borrow Pit, Knights Landing Ridge Cut, and Yolo By-Pass

above West Sacramento, from Lower Butte Creek and Butte Slough, from the Feather River below Oroville, from the Yuba River below Smartville, from the Sutter By-Pass and Sacramento Slough, from the American River below Fair Oaks, from the San Joaquin River between Fremont Ford Bridge (Stevinson-Gustine Highway) and Mossdale Bridge, from the Merced River below Snelling, from the Tuolumne River below La Grange, and from the Stanislaus River below Knights Ferry, and the irrigated areas lying on the "uplands" side of and receiving water from the San Joaquin River between Mossdale Bridge and Stockton, Old San Joaquin River and Tom Paine Slough. The cooperative activities of the U. S. Bureau of Reclamation during 1948 made it possible to increase the area covered by data in this report to include the lands along the San Joaquin River upstream from Fremont Ford Bridge to Friant. The area covered and its geographical relation to the Central Valley Drainage Basin are shown on Plate 1.

Water Supervision Activities

The work of the Sacramento-San Joaquin Water Supervision unit of the Division of Water Resources is divided into two portions, field work, mainly during the spring, summer and fall months, and office work during the winter and early spring months.

The field activities include:

(1) Measurement of stream flow passing the many recording stations along the river and drainage channels;

(2) Measurements of the amounts of water diverted and collection of records of use by each water user;

(3) Measurements of the amounts of water returned to natural channels, through drainage plants or gravity drains, for possible re-use;

(4) Obtaining an annual census of irrigated acreages and crops supplied by either a primary, or drainage water supply, or both;

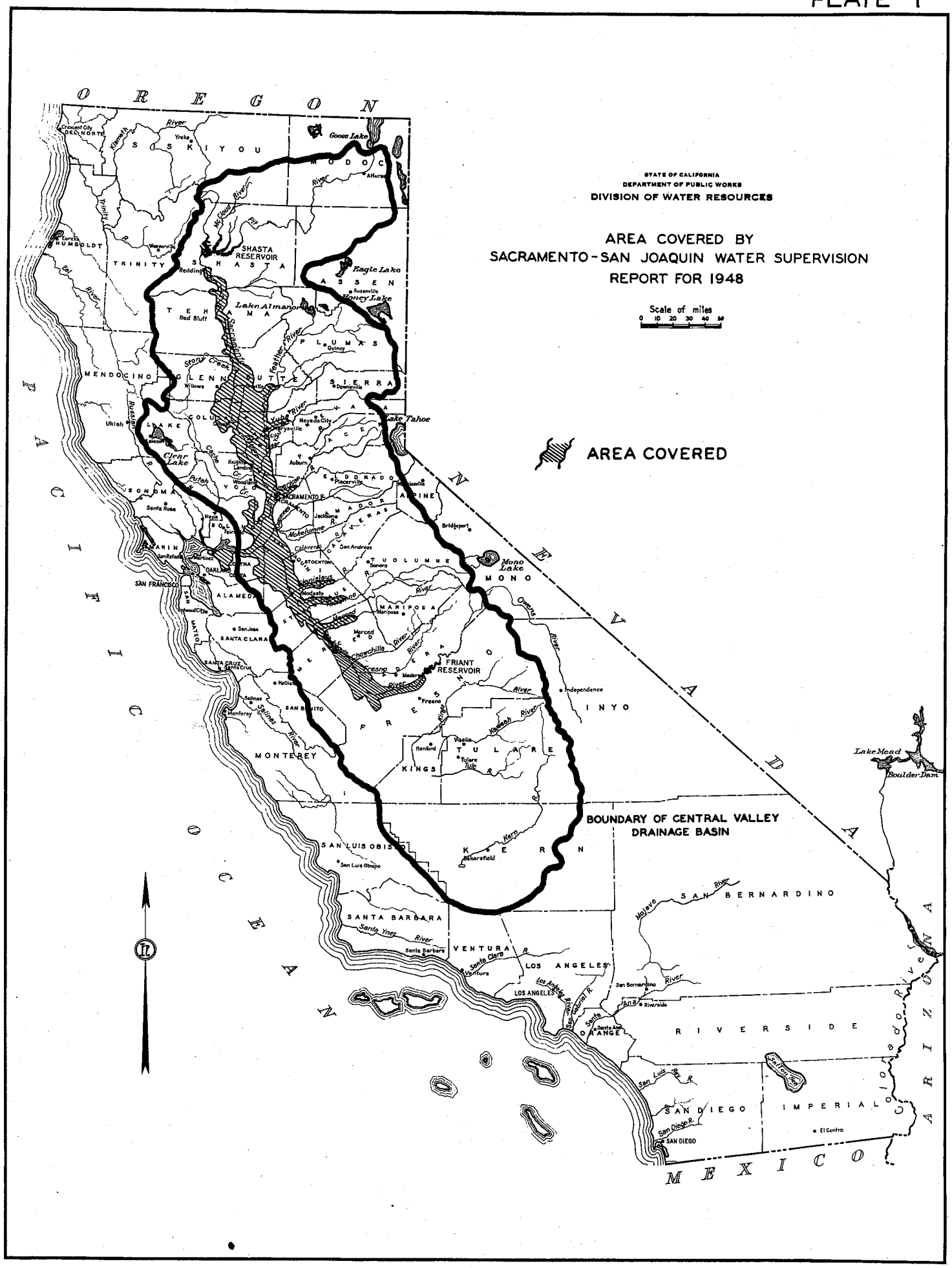
(5) Maintaining the Delta salinity observation program;

(6) Cooperation with and assistance to water users in connection with individual problems of diversion; and

(7) Assistance with hydrographic activities of cooperating public and private agencies.

The office work comprises mainly the assembly, computation and analysis of hydrographic and other data collected during the field season for presentation in the annual report of Water Supervision. This report contains the basic records of water supply available to, and the water utilization by, each user of water from the streams covered in the area. The computation of stream flow, drainage and accretions involves the conversion of the recorded daily gage records to figures showing the daily flows in second feet and monthly runoffs in acre-feet. The computation of the amounts of water diverted by each water user involves the reduction of data showing the operation of his diversion plant,

PLATE I


STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF WATER RESOURCES
AREA COVERED BY
SACRAMENTO-SAN JOAQUIN WATER SUPERVISION
REPORT FOR 1948
Scale of miles
0 10 20 30 40 50
AREA COVERED
BOUNDARY OF CENTRAL VALLEY
DRAINAGE BASIN
OREGON
NEVADA
ARIZONA
MEXICO
PACIFIC OCEAN
SHASTA RESERVOIR
FRIANT RESERVOIR
Goose Lake
Eagle Lake
Honey Lake
Lake Almanor
Lake Tahoe
Clear Lake
Mono Lake
Lake Mead
Boulder Dam
SAN FRANCISCO
SAN DIEGO
Salton Sea
Colorado River
SISKIYOU
MODOC
HUMBOLDT
TRINITY
SHASTA
ASSEN
TEHAMA
PLUMAS
MENDOCINO
GLENN
BUTTE
SIERRA
LAKE
COLUSA
PLACER
SONOMA
YOLO
ELDORADO
ALPINE
MARIN
CONTRA COSTA
ALAMEDA
SACRAMENTO
AMADOR
CALAVERAS
TUOLUMNE
MONO
MARIPOSA
SANTA CLARA
SANTA CRUZ
SAN BENITO
MERCED
FRESNO
INYO
MONTEREY
KINGS
TULARE
SAN LUIS OBISPO
KERN
SANTA BARBARA
VENTURA
LOS ANGELES
SAN BERNARDINO
ORANGE
RIVERSIDE
SAN DIEGO
IMPERIAL

its electric power consumption, and its efficiency. The results of these computations are then compiled in the tabulations in this report for the purpose of giving basic records that are readily usable by all interested parties. The office work also includes the preparation of certain hydrographic data in form to be used as a guide in the ensuing season's field work.

The office work in connection with the program of observing Delta salinity conditions consists of collating the results of the chlorine tests from samples taken at four-day intervals at each observation station. These salinity records are presented each month in a bulletin which is distributed to governmental agencies and to many individuals and organizations that are interested in the results.

Hydrographic Activities of Cooperating Agencies

The United States Geological Survey, Water Resources Branch, through continued cooperative agreements with the Division of Water Resources, has maintained a series of stream gaging stations in the Sacramento and San Joaquin valleys. Some of the work of obtaining data from these stations is done by one of its engineers who works out of Sacramento, utilizing the office facilities of the Division of Water Resources. Certain of the stream flow rating measurements and the office work of compiling the records have been conducted cooperatively by the Federal engineer and the State Water Supervision engineers.

The Modesto Irrigation District, the Oakdale Irrigation District, the South San Joaquin Irrigation District, and the Turlock Irrigation District in the San Joaquin Valley have cooperated with the Water Supervision engineers by assisting in the installation of certain recorder equipped stream gaging stations and are continuing to cooperate by operating the recording instruments at those stations.

The City of San Francisco Public Utilities Commission, Hetch Hetchy Water Supply, has continued to cooperate with the Water Supervision engineers by maintaining, operating and compiling records from a series of stream gaging stations on the San Joaquin and Tuolumne rivers in the San Joaquin Valley.

The United States Bureau of Reclamation, through its offices at Sacramento, Colusa, Chico, Modesto and Merced, cooperated up to October 1, 1948 by operating certain recorder equipped stream gaging stations, by furnishing records of flow at certain stations, by making stream flow rating measurements and by measuring the quantities of water diverted by many of the pumping plants along the main stream of the Sacramento and San Joaquin rivers. Work of the State Water Supervision engineers included furnishing to the Bureau current monthly preliminary estimates of flow and diversion quantities along the Sacramento River as affected by releases from Shasta Reservoir, and along the San Joaquin River as affected by releases from Friant Reservoir (Millerton Lake). This additional cooperation necessitated monthly conferences at the Bureau's field offices between its engineers and State Water Supervision engineers in order to preliminarily compute the monthly diversions.

The final computations of the diversion quantities, as shown in this report, are the result of giving full consideration to all measurements and records of operation during the entire season for each individual diversion.

The specific degree of cooperation by these agencies with the Water Supervision engineers is detailed in footnotes on the many stream flow tabulations contained in this report.

SHASTA AND FRIANT RESERVOIR OPERATIONS

Shasta Reservoir on the Sacramento River above Redding was first used to store water for irrigation use during the winter of 1943-44 and releases for supplemental irrigation water along the Sacramento River commenced in the late spring of 1944. The release of water from the reservoir since 1944 has substantially changed the natural regimen of flow of the Sacramento River and in many respects greatly benefited conditions along that stream. However, it also has created added diversion problems.

Friant Reservoir on the San Joaquin River near Friant was first used to store water for irrigation use during the winter and spring of 1943-44 and the first releases for supplemental irrigation water occurred during 1944. Releases were made during 1948 for regulating and supplementing the irrigation supplies along the San Joaquin River.

The operations of the Shasta and Friant reservoirs are directed by the United States Bureau of Reclamation.

Reservoir Data

Shasta Reservoir is created by a gravity concrete dam, 528 feet high above streambed, located 13 miles upstream from Redding. The gross capacity of the reservoir with spillway gates closed is 4,500,000 acre-feet, of which a space of 4,000,000 acre-feet will be available for the active storage of water and 500,000 acre-feet of space will be reserved for silt deposits and to create head for the generation of power. The spillway steel drum gates were installed in 1948, thus providing a storage of 786,000 acre-feet above the 3,714,000 acre-feet at the fixed crest of the spillway. The ultimate storage capacity will be filled every year when the natural stream runoff from above the dam is equal to or exceeds the normal amount. Water from the reservoir is conveyed through the Sacramento Valley in the channel of the Sacramento River.

Friant Reservoir, on the San Joaquin River, is created by a gravity concrete dam about 275 feet high above streambed, and is located at the base of the foothills about 20 miles northeast of Fresno. The gross capacity of the reservoir with spillway gates closed, is 520,000 acre-feet, of which a space of 404,000 acre-feet between the top of the spillway gates at elevation 578 and the bottom of the Friant-Kern Canal outlet at elevation 459.4 feet will be available for the storage of water for flood control and to supply irrigation demands in the San Joaquin Valley. It is planned to ultimately convey the major portion of the water from Friant Reservoir through the Madera and Friant-Kern canals to lands north

and south of the San Joaquin River in Madera, Fresno, Kings, Tulare and Kern counties. During 1948 the spillway gates on Friant Dam were completely installed, thus providing a storage of 84,000 acre-feet above the 350,000 acre-feet of space between the fixed crest of the spillway at elevation 560 feet and the bottom of the Madera Canal outlets at elevation 442.2 feet. The Friant-Kern Canal was in course of construction during 1948 and no water was diverted through it.

Shasta Reservoir Operation - 1948

The Shasta Reservoir has been constructed for multiple uses. It is designed to furnish water for (1) irrigation in the Sacramento and San Joaquin valleys, including the Sacramento-San Joaquin Delta area; (2) salinity control in the Delta by maintaining a flow in the lower Sacramento River sufficient to repel the intrusion of salt water from Suisun Bay; (3) navigation on the Sacramento River above Sacramento to Chico Landing; and (4) the generation of hydroelectric power. The reservoir will also be used to control floods in the Sacramento River originating above Shasta Dam.

Although the storage of water in the reservoir commenced in the early part of the winter of 1943-44, the ensuing season's subnormal runoff into it was not sufficient to fill the reservoir to the spillway lip. However, the United States Bureau of Reclamation was able to release sufficient stored water throughout the irrigation season of 1944 to augment the natural stream flows and thereby facilitate diversions of those natural flows by the diverters along the Sacramento River.

Since 1944, including 1948, the quantity of water in storage in Shasta Reservoir was sufficient to afford releases (1) to facilitate irrigation diversions by maintaining higher river levels along the Sacramento River, (2) to sustain minimum flow for navigation of approximately 5,000 second feet upstream from Knights Landing, (3) to supplement irrigation supplies in the Delta area below Sacramento, and (4) to control salinity. During 1948, a year of 78 percent of normal runoff to the Delta, releases from the reservoir were regulated to maintain a stream flow out of the Delta into Suisun Bay sufficient to hold back the line of excess saline concentration to an arc embracing only 1,200 acres of the lower Delta area.

The daily total mean-second-foot-flows into Shasta Reservoir during 1948 are given in Table 6. These inflows to the reservoir, as shown by the daily figures, represent the amounts of water that would have been flowing in the Sacramento River at the dam site if the dam had not been built. The inflow figures are computed by combining the effects of daily change in storage, reservoir evaporation, releases and spill.

A tabulation of the daily amounts of water in storage in Shasta Reservoir during 1948 is given in Table 7. The daily mean-second-foot-flows as measured below Shasta Dam at the United States Geological Survey station near Keswick are given in Table 8. The flows at the Keswick station are the same as the releases from Shasta Reservoir except for

the amounts of inflow between the station and Shasta Dam. The amounts of this inflow are small during the irrigation season, and can be ignored, so that the flows at the gaging station can be assumed the same as the releases from the reservoir during that period.

A chart depicting the operation of Shasta Reservoir for 1948, as prepared by the U. S. Bureau of Reclamation, giving the inflows to the reservoir, the amounts released, the water surface elevations and the amounts of water in storage, is shown on Plate 2.

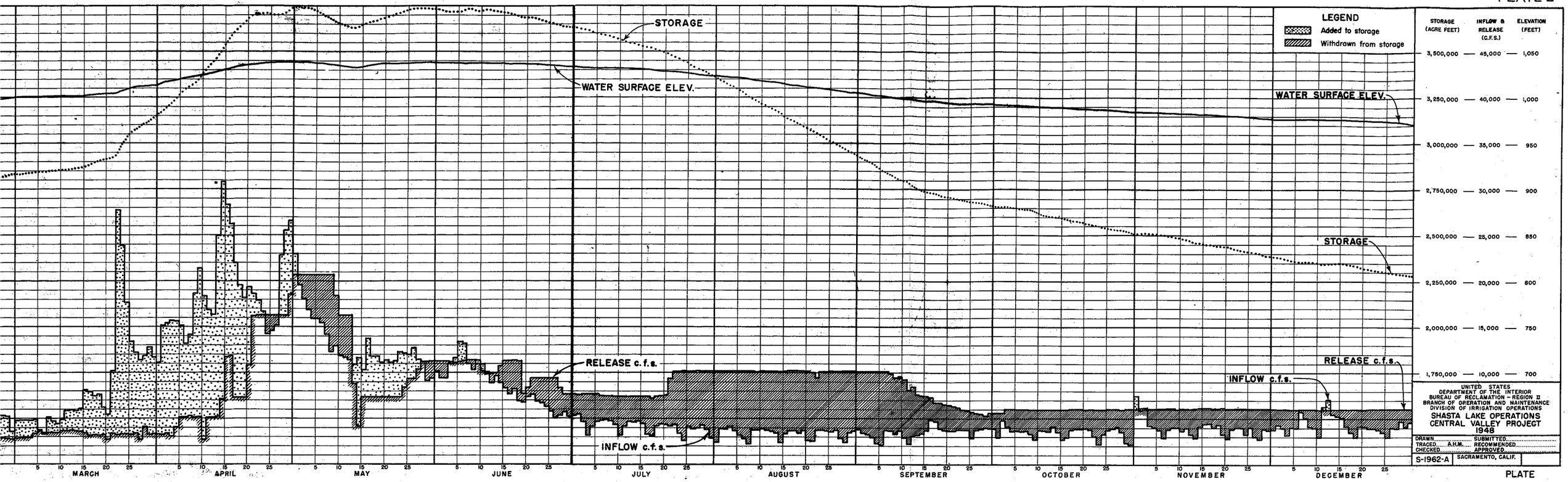
Friant Reservoir Operation - 1948

The Friant Reservoir will be used only for the storage of water for flood control and irrigation purposes. The daily total mean-second-foot-inflows to Friant Reservoir during 1948 are given in Table 74. A tabulation of the daily amounts of water in storage in the reservoir during 1948 is given in Table 75. The daily mean-second-foot-flows, as measured at the United States Geological Survey gaging station below Friant, are given in Table 76. These flows are the same as the releases from Friant Reservoir except for the amounts of inflow between the station and Friant Dam. The amounts of this intermediate inflow are small during the irrigation season so that the measured flows at the gaging station are practically the same as the releases from the reservoir during that period. A chart depicting the operation of Friant Reservoir for 1948, as prepared by the U. S. Bureau of Reclamation, giving the same data as are shown by the chart for Shasta Reservoir, is also shown on Plate 2.

During the 1948 irrigation season, water stored in Friant Reservoir (Millerton Lake) was released both into the Madera Canal and into the channel of the San Joaquin River. Diversions by the Madera Canal served largely to aid in the replenishment of ground water supplies in the Madera area. The regulated releases flowing down the San Joaquin River served not only the irrigation requirements of the lands along that stream above the head of the Gravelly Ford Canal, but also the requirements of the numerous diversions below that point to Temple Slough.

RUNOFF AND WATER SUPPLY

The variable flows of the streams entering the Sacramento and San Joaquin valleys on the north and east sides result from the rainfall runoff occurring each winter and spring season principally from December to April, the snow melt runoff occurring during the spring and summer seasons from March through June, and a combination of runoff from perennial springs and released stored water during the summer and fall seasons. Flood flows in the valley floor channels are caused by runoffs from rainfall and melting snow in the mountain areas in excess of mountain reservoir capacities, and by rain storm runoff from the vast area of minor foothill watersheds and valley floor lands. Some incidental flood control is accomplished by reservoirs in many of the tributary watersheds including those of the Sacramento, Feather, Yuba, Stanislaus, Tuolumne, Merced and San Joaquin rivers. The extent of the flood flows in 1948 is given by the accompanying tabulations of daily stream flows.



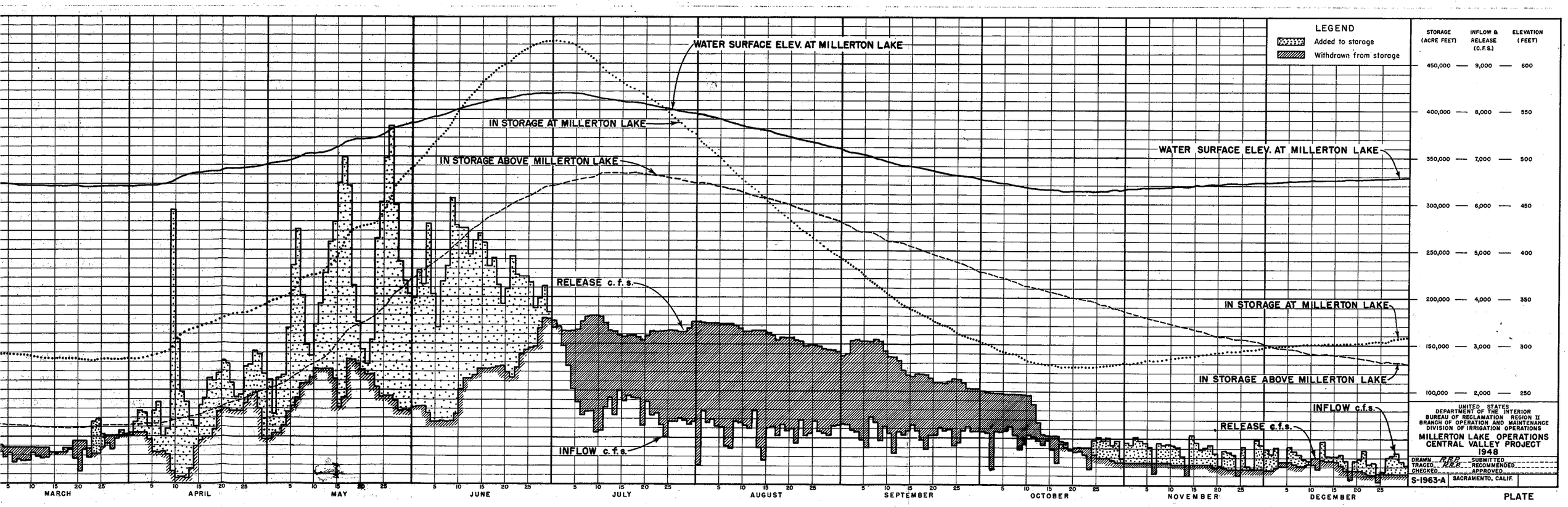
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION - REGION II
BRANCH OF OPERATION AND MAINTENANCE
DIVISION OF IRRIGATION OPERATIONS

SHASTA LAKE OPERATIONS
CENTRAL VALLEY PROJECT
1948

DRAWN ..... SUBMITTED .....
TRACED ..... A.H.M. ..... RECOMMENDED .....
CHECKED ..... APPROVED .....

S-1962-A | SACRAMENTO, CALIF.

PLATE



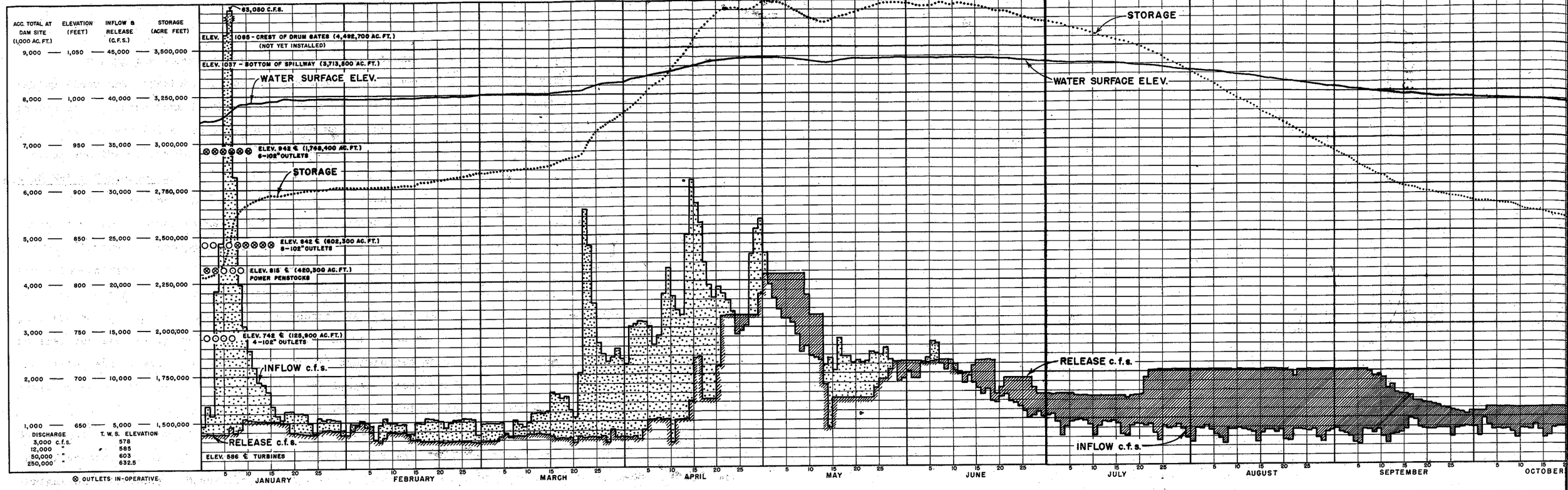
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION REGION II
BRANCH OF OPERATION AND MAINTENANCE
DIVISION OF IRRIGATION OPERATIONS

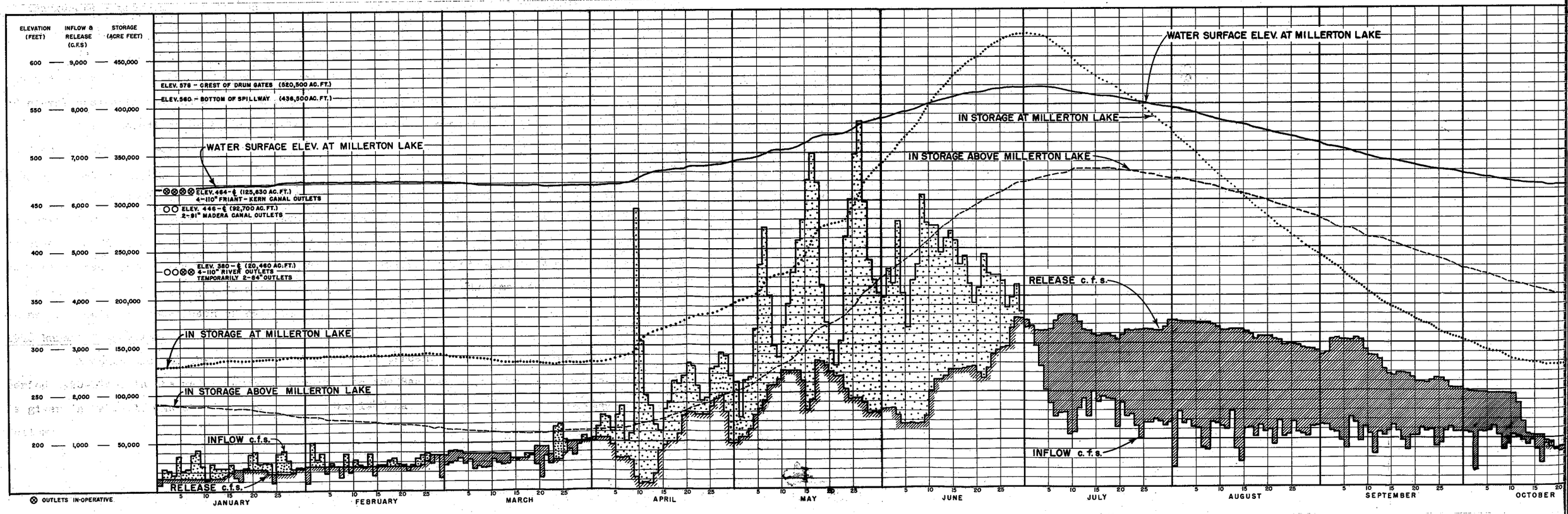
MILLERTON LAKE OPERATIONS
CENTRAL VALLEY PROJECT
1948

DRAWN H.R.B. SUBMITTED .....
TRACED H.R.B. RECOMMENDED .....
CHECKED ..... APPROVED .....

S-1963-A | SACRAMENTO, CALIF.

PLATE


ACC. TOTAL AT DAM SITE (1,000 AC. FT.)
ELEVATION (FEET)
INFLOW & RELEASE (C.F.S.)
STORAGE (ACRE FEET)
9,000 — 1,050 — 45,000 — 3,500,000
8,000 — 1,000 — 40,000 — 3,250,000
7,000 — 950 — 35,000 — 3,000,000
6,000 — 900 — 30,000 — 2,750,000
5,000 — 850 — 25,000 — 2,500,000
4,000 — 800 — 20,000 — 2,250,000
3,000 — 750 — 15,000 — 2,000,000
2,000 — 700 — 10,000 — 1,750,000
1,000 — 650 — 5,000 — 1,500,000
DISCHARGE
T. W. S. ELEVATION
3,000 c.f.s. 578
12,000 " 585
50,000 " 603
250,000 " 632.5
⊗ OUTLETS IN-OPERATIVE
63,050 C.F.S.
ELEV. 1065 - CREST OF DRUM GATES (4,482,700 AC. FT.)
(NOT YET INSTALLED)
ELEV. 1037 - BOTTOM OF SPILLWAY (3,713,500 AC. FT.)
WATER SURFACE ELEV.
ELEV. 962 ℄ (1,768,400 AC. FT.)
6-102" OUTLETS
STORAGE
ELEV. 842 ℄ (602,300 AC. FT.)
8-102" OUTLETS
ELEV. 815 ℄ (420,300 AC. FT.)
POWER PENSTOCKS
ELEV. 742 ℄ (125,600 AC. FT.)
4-102" OUTLETS
INFLOW c.f.s.
RELEASE c.f.s.
ELEV. 586 ℄ TURBINES
STORAGE
WATER SURFACE ELEV.
RELEASE c.f.s.
INFLOW c.f.s.
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER


ELEVATION (FEET)
INFLOW & RELEASE (C.F.S)
STORAGE (ACRE FEET)
600 — 9,000 — 450,000
550 — 8,000 — 400,000
500 — 7,000 — 350,000
450 — 6,000 — 300,000
400 — 5,000 — 250,000
350 — 4,000 — 200,000
300 — 3,000 — 150,000
250 — 2,000 — 100,000
200 — 1,000 — 50,000
⊗ OUTLETS IN-OPERATIVE
ELEV. 578 - CREST OF DRUM GATES (520,500 AC. FT.)
ELEV. 560 - BOTTOM OF SPILLWAY (436,500 AC. FT.)
WATER SURFACE ELEV. AT MILLERTON LAKE
ELEV. 464 - ℄ (125,630 AC. FT.)
4-110" FRIANT - KERN CANAL OUTLETS
ELEV. 446 - ℄ (92,700 AC. FT.)
2-91" MADERA CANAL OUTLETS
ELEV. 380 - ℄ (20,460 AC. FT.)
4-110" RIVER OUTLETS
TEMPORARILY 2-84" OUTLETS
IN STORAGE AT MILLERTON LAKE
IN STORAGE ABOVE MILLERTON LAKE
INFLOW c.f.s.
RELEASE c.f.s.
WATER SURFACE ELEV. AT MILLERTON LAKE
IN STORAGE AT MILLERTON LAKE
IN STORAGE ABOVE MILLERTON LAKE
RELEASE c.f.s.
INFLOW c.f.s.
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER

During the summer irrigation season, variations in flow of the streams on the valley floor are affected, (1) by the combination of diversions from the streams for irrigation and of accretions to the streams from both direct surface drainage and seepage from ground water, and (2) by releases of stored water for irrigation, navigation, salinity control and the generation of electric power.

1948 Water Conferences

Prior to about March 4, 1948, the preceding season's runoff was so far below normal that grave concern was felt by a large number of water users over the ensuing season's irrigation prospects. On some of the streams, early snow surveys and other observations afforded data from which it was predicted that the amounts of runoffs would be less than 50 percent of normal to as low as 25 percent of normal. In anticipation of a possible serious water shortage in the Central Valley streams, the State Engineer arranged several conferences between state officials and water users for the purpose of acquainting the latter with prevailing conditions. These conferences were divided between groups of water users, each group representing one particular stream system.

As the direct result of these conferences, irrigators along the Sacramento and San Joaquin rivers and in the Delta voluntarily put into motion programs to curtail planting of acreages of irrigated crops, to prevent unnecessary waste of water and to increase irrigation efficiency. Meanwhile, during March, Water Supervision personnel laid plans to inaugurate a program of water conservation by supervising diversions in a manner similar to the work which was done during the low water seasons of 1924, 1931, 1934 and 1939.

By the middle of April, 1948, the abundant rainfall during March and April changed the entire outlook for summer irrigation water from one of dire deficiency to one of normal prospects and plans for water conservation were dismissed.

The proceedings of these 1948 water conferences in memorandum form are on file with the Division of Water Resources.

1948 Inventory of Runoff

A comprehensive summary and inventory of the monthly stream flows, diversions and accretions, in acre-feet, is contained in Tables 2 and 3. This inventory is arranged to give these data for each reach of each stream covered by Water Supervision work in a summarized ready-reference form. The inventory is designed to give a picture of the complete disposition of the season's water supply, with stress upon the amounts of losses or gains in flow along each reach of each stream.

1948 Runoff Comparisons

A comparison of the full natural runoffs in percent of a 50-year normal for the period 1920-1948, in the major streams tributary to the Sacramento and San Joaquin valleys is given in Table 1. As shown in that table, the 1948 natural runoff may be summarized as follows:

Stream and Station	Percentage of 50-year normal
Sacramento River at Red Bluff	87 percent
Sacramento River at Sacramento	83 percent
San Joaquin River at Friant	63 percent
San Joaquin River at Vernalis	68 percent
Sacramento and San Joaquin rivers flow to the Delta	78 percent

A comparison of the season's actual minimum flows is given in Table 146. The minimum 10-day-flows during 1948 are shown to have been:

Stream and Station	Average minimum 10-day-flow
Sacramento River at Sacramento	7550 second feet
San Joaquin River at Vernalis	357 second feet (March 8, 1948)
	606 second feet (August 9, 1948)
Combined Sacramento and San Joaquin rivers flow to the Delta	8260 second feet

It is apparent from these comparisons that the water supply available in the 1948 season was subnormal. Observations of water utilization and the amounts of residual flows in the streams reaching the Delta in 1948 indicated that the demands for irrigation and salinity control exceeded the natural flow supplies, and the releases of stored water from Shasta Reservoir were of primary importance in maintaining satisfactory river flows and fresh water conditions in the Delta.

Primary Irrigation Supplies

The flows onto the valley floor during the summer season through the major streams are considered to be the primary water supplies for irrigation. This primary water is differentiated from the flows available for irrigation in the lower reaches of the streams resulting from large accretions including the return of a substantial amount, through drainage, from the flows diverted for irrigation upstream. The amounts of primary water available for irrigation in the Sacramento Valley are given in the flow tabulations for those gaging stations located at the edge of the valley floor, to wit, tables numbered 8, 51, 56, 57, 64, 68 and 72.

In the San Joaquin River service area, primary water supplies are almost entirely diverted from the upper reaches of the Stanislaus, Tuolumne and Merced rivers by the large irrigation districts, and from the San Joaquin River in the vicinity of Mendota by the large canal companies. These upper diversions from the Stanislaus, Tuolumne and Merced rivers are above the upstream gaging stations, but are included in Tables 124, 123 and 122, respectively. Primary water supplies in the San Joaquin River for irrigation below Friant are measured at the San Joaquin River gaging station below Friant, Table 76.

Accretions to Stream Flow

As evidenced by the data for stream flow and diversions, summarized in Tables 2 and 3, there are large quantities of accretions to the flows of the streams and channels in their courses across the valley floors. These accretions are of major importance as available irrigation supplies. They are made up of measured flows from surface drains and of many other flows, not susceptible to direct measurement, from minor ephemeral streams, from scores of small surface drains, from seepage and return of percolated irrigation water and from escaping underground water normally present as the result of percolated rainfall on the valley floor.

During the summer season a large portion of the accrete water is derived from upstream irrigation returning to the streams either as surface drainage or waste into open drains or as deep percolation to the ground water from which it finds its way to nearby streams or drains.

Throughout the year, along certain reaches of the streams, the flows are augmented by outflows from seepage of the natural ground water. This portion of the ground water, which is independent of irrigation as a source, is replenished from two other sources, (1) rainfall on the valley floor, a portion of which percolates to the water table during periods of abundant precipitation, and (2) infiltration and escape from stream channels through the banks during high flood flow conditions, later to partially return to that stream when its water levels recede to low flow conditions of the summer and fall.

The figures shown in all reports prior to 1947, giving the relation of "return water in percent of diversion" as discussed under heading "Drainage and Return Water", may be misleading inasmuch as all accretions, heretofore referred to as "return water", actually may include substantial amounts of ground water seepage not derived from upstream irrigation and unmeasured contributions from small tributaries.

Sacramento Valley Accretions. In the Sacramento Valley all of the accretions to natural and regulated flows which are not diverted on lands north and west of the Sacramento Delta flow into the Delta and are available for use in that area. Practically all of the summer accrete flows in Colusa Trough, Back Borrow Pit, Knights Landing Ridge Cut, and Yolo By-Pass are mainly return waters derived from diversions from the Sacramento River. Since the Sacramento River is the main stream through the Sacramento Valley the accretions to that stream include substantial amounts of return water from irrigated areas served by water from other sources, particularly the Feather River. A large part of the summer return water flows reaching the Sacramento River through the Butte Slough Outfall Gates (Mile 84.0L) and from Sutter By-Pass through Sacramento Slough (Mile 21.2L) are of Feather River origin. However, the measured flows in Sacramento Slough, Table 50, include not only return water from Feather River diversions but also return water from Sacramento

River diversions into Reclamation District No. 1500, Table 49. In Water Supervision reports prior to 1947 estimates are given showing that bank seepage into the West Borrow Pit of the Sutter By-Pass from R.D. 1500 amounts to 10 percent of that district's diversions from the Sacramento River.

Along the Sacramento River between Colusa and Red Bluff there are no large well defined artificial drainage channels. Records or estimates of natural inflow to the Sacramento River from streams in this stretch were, however, obtained where available. Above Red Bluff to Redding there is considerable drainage water from the Anderson-Cottonwood Irrigation District, but it is not recorded.

Along the Feather River, during years of subnormal water supply, practically all of the primary regulated water is diverted upstream from, or at, the Sutter-Butte diversion dam, yet accretions accumulate below that point in amounts sufficient to afford a limited supply for all diversions.

Table 2 is designed to give a summary not only of monthly flows measured on the Sacramento Valley floor but also the computed monthly amounts of accretions (or losses, as shown by a minus sign preceding the figure) occurring along each reach of each stream between gaging stations. At the end of each series of data for one stream, as shown in Table 2, there are summations of diversion and accretion quantities.

In order to compare 1948 season conditions along the Sacramento River with those of previous years, the following tabulation gives the seasonal accretions, July through September, in percent of simultaneous diversions. This tabulation, in part, is excerpted from Table 147 in the 1946 Water Supervision Report. The figures for 1947 and 1948 were derived from the summation data in Table 2 in each report, but under the same provisions detailed in the "note" under the 1946 Table 150.

Comparative Seasonal Accretion Percentages - 1938 - 1948

Sacramento River - Red Bluff to Sacramento

Year	Seasonal Runoff at Red Bluff in per cent of 50-year Normal	Accretions in per cent of Diversions* July through September
1938	168	64
1939	50	36
1940	120	40
1941	164	56
1942	129	56
1943	97	53
1944	53	49
1945	76	43
1946	92	51
1947	58	52
1948	87	62

*Excludes City of Sacramento municipal.

It is apparent from the above tabulations that there are variations in the accretion percentages with relation to the seasonal runoffs. However, a definite trend in this relation indicates that summer accretions to stream flow on the Sacramento Valley floor are influenced not only by return water from irrigation but also by natural ground water seepage. Ground water seepage, as indicated by the above accretion ratio, is observed to be accelerated during those summer seasons which follow late and abundant spring rains on the valley floor.

San Joaquin Valley Accretions. The summer and fall season stream flows in the lower San Joaquin River and its tributaries on the valley floor consist mainly of accrete flows derived to a large extent, from irrigation water returning to the stream channels by way of percolation into the ground water and the latter's seepage into the channels. The exceptions to this condition are on the Tuolumne and Stanislaus rivers when irregular releases for power generation below upstream diversion points further augment the flows.

The channels of the Stanislaus, Tuolumne and Merced rivers in their westward flow across the valley floor from the foothills are in deep degraded canyons between more or less sheer bluffs rising from 10 to 50 feet to the predominant level of the upper plains of the valley floor. The plains areas are intensively irrigated with regulated gravity water supplies derived from the upper reaches of the same streams. Thus, an abundant water supply in normal years, a deep and permeable soil and the deep river channels are all conducive to relatively steep slopes of the ground water table toward the rivers and the consequent high rate per mile of accretions to the stream flow.

The magnitude and importance of these accrete waters in the San Joaquin Valley as a water supply is brought out in Table 3. There does not appear to be as definite a relation of accretions with respect to diversions along these San Joaquin Valley streams as exists in the Sacramento Valley. This lack of a relation may be due, (1) to the considerable lag between the time diverions are made from the streams for storage in terminal reservoirs (Woodward, Dallas-Warner, and Owens) and the time a portion of those waters return to the stream channels after having been applied for irrigation, and (2) to the prevailing climatic effects upon rainfall, humidity, transpiration and evaporation.

The ratio of accretion (including return water from irrigation) to diversions along the lower San Joaquin River and its tributaries, Stanislaus, Tuolumne and Merced rivers, is considerably smaller than that for the Sacramento River. Analysis of pertinent data in Table 3 and comparison with the data contained in Table 147 of the 1946 Water Supervision Report indicate this San Joaquin Valley ratio to vary between 19 and 35 percent while the foregoing table on page 26 shows the Sacramento Valley ratio to vary between 36 and 64 percent. This difference may be attributed to the fact that, whereas, due to basin topography and geology, practically all drainage from the Sacramento River diversions is quickly returned to the river, considerable of the return water in the

San Joaquin Valley may never reach the surface streams because of its percolation to ground water and its immediate recovery by drainage and deep well pumps in the areas of many of the irrigation districts for re-use through the irrigation canals.

Stream Flow Measurements

Many of the stream gaging stations, the records from which are reported herein, are maintained, operated and rated, and the flows at them are computed, by agencies cooperating with the work of the Sacramento-San Joaquin Water Supervision. The methods used by all cooperating parties are standardized and the results obtained are equally good. In order to obtain uniformity, however, the Water Supervision engineers cooperate with the other agencies in obtaining and correlating the records for each of the cooperative stations.

Approximately one-half of the gaging stations on streams and drainage channels for which records are reported herein are maintained, operated and rated, and the flows at them are computed, solely by the Division of Water Resources through the Water Supervision and Flood Control organizations.

An automatic water stage recorder is in operation at each of the gaging stations used in this work. The continuous records of water surface elevations at the stations serve two major purposes in the preparation of the data presented in this report. First, the actual water surface elevations at two adjacent stations on a stream afford the means of obtaining the water surface elevations at the pumping plants along the stream between those stations. These elevations give the pumping heads, which heads, in turn, become factors in determining the rates of diversion by the pumping plants. Second, the water surface elevation (gage height) is a factor in determining the flow of the stream, in second feet, passing the station.

A stream flow rating is made for each gaging station. This rating gives the flows in second feet for each gage height at the station. Normally this gage height-flow relation, or rating, is more or less permanent where there is a fixed channel and flow regimen at the station. The rating varies however where the bed of the channel is of loose shifting sand, or heavy weed growth accumulates as the season progresses, or where there may be backwater effects from downstream conditions. In this latter case more frequent measurements of flow are made to obtain accurate records of the flows passing the stations.

Water surface elevations at certain gaging stations at any time may be derived by the reader by using Table 5 coupled with the stream flow data in Tables 8 through 103. From the stream flow table the flow on any desired day is interpolated into the specific station's rating table in Table 5 to give a gage height (or elevation) of the stream's water surface for that day.

Preliminary Data from Cooperating Agencies

Some of the stream flow records submitted by cooperating agencies and included in this report must be considered "Preliminary Data" since this report is published prior to final preparation of the data for publication by those agencies. This condition is particularly true with respect to some data furnished by the U. S. Geological Survey.

Stream Flow Bulletins

During 1948, stream flow bulletins were compiled from time to time and mailed to interested agencies and persons. The bulletins listed the results of stream flow current meter measurements made along the Sacramento and San Joaquin river system on the valley floor by Division of Water Resources (Sacramento-San Joaquin Water Supervision) and U. S. Geological Survey engineers.

Notes on Certain Gaging Stations

Records are obtained and published in this report for 94 gaging stations in the Sacramento and San Joaquin valleys including 12 stations not heretofore published in this series of reports. A brief description of each station is given at the bottom of the stream flow data table. The location of each station is shown on Plate 3 in the pocket on the back cover of this report. Notes on the newly included stations, together with a repetition of notes on the Sacramento River at Sacramento, are believed desirable, however, for a better understanding of the records. These notes are as follows:

Sacramento River at Sacramento. The method of computing daily mean flows at this station, beginning with 1947, has been radically changed. Heretofore, as shown in reports prior to 1947, the low flows which are affected by tidal action, were derived from (1) the records of flows at Verona on the Sacramento River and at H Street Bridge on the American River and (2) records of diversions from and drainage to the rivers between those two upper stations and the I Street Bridge at Sacramento. The method previously used did not take into account unmeasured accretions or losses in the reach between Verona and I Street Bridge and in the American River below H Street.

The procedure employed in 1947 and 1948 involves the computation of daily mean Sacramento River flows passing Sacramento by the usual and standard practice of rating the stream, at the I Street Bridge station by means of the slope-velocity method. This method requires a consideration of the gage heights recorded at the river gaging station at Snodgrass Slough (20 miles downstream from Sacramento) as well as the recorded gage heights at Sacramento. The adaptation of this method in 1947 as a means of direct rating, was accepted after Water Supervision engineers had measured and studied the problem with this method in mind for the previous three years.

The final relation for tidal influenced flow conditions at Sacramento involves the construction of a rating curve having as the ordinate the difference between the gage heights at Sacramento and at Snodgrass Slough and as the abscissa a function of velocity (fV) equalling the discharge (Q) divided by the gage height at Sacramento. Flows, in

second feet, passing Sacramento are obtained from this relation by multiplying the scale value of fV for any differential gage height, by the corresponding gage height at the I Street recorder. This relation is used for gage heights at Sacramento below 10.5 feet (a flow of 33,000 second feet) below which tidal fluctuations are effective.

The flows for gage heights above 10.5 feet follow the simple exponential relation

$$Q = 435 \times (\text{I Street Recorder G.H.} + 7.40)^{3/2}.$$

Tidal fluctuations cease above the 10.5-foot stage and a straight flow-stage relation exists.

Channel dredging activities by the U. S. Corps of Engineers in the vicinity of Sacramento during two years prior to 1947 caused a substantial shift in the flow-stage relationship in those years, but frequent flow measurements, including tidal cycle measurements, made during 1947 and 1948 delimit the above relationships.

Minor Tributaries to Sacramento River. The following stream flow stations, installed by the U. S. Bureau of Reclamation, were acquired for operation and maintenance by the Division of Water Resources on October 1, 1948 under the terms of Contract No. 3-170. These stations are located on creeks tributary to the Sacramento River between Chico and Red Bluff, and with the exception of Red Bank Creek, are near enough to their respective mouths to record directly the inflow from the creeks to the river. Since it is the intent that most of these stations be used to record only flows during the irrigation season, no attempt is made to obtain a continuous record throughout the year, and the recorders are removed during the highwater season to prevent possible damage.

Red Bank Creek near Foothills:

Station is located in Section 23, Township 26 North, Range 5 West, and is approximately 15 miles above the mouth of the creek. Station was installed February 27, 1947

Craig Creek near Mouth:

Station is located in Section 31, Township 27 North, Range 2 West, near the mouth of the creek. Station was installed June 26, 1947.

Butler Slough near Mouth:

Station is located in Section 8, Township 26 North, Range 2 West, near the mouth of the creek. Station was installed April 6, 1948.

Antelope Creek near Mouth:

Station is located in Section 17, Township 26 North, Range 2 West, approximately 2.3 miles above the mouth of the creek. Station was installed June 19, 1947. Monthly estimates of the flow of Antelope Creek to the Sacramento River during the summer seasons have been kept cooperatively by the Division of Water Resources, Los Molinos Land Company, and Coneland Water Company since 1924.

Irrigation Drain into Antelope Creek:

Station is located in Section 28, Township 26 North, Range 2 West, near the confluence of this drain with Antelope Creek. Station was installed June 19, 1947.

North Fork of Mill Creek near Mouth:

Station is located in Section 4, Township 25 North, Range 2 West, near the mouth of the creek. Station was installed May 23, 1947.

Mill Creek near Mouth:

Station is located in Section 4, Township 25 North, Range 2 West, near the mouth of the creek. Station was installed May 21, 1947. Monthly estimates of the flow of Mill Creek to the Sacramento River during the summer season have been kept cooperatively by the Division of Water Resources, Los Molinos Land Company and Coneland Water Company since 1924.

Champlin Slough near Mouth:

Station is located in Section 34, Township 25 North, Range 2 West. Champlin Slough is tributary to Toomes Creek. Station was installed June 13, 1947.

Toomes Creek near Mouth:

Station is located in Section 34, Township 24 North, Range 2 West, above the confluence of Toomes Creek with Champlin Slough. Station was installed April 19, 1948.

Deer Creek near Mouth:

Station is located in Section 34, Township 25 North, Range 2 West, near the mouth of the creek. Station was installed May 12, 1948. Monthly estimates of flow of Deer Creek into the Sacramento River during the summer seasons have been kept cooperatively by the Division of Water Resources and the Stanford-Vina Ranch intermittently since 1925.

Chico Creek near Mouth:

Station is located in Section 36, Township 22 North, Range 1 West, and is approximately 1.5 miles above the mouth. Station was installed May 15, 1947.

Sacramento River at Ord Ferry. Prior to 1947, stream flow measurements at this station were not sufficient to establish a reliable rating curve on a daily mean discharge basis for record purposes. Measurements made in 1948 were sufficient to establish a satisfactory stage-flow relationship and in consequence daily mean flows are given for 1948 in Table 14.

Automatic Radio Stream Gage Transmission

For purposes of receiving immediate and current information on flood flows in the winter and spring, and the variations of summer water supplies at critical stations, the Division of Water Resources has maintained for many years a system of automatic radio transmission of gage heights. The radio signals indicating the gage heights are received at Sacramento headquarters office of the Division through a permanent receiver, or at desired points in the valley through portable receivers. The stream gaging stations which are equipped with automatic radio gage height transmitters are, Sacramento River near Red Bluff, Sacramento River at Ord Ferry, Sacramento River at Colusa, Sacramento River at Fremont Weir, Feather River near Oroville, South Fork American River at Coloma, North Fork American River at Rattlesnake Bridge and San Joaquin River near Vernalis. The instantaneous stream flow information thus received is not only of value to the Water Supervision

and Flood Control work of the Division but it is relayed immediately to interested agencies including the United States Bureau of Reclamation, United States Weather Bureau, and United States Corps of Engineers, and made public daily through the press.

Precipitation

In the Central Valley of California direct precipitation is a negligible source of water supply for growing crops during the late spring, summer and fall seasons. During the early irrigating season, however, the attendant cooler temperatures and higher humidities of rain storms substantially reduce the demand for irrigation diversions, and are two of the main factors affecting the variations in demand in the same month from year to year.

The following tabulation gives the 1948 monthly total precipitation at representative valley floor rainfall stations and the monthly normals. Records are from U. S. Weather Bureau.

Station		Inches of Precipitation												
		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Red Bluff	- 1948	1.78	.82	3.83	5.79	1.79	1.26	.22	.19	.70	.51	1.01	4.58	22.48
	- normal	4.76	4.01	3.25	1.70	1.13	.47	.03	.05	.80	1.33	2.97	4.40	24.90
Colusa	- 1948	.47	.86	3.41	4.81	2.68	.63	.00	.00	.00	1.18	.43	3.06	17.53
	- normal	3.24	2.96	2.14	1.08	.53	.27	.01	.01	.30	.66	1.65	3.25	16.10
Marysville	- 1948	.54	1.47	3.93	3.91	1.93	.31	.00	.00	.22	.10	.83	3.21	16.45
	- normal	3.86	3.50	2.76	1.47	.81	.24	.00	.01	.31	1.04	2.20	3.77	19.97
Sacramento	- 1948	.51	.88	3.68	3.05	3.04	.01	.00	.00	.01	1.45	.59	4.88	18.19
	- normal	3.72	3.09	2.57	1.51	.77	.15	.00	.00	.38	.92	1.88	3.03	18.02
Modesto	- 1948	.21	.93	3.08	2.36	1.64	T	.00	.00	.00	.98	.11	1.97	11.28
	- normal	2.18	1.80	1.74	.91	.46	.12	.01	.01	.16	.52	1.19	1.97	11.07
Merced	- 1948	.06	.84	2.73	3.23	1.65	T	.00	.00	.00	.50	.08	1.89	10.98
	- normal	2.30	1.91	1.87	1.01	.48	.11	.01	.02	.18	.49	1.17	1.80	11.35
Fresno	- 1948	T	.77	2.28	2.28	.96	.01	.00	.00	.00	.08	.02	1.23	7.63
	- normal	1.73	1.47	1.58	.95	.44	.08	.01	.01	.21	.57	.93	1.45	9.43

It can be seen from these data that Central Valley floor precipitation averaged 91 percent of normal for the 1948 season.

USE OF WATER FOR IRRIGATION

The prevailing warm temperatures and a prolonged frost-free period during the summer season in the Sacramento and San Joaquin valleys favors the profitable production of wide variety of marketable crops in large quantities. The availability of irrigation water during the dry summer season affords continuous growing conditions necessary for the many crops.

The major irrigated crops in the Sacramento Valley include rice, alfalfa and clover, citrus and orchard fruits, nuts, grapes, hops, truck crops, and field crops; in the Delta area they include alfalfa, orchard fruits, corn and truck crops; and in the San Joaquin River and tributaries service area they include grapes, nuts, orchard fruits, cotton, alfalfa and clover, truck crops, corn, grain, flax and pasture.

Irrigation Diversions

Measurements and records of diversions in 1948 have included all of the points of diversion on the valley floor along the Sacramento River and its tributaries; along the upland banks of the delta channels of Old San Joaquin River, Tom Paine Slough and San Joaquin River; along the Stanislaus, Tuolumne and Merced rivers, below the major irrigation districts' upstream gravity diversions; along the San Joaquin River between Friant Dam and Durham Ferry Bridge (Vernalis); and along Fresno Slough and Fresno Slough By-Pass.

This report contains records of a total of 867 points of diversion segregated as to various sources as follows: Sacramento River 292, Colusa Trough (above Colusa-Williams Highway crossing) 17, Back Borrow Pit (extension of Colusa Trough along back levees of Reclamation Districts 108 and 787) 37, Knights Landing Ridge Cut 11, Yolo By-Pass 12, Cache Slough 1, Lower Butte Creek and Butte Slough 29, Sutter By-Pass and Sacramento Slough 38, Feather River 39, Yuba River 13, American River 30, Old San Joaquin River 17, Tom Paine Slough 10, San Joaquin River (below Vernalis gaging station) 60, San Joaquin River (between Vernalis gaging station and Fremont Ford Bridge) 27, San Joaquin River (between Fremont Ford Bridge and Friant Dam) 113; Fresno Slough and Fresno Slough By-Pass 11, Merced River 64, Tuolumne River 21, and Stanislaus River 25. The location of these points of diversion are shown on Plate 3 in the pocket at the back of this report.

All of the diversions, except 42 by gravity, are accomplished by pumping. The records of diversion by gravity are obtained by means of canal ratings established by flow measurements. In the case of the pumping diversions there are a few instances where the records are obtained by means of canal ratings but, in the main, the records are obtained from a relation established between electric power consumption, static head and plant efficiency. This is made possible by the fact that nearly all of the pumping plants are electrically operated. The relation between water pumped and power input is determined from current meter measurements of the discharge and the measured kilowatt input. At the larger pumping plants several measurements are made during each season. At the smaller plants a number of measurements are made initially to determine the ratings and thereafter measurements are made at intervals to discover any changes which may occur in the ratings. Due to the intermittent operation of the smaller plants and the large area to be covered by the field engineers, it is not possible to make many discharge measurements at any one of them. However, it is believed that the rating, as initially determined, remains more or less constant and that over a period of time enough measurements are secured to determine any change in the rating. All rating measurements made by owners or cooperating agencies have been given full consideration in the final computations of the amounts of water diverted by each individual plant.

Prior to 1933 a daily diversion record for each plant was compiled. However, since that year, except for some of the larger plants, the monthly diversion records only are available. The diversions for 1948 have been computed on a monthly basis only, and

the breakdown into daily records was not made. The monthly amounts of water diverted at the individual points of diversion along all of the streams covered by the Water Supervision work are given in Tables 105 through 124.

Prior to 1947 the monthly amounts of diversions in acre-feet by the large east side irrigation districts from the Stanislaus, Tuolumne and Merced rivers were published annually in this series of Water Supervision reports and are found in 1946 Table 154. The amounts of these diversions during 1948 are shown in Tables 122, 123 and 124. The amounts of these diversions during the 1947 season were omitted from the 1947 annual Water Supervision report but are included in this report in Table 139, specially prepared to supplement the 1947 report.

Fresno Slough and Fresno Slough By-Pass normally convey excess Kings River water flood flows into the San Joaquin River at a point above Mendota Dam, but during the irrigation season San Joaquin River water is backed up through those channels by the Mendota Dam to afford irrigation supplies to the James and Tranquillity irrigation districts and to certain other diverters. The diversion and irrigated acreage data for these streams shown in Tables 120 and 121 were furnished by the U. S. Bureau of Reclamation. The field activities of the Sacramento-San Joaquin Water Supervision work did not include upper San Joaquin River observations except to become acquainted with the general problems involved.

Table 110, diversions and irrigated acreage by Reclamation District No. 2068 from Cache Slough, is included in this report, in order to present Delta crop data for 1948 similar to that presented in the 1938 Water Supervision report for the Delta crop survey made in that year. The irrigated area in the District lies outside of the established boundary of the Delta shown on Plates 3 and 4 and can be classed as a "Delta Uplands" area. The purpose of including Table 110 in this 1948 report is to present as full a record as is available of the use of water in and from the Delta, in conjunction with the Delta crop survey data in Table 148. The data in Table 110 are not included in Table 148.

A seasonal summary of water utilization during the past ten years, 1939 through 1948, from the Sacramento River and its tributaries and the San Joaquin River and its tributaries is shown in Table 104. This table presents an overall picture of the water utilization in these areas.

In Table 125 there are shown the average monthly diversions in percent of the seasonal for the streams in the Sacramento and San Joaquin valleys. A summary of the monthly diversions from the Sacramento and San Joaquin valley streams for the ten-year period, 1939 through 1948, is given in Tables 126 through 136. Table 137 shows, for the Sacramento River only, the seasonal diversions and acreages irrigated for the period 1939 through 1948, segregated to the different river sections.

Irrigated Acreage

Toward the end of the irrigating season in 1948, as was done in previous years, a complete canvass was made of acreages irrigated from each of the points of diversion covered by the Water Supervision work. The irrigated acreages for all of the points of diversion on the streams north of Durham Ferry Bridge (Vernalis) on the San Joaquin River, including the Sacramento Valley floor streams, were plotted on suitable maps and are retained on file in the office of the Division of Water Resources for record.

The area irrigated through each individual point of diversion along the streams covered in this work is given in Tables 105 to 124, inclusive. These tabulations and the associated summarizing tables do not include data on diversions and use of water in the Delta.

The following is a summary of the total acreage irrigated during 1948 in the area covered by the Water Supervision work. A comparison of annual total acreage irrigated, 1939 through 1948, is given in Table 4. Detailed acreage tabulations are found in Tables 104 through 124, and 148.

Area	1948 Irrigated Acreage	
Sacramento Valley Floor above Sacramento	403,700	
San Joaquin Valley Floor above Delta	492,300	
Total area served by measured diversions		896,000
Sacramento-San Joaquin Delta		
Cropped	371,800	
Water consuming--not cropped	77,000	
Total Delta		448,800
Grand Total		1,344,800

Table 138 shows a comparison of the acreage of rice irrigated during the period 1924 through 1948 from the stream channels within the Sacramento and San Joaquin valleys which are covered by Water Supervision work, and the total acreage of rice in California irrigated from all sources as reported by the Federal-State Crop Reporting Service.

In view of the methods of farming, which usually employ rotation of crops with summer-fallow, it is probable that the acreage of land under irrigation facilities in the area covered by the Water Supervision activities approaches 1,400,000 acres.

1948 Sacramento-San Joaquin Delta Crop Survey

A complete survey of the acreages of crops, including both irrigated and non-irrigated, in the Sacramento-San Joaquin Delta was made during November and December of 1948, as called for in the State-Federal contract described in the "Foreword" of this report. The crop segregations were plotted on a series of suitable maps of the Delta islands which are on file with the Division of Water Resources. Similar surveys of the Delta area have been made previously, the last one in 1938. All of the 1948 Delta acreage data are tabulated in Table 148 (to be found in the pocket on the back cover). This table gives the acreage of each cultivated or uncultivated crop segregated as to tracts and islands.

The total water consuming area of the Delta is segregated for 1948 as follows:

Total irrigated cultivated crops, not including double- or inter-crops	371,800 acres
Total idle lands below 5.0 feet in elevation, including interior water surfaces	37,400 acres
Total exterior channel water surfaces	37,600 acres
Small islands (est.)	300 acres
Total brush and trees in exterior channels (est.)	1,700 acres
Total water consuming area, 1948	448,800 acres

These data are similar and are comparable to data in Table 77 of the 1938 Water Supervision report.

Gross Duty of Water

The term "gross duty of water", as used in this report, is defined as being the total amount of water diverted to serve one acre of irrigated land. The gross duty for any particular period may be expressed as the amount of water diverted in acre-feet per acre irrigated, or, conversely stated, may be expressed as the number of acres irrigated per one second-foot average diversion rate. The gross duty of water does not include solely the net amount of water consumed by plants in their processes of transpiration and growth, but also includes all irrecoverable losses through evaporation and deep percolation, plus canal and conveyance losses, and those amounts of water which act as a necessary vehicle to carry irrigation heads across porous soils or to maintain fresh water ponds in the growing of rice and which return to some river or drainage channel, with little loss, to become available for re-use.

Gross duty of water figures for the individual stream channels covered by Water Supervision work are given for the Sacramento and San Joaquin valleys in Table 104.

Use of Water in Delta

Previous Water Supervision annual reports have included considerable analyses of the utilization of water in the Sacramento-San Joaquin Delta. The work of Water Supervision does not cover the delta area to the extent of measuring flows in the numerous interconnected channels or quantities of water diverted for irrigation, but, periodically, surveys have been made of crops and irrigated acreages. Special investigations of the Delta irrigation problems have been conducted and the results therefrom have been reported in previous reports.

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

SALINITY INVESTIGATIONS

The intrusion of salty water from San Francisco Bay into the channels of the Delta from which irrigation supplies are derived, is a matter of extreme importance and the Water Supervision work has included observations during 1948 of the saline content of the water at several stations throughout the Delta and upper San Francisco and Suisun Bay areas, with cooperation from the U. S. Bureau of Reclamation.

Purpose

The purpose of the salinity investigation, as outlined in previous reports, has been to record the occurrence and extent of salinity encroachment from San Francisco Bay, and to establish the relation between movement of salinity, stream flow to the Delta, and tidal action. As reported in Bulletin 27 of the Division of Water Resources, this relation was established for the conditions which obtained during the period of the special investigation for that bulletin and upon the basis of all data available at 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 the corroboration of the relation presently established, but as the basis for a check of possible modifications in the relation due to changes in channel and tidal conditions which may have taken place or will occur in the future. Also, during periods of low stream flow, the continuation of salinity sampling has been essential in keeping the Delta irrigators advised of conditions through periodic bulletins so that damage from the use of water of too high salt content might be averted. (Saline concentrations exceeding 100 parts of chlorine per 100,000 parts of water are toxic to the average plant and are objectionable for human consumption.)

During 1948 the continuous observations of salinity served as an important factor in determining the amounts of release from Shasta Reservoir as controlled by the U. S. Bureau of Reclamation.

Scope

The general scope of this investigation each season has been such as to insure that samples of water to be tested for salinity could be taken at regular intervals at a sufficient number of stations throughout the Delta and upper Bay region so that the advance and retreat of the salinity from early summer to late fall would be completely recorded. Plate 4 shows the limit of encroachment into the Delta of water having 100 parts of chlorine per 100,000 parts of water for the years 1931, 1938, 1943, 1944, 1945, 1946, 1947 and 1948. These certain years are chosen, first, to represent a range of runoff conditions prior to the commencement of releases from Shasta Reservoir, to wit, 30 percent of normal runoff during 1931, 170 percent of normal runoff during 1938, 114 percent of normal runoff during 1943, and second, to represent the consecutive years concurrent with those releases. The salinity encroachment lines for each of the years 1920 to 1944, inclusive, may be found on the Delta map in the 1944 annual Water Supervision report.

Due to curtailment of appropriations to the Division of Water Resources by the Legislature in the 1941-1942 budget, sampling for salinity at all stations in the Bay and Delta areas was stopped by the Division of Water Resources on July 15, 1941. Through co-operation of the Fontana Farms Company, the City of Antioch Water Department, the U. S. Bureau of Reclamation, the Dow Chemical Company at Pittsburg and the City of San Francisco, miscellaneous samples were taken during the 1943 season and the results of the analyses are presented in the 1943 report of Water Supervision. In that same report there are tabulated a large number of complete analyses of water from the channels of the Sacramento and San Joaquin valleys and the Delta as prepared by the U. S. Bureau of Reclamation.

A regular program of salinity sampling and testing was re-established early in 1944 as part of the activities of the Sacramento-San Joaquin Water Supervision, with the necessary funds therefor being provided by the U. S. Bureau of Reclamation. This regular program was continued throughout 1948. The records of water samples taken during 1948 from 37 active sampling stations are given in Tables 142 through 145.

Complete or Partial Analyses of Surface Flows

As a matter of record there is included in this report a tabulation of the results of complete or partial chemical analyses of samples of water taken at many points along the Sacramento and San Joaquin rivers and in the Delta during 1948. These results are contained in Table 147 and are furnished entirely by the U. S. Bureau of Reclamation. The methods of collecting the samples and of analysis are definitely different from the methods employed in determining the chlorine component as part of the regular salinity observation activities in the Sacramento-San Joaquin Delta.

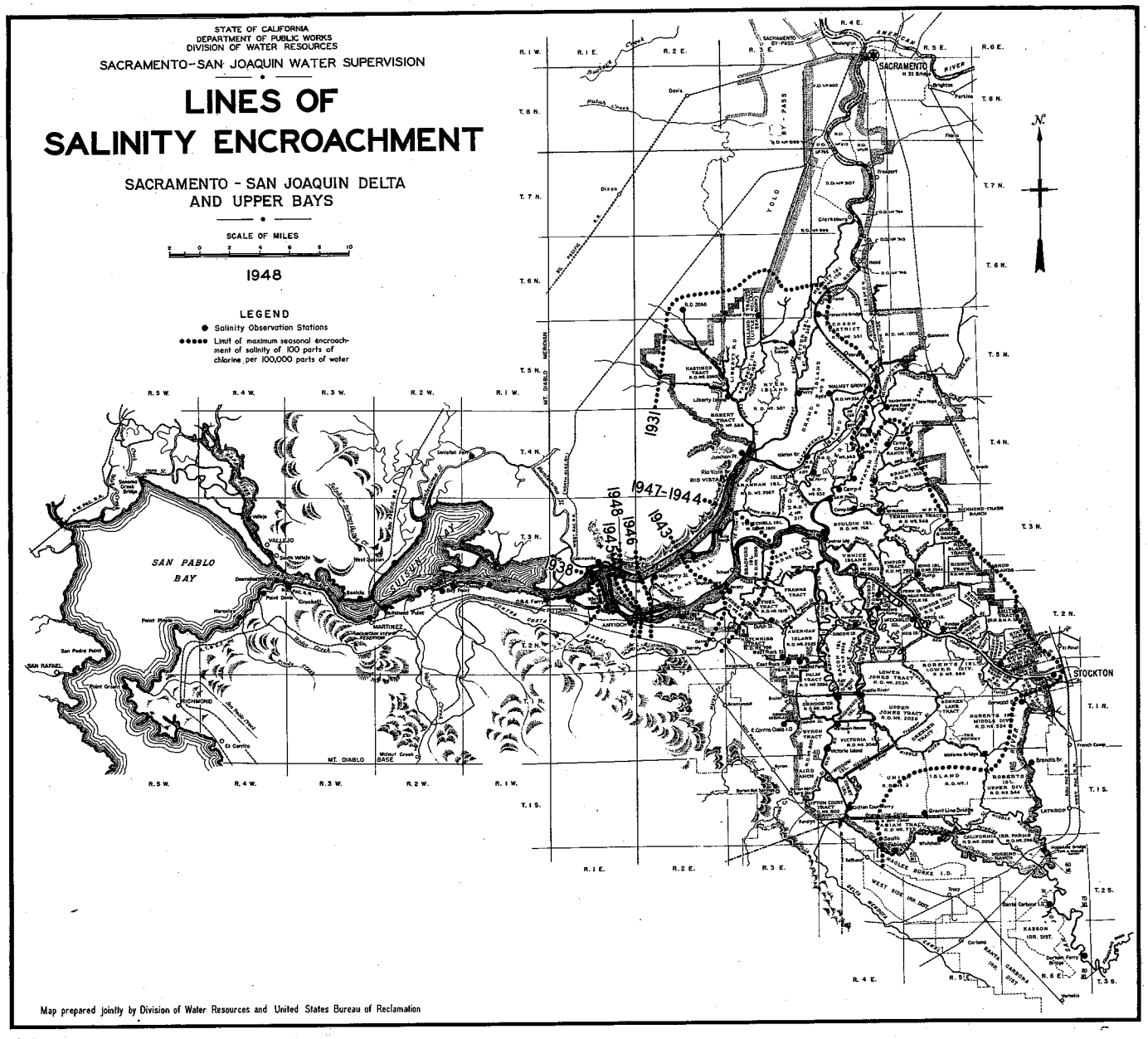
New Salinity Observation Stations

Several salinity observation stations in the central portion of the Delta, which had been discontinued in previous years, were reactivated during 1948. These stations were found to be necessary in order that a better indication of the actual transfusion of the fresh Sacramento River water southward through the Delta can be obtained. The re-established stations are: South Fork of Mokelumne River at Terminous on July 9, 1948; junction of North and South Forks of Mokelumne River at Southwest Point on July 9, 1948; San Joaquin River at Stockton Country Club on August 19, 1948; San Joaquin River at Garwood Bridge on August 19, 1948; Middle River at Williams Bridge on August 19, 1948; and Old River at Orwood Bridge on October 21, 1948.

A description of the location of each of these new stations is contained in Table 141, together with the descriptions of all other stations active during 1948.

Sacramento River Water Moves Southward

With reference to Table 142, a study of the salinity concentrations in progressive months points out clearly that the freshening effect of Sacramento River water reaches far southward into the branching channels of the San Joaquin River. This condition may be expected when consideration is given to the relatively small amounts of inflow from the


STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF WATER RESOURCES
SACRAMENTO-SAN JOAQUIN WATER SUPERVISION
LINES OF SALINITY ENCROACHMENT
SACRAMENTO - SAN JOAQUIN DELTA AND UPPER BAYS
SCALE OF MILES
1948
LEGEND
Salinity Observation Stations
Limit of maximum seasonal encroachment of salinity of 100 parts of chlorine per 100,000 parts of water
SAN PABLO BAY
SUISUN BAY
SACRAMENTO
STOCKTON
1931
1947-1944
1948
1945
1946
1943
1938
Map prepared jointly by Division of Water Resources and United States Bureau of Reclamation

San Joaquin River. The more than 100,000 acres of upland and delta lands lying south of the latitude of Stockton require irrigation flows in excess of 1,000 second feet during months of maximum use. The inflows to this southern Delta area from the San Joaquin River were insufficient in 1948 to supply this demand. There must therefore have been a transfusion of Sacramento River water of approximately 500 second feet passing the Stockton latitude.

Station Maintenance and Records

The salinity sampling at all stations is done by local observers. Each observer is provided with a schedule showing the exact time for taking the samples, so that, throughout the Delta and upper bays all samples are taken at approximately one and one-half hours after the same high tide at four-day intervals. Table 141 gives the location and description of each active station from which samples were received during 1948. Location description of inactive stations are deleted in this report but can be found in previous reports.

The observers are furnished with stamped containers for the sample bottles so that the latter can be mailed, as filled, to the laboratory at Sacramento. All analyses of the water were made at the Materials and Research Laboratory of the Division of Highways in Sacramento during the 1948 season.

The maximum salinity as recorded at the stations in 1948 is shown in Table 140. For comparative purposes, this table shows also the maximum salinity recorded at these stations in previous years beginning with 1938. Only presently indicative and active stations are included in this comparison.

Daily Salinity Observations

In compliance with the desire of the U. S. Bureau of Reclamation to obtain daily observations of salinity in the Suisun Bay area arrangements were made for daily observations with the U. S. Maritime Commission, Reserve Fleet Division, for the West Suisun station and with the U. S. Navy, Marine Barracks, for the Port Chicago station. Special schedules of daily times for taking salinity samples were prepared for each of the two stations and complete and satisfactory cooperation by the two agencies was experienced through the year. The special results of the daily observations were transmitted immediately to the U. S. Bureau of Reclamation as received from the State Testing Laboratory. Results of daily salinity observations taken at Antioch are also included in the 1948 report, Table 145. These Antioch data were obtained from the City of Antioch by the U. S. Bureau of Reclamation and submitted for inclusion herein. The daily records at these three stations are given in Tables 143, 144 and 145. However, the regular four-day interval results of observations for the three stations, West Suisun, Port Chicago and Antioch, are included herein in Table 142 together with similar results for all other stations.

Salinity Bulletins

During 1948 a salinity bulletin was mailed each month to many interested agencies and individuals giving the results of samples taken and analyzed at four-day intervals at

all stations. The figures given were the laboratory determination of the number of parts of chlorine per 100,000 parts of water.

Area of Salinity Encroachment

There is an apparent relation between the average stream flow to the Delta during the ten-day period of minimum flow and the area affected by salinity encroachment. Data amassed in this regard indicate that when the flow to the Delta drops below a certain amount the rate of advance of salinity encroachment greatly accelerates. A comparison of the average stream flows during the ten-day period of minimum flow and the affected acreage in the Delta is presented in Table 146. The area affected by salinity encroachment of 100 parts of chlorine per 100,000 parts of water amounted to approximately 1,200 acres in 1948.

TIDE GAGES

The 28 recording tide gages located on the Delta channels and on the upper bays were continued during 1948. Previous Water Supervision reports contained detailed descriptions and locations of the gages. The Flood Control branch of the Division of Water Resources operates and maintains 18 of these tide gages. The remaining 10 are operated by Federal agencies.

TABLES

TABLE 1

ANNUAL RUNOFF IN PERCENT OF 50 YEAR NORMAL(1)
SACRAMENTO-SAN JOAQUIN RIVER SYSTEM

	Sacramento and San Joaquin Rivers to Delta	Sacramento River at Red Bluff	Sacramento River at Sacramento	Feather River near Oroville	Yuba River at Smartville	American River at Fairoaks	Mokelumne River at Mokelumne Hill	Stanislaus River below Melones	Tuolumne River near La Grange	Merced River at Exchequer	San Joaquin River below Friant	San Joaquin River near Vernalis
Mean Annual Runoff(1) Thous. Ac. Ft.	(2) 26977	8747	(2) 19342	4853	2490	2879	802	1273	1985	1069	1914	(2) 6241
1920	52	48	48	45	52	51	58	58	68	64	69	66
1921	118	131	126	124	127	111	109	99	102	95	84	95
1922	103	76	95	105	119	114	115	112	125	133	123	123
1923	76	61	70	63	83	96	88	89	90	88	87	88
1924	28	38	30	27	24	19	24	21	28	24	23	24
1925	86	92	84	65	85	94	104	96	97	85	75	88
1926	60	65	63	65	65	48	47	48	56	57	61	56
1927	121	125	127	121	142	127	112	107	103	101	105	104
1928	84	87	89	88	98	88	80	75	77	69	61	70
1929	44	50	44	38	41	40	43	41	49	46	46	46
1930	65	70	71	80	73	57	57	58	58	48	46	53
1931	30	38	32	30	26	25	26	25	30	25	25	27
1932	78	58	69	68	85	90	93	106	106	104	108	106
1933	48	52	46	39	43	44	53	48	56	48	58	54
1934	43	51	45	42	40	39	37	33	41	34	37	37
1935	91	86	87	88	90	90	88	95	106	110	101	103
1936	96	81	92	88	104	118	112	104	109	108	98	104
1937	80	68	70	65	75	81	87	87	101	114	115	105
1938	170	168	167	175	162	157	154	161	173	195	193	180
1939	43	50	43	39	36	36	43	41	46	45	49	46
1940	115	120	118	116	115	118	107	110	112	103	98	105
1941	137	164	143	133	129	109	105	105	126	136	137	127
1942	129	129	133	136	137	136	123	117	120	120	118	118
1943	114	97	111	115	126	135	125	123	120	121	108	117
1944	56	53	54	57	56	51	56	53	66	64	63	62
1945	86	76	79	77	88	88	97	100	106	103	112	106
1946	92	92	92	85	96	100	93	93	95	88	91	92
1947	54	58	54	52	55	49	49	50	55	53	59	55
1948	78	87	83	80	81	78	79	70	71	64	63	68

(1) 50 year normal taken as 50 year (1889-1939) mean annual full natural runoff (Oct.-Sept. incl.).

(2) Summation of full natural runoff at foothill stations on major tributaries only, and does not include runoff from minor tributaries and from valley floor.

TABLE 2

INVENTORY OF MONTHLY STREAM FLOW - SACRAMENTO RIVER AND TRIBUTARIES - 1948

Item	Mileage	Record in Table No.	Quantities in Acre-Feet Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Total
							SACRAMENTO RIVER								
INFLOW TO SHASTA RESERVOIR (Computed)		6	941950	271080	530660	1132120	799830	511380	505070	204830	206080	214810	239540	266660	5624010
Change in Storage		7	+475300	+73000	+326200	+585000	-10800	-104200	-270900	-424800	-264800	-154900	-125600	-106500	-3000
Unmeasured Accretions			12150	3320	15440	30480	13170	-2480	-251570	-4230	-5180	-6410	-1540	4140	-192710
AT KESWICK	250.5	8	278800	201400	219900	577600	823800	613100	524400	625400	465700	363300	363600	377300	5434300
Diversions			144	162	146	625	20633	25928	25214	24500	22434	22254	8994	1374	152408
Unmeasured Accretions			1632	-310	3449	-3982	-10957	-4380	-9698	-2498	4846	5015	9307	-3147	-10723
AT REDDING	240.7L	9	280288	200928	223203	572993	792210	582792	489488	498402	448112	346061	363913	372779	5271169
Diversions			0	53	0	20	523	1370	3264	2889	2737	1508	330	0	12694
Unmeasured Accretions			162171	32543	168538	306689	106105	75731	7053	8145	3352	5158	12330	35465	923280
AT BALLS FERRY	224.5L	10	442459	233418	391741	879662	897792	657153	493277	603658	448727	349711	375913	408244	6181755
BATTLE CREEK Nr. COTTONWOOD	221.5L	22	32640	16090	34010	63010	52100	49540	22390	13990	12830	15030	16450	18220	346300
COTTONWOOD CR. Nr. COTTONWOOD	222.2R	21	53600	12580	28430	110900	54910	27800	7480	3000	4190	5120	5100	10810	323920
Diversions			0	0	0	0	0	70	147	232	142	122	0	0	713
Unmeasured Accretions			16701	1312	32819	55428	92198	34877	23200	21084	25295	18761	9337	14126	345138
NEAR RED BLUFF	198.6	11	545400	263400	487000	1109000	1097000	769300	546200	641500	490900	388500	406800	451400	7196400
REDBANK CREEK AT FOOTHILLS	191.2R	23	NR	NR	702	1359	956	658	167	0	0	0	0	NR	
CRAIG CREEK NEAR MOUTH	187.6L	24	NR	NR	NR	NR	NR	7740	613	714	325	65	331	NR	
BUTTLER SLOUGH NEAR MOUTH	185.0L	25	NR	NR	NR	NR	21442	652	52	141	478	541	405	NR	
ANTELOPE CREEK NEAR MOUTH	180.7L	26	3824	777	6179	11401	3727	3271	216	163	200	401	817	NR	
IRRIGATION DRAIN INTO ANTELOPE CR.	180.7L	27	NR	NR	NR	NR	66	103	18	28	75	80	2	NR	
NORTH FORK MILL CREEK Nr. MOUTH	179.3L	28	NR	NR	NR	NR	1115	1103	265	99	140	161	142	NR	
MILL CREEK NEAR MOUTH	178.0L	29	21126	8469	25139	41277	33055	29310	7345	1561	549	1376	6363	NR	
CHAMPLIN SLOUGH NEAR MOUTH	171.0L	30	134	114	NR	NR	164	186	108	126	140	139	62	NR	
TOOMES CREEK NEAR MOUTH	171.0L	31	NR	NR	NR	NR	NR	1922	139	151	119	153	137	NR	
DEER CREEK NEAR MOUTH	168.5L	32	NR	NR	NR	NR	NR	16491	2227	379	946	2813	6448	NR	
Diversions			0	4	10	0	1	12	121	182	20	4	0	0	354
Unmeasured Accretions			87721	25642	94962	215277	105887	19464	-421	-5101	-1666	-15238	-16714	11826	521639
AT VINA BRIDGE	166.5R	12	658205	298398	613972	1378314	1244111	850188	556808	639579	492186	378987	404793	463226	7978767
Diversions			0	91	30123	1343	84370	101780	127022	131264	86833	35470	34926	376	633598
Unmeasured Accretions			-13488	2292	-28112	-72899	-2647	3735	7100	-1194	5687	17599	10013	1011	-70903
AT HAMILTON CITY BRIDGE	149.5L	13	644717	300599	555737	1304072	1157094	752143	436886	507121	411040	361116	379880	463861	7274266
CHICO CREEK NEAR MOUTH	141.5L	33	NR	NR	NR	NR	NR	NR	700	NR	0	36	0	NR	
STONY CREEK NEAR HAMILTON CITY	136.3R	34	3390	0	0	26150	12860	3050	0	0	0	0	0	0	45450
Diversions			0	0	71	0	0	48	2679	3736	2784	0	0	0	9318
Unmeasured Accretions			16393	25501	75834	54778	69046	32055	20793	18115	20944	13848	16320	13339	376966
AT ORD FERRY	130.8R	14	664500	326100	631500	1385000	1239000	787200	455700	521500	429200	375000	396200	477200	7688100
Diversions			0	35	1682	0	3283	3413	11915	4028	36	0	18	1041	25451
Unmeasured Accretions			6200	-5965	-21218	77000	89283	30113	17715	22428	16336	6200	5718	6541	250351
AT BUTTE CITY	115.8L	15	670700	320100	608600	1462000	1325000	813900	461500	539900	445500	381200	401900	482700	7913000
MOULTON WEIR	104.0L	35	0	0	0	0	0	0	0	0	0	0	0	0	0
COLUSA WEIR	92.4L	36	714	0	31300	59030	67800	0	0	0	0	0	0	0	158844
Diversions			0	429	2238	1247	16320	12959	24481	23136	11810	470	473	53	93616
Unmeasured Accretions			-12486	4629	9238	-155723	-8880	33059	2781	-9664	-490	9570	2373	-12647	-138240
AT COLUSA	89.4R	16	657500	324300	584300	1246000	1232000	834000	439800	507100	433200	390300	403800	470000	7522300
BUTTE SLOUGH OUTFALL	84.0L	37	22450	14860	30780	18700	9699	9269	25040	13400	21860	15680	12520	7430	201688
R.D. 70 DRAIN	68.8L	39	0	0	0	434	4409	5429	2317	3047	5411	780	196	87	22110
TISDALE WEIR	64.2L	38	16460	0	21960	159100	183600	0	0	0	0	0	0	0	381120
Diversions			0	2385	7556	9421	70106	75038	90204	86974	46229	1962	313	1208	391396
Unmeasured Accretions			2910	9125	-47664	-19613	24598	-28060	-1853	3427	25158	11502	697	9691	-10082
AT WILKINS SLOUGH	62.9R	17	666400	345900	537900	1077000	1017000	745600	375100	440000	439400	416300	416900	486000	6963500
R.D. 108 DRAIN	44.0R	40	1105	785	339	2749	18120	21010	15710	19600	21390	1960	926	1624	105318
COLUSA BASIN DRAIN	34.15R	44	8961	877	8662	2864	2503	18360	22420	37540	55540	23600	28350	12720	222397
SYCAMORE SLOUGH	34.15R	45	0	0	0	0	0	0	1041	1535	1368	1319	516	22	5801
Diversions			0	699	4278	1119	23942	21930	32982	31718	16520	212	64	0	133464
Unmeasured Accretions			-11266	5737	-13223	-8494	30319	23860	6911	-4557	-13978	-12167	3372	6034	12548
AT KNIGHTS LANDING	34.0L	18	665200	352600	529400	1073000	1044000	786900	388200	462400	487200	430800	450000	506400	7176100
SACRAMENTO SLOUGH	21.2L	50	40360	1095	42690	NR	NR	81260	50500	51640	52760	24610	7299	5357	357571
FEATHER RIVER AT NICOLAUS	20.9L	55	518100	247200	389600	1326000	1091000	590200	73600	16170	48190	132900	139800	178000	4750760
FREMONT WEIR	23.0R	46	0	0	0	329800	233600	0	0	0	0	0	0	0	563400
R.D. 1001 DRAIN	19.6L	60	0	0	0	212	605	323	0	0	0	0	0	323	1463
Diversions			0	790	1824	247	8916	9544	13961	13886	10571	156	3	0	59898
Unmeasured Accretions			-47660	-19905	-12366	417835	600911	21861	13261	23276	26821	14046	-6996	1120	1032204
AT VERONA	19.6L	19	1176000	580200	947500	2487000	2494000	1471000	511600	539600	604400	602200	590100	691200	12694800
R.D. 1000 (#3) DRAIN	6.85L	62	0	0	403	369	4485	1238	573	819	1454	837	0	1325	11503
R.D. 1000 (2nd Bannon Sl.) DRAIN	2.1L	63	474	0	236	508	2396	752	0	42	4766	2928	0	918	13020
AMERICAN RIVER AT SACRAMENTO	1.1L	65	178900	86100	161300	537900	650200	457600	80520	20870	14200	29180	49110	67280	2333160
SACRAMENTO WEIR	4.2R	61	0	0	0	0	0	0	0	0	0	0	0	0	0
Diversions			2132	4130	6292	2129	23440	19969	34254	29845	18089	3011	3054	2908	149553
Unmeasured Accretions			103758	86030	68853	58652	89359	96379	48361	-8886	13869	4966	52544	104985	718870
AT SACRAMENTO	0.4L	20	1457000	748200	1172000	3082000	3217000	2007000	606800	522600	620600	637100	688700	862800	15621800
SHASTA RESERVOIR TO SACRAMENTO															
Total Unmeasured Accretions			324736	169951	346550	955428	1198392	336214	-116367	60345	120994	72850	96761	192484	3758338
Total Diversions			2276	8778	54220	16451	251534	272061	366244	352390	218205	65169	48175	6960	1662463

Table continued next page.

TABLE 2 (CONT'D)

INVENTORY OF MONTHLY STREAM FLOW - SACRAMENTO RIVER AND TRIBUTARIES - 1948

Item	Mileage	Record in Table No.	Quantities in Acre-Feet Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Total
							FEATHER RIVER								
NEAR OROVILLE	71.0L	51	353600	156300	234200	818100	685100	411000	150200	113100	105200	139800	118600	115900	3401100
Diversions			0	0	2025	5700	64224	121532	130916	112402	79341	36127	13800	0	566067
Unmeasured Accretions			-9000	-4600	-13175	-21200	-28076	-17268	7616	3092	1241	1327	2900	-4000	-81143
NEAR GRIDLEY	49.7L	52	344600	151700	219000	791200	592800	272200	26900	3790	27100	105000	107700	111900	2753890
Diversions			0	118	188	17	109	2600	4805	3507	1757	124	0	0	13225
Unmeasured Accretions			32400	26218	45888	46317	69609	53300	12705	11407	12697	13024	16700	14200	354465
AT YUBA CITY	28.0R	53	377000	177800	264700	837500	662300	322900	34800	11690	38040	117900	124400	126100	3095130
YUBA RIVER AT MARYSVILLE	27.3L	58	156100	55500	110100	439000	436400	259100	34900	10600	17100	9350	25600	46500	1600250
Diversions			0	0	0	0	0	15	99	27	10	0	0	0	151
Unmeasured Accretions			-32800	4300	-7300	2500	-69700	-24685	-1241	527	4560	19950	-2200	3300	-102789
BELOW SHANGHAI BEND	23.0R	54	500300	237600	367500	1279000	1029000	557300	68360	22790	59690	147200	147800	175900	4592440
BEAR RIVER NEAR WHEATLAND	12.0L	59	16130	12920	19300	88020	45030	12840	720	163	487	2760	5120	12020	215510
Diversions			0	0	968	0	1984	3318	4794	4479	3499	406	0	0	19448
Unmeasured Accretions			1670	-3320	3768	-41020	18954	23378	9314	-2304	-8488	-16654	-13120	-9920	-37742
AT NICOLAUS	9.3L	55	518100	247200	389600	1326000	1091000	590200	73600	16170	48190	132900	139800	178000	4750760
OROVILLE TO NICOLAUS															
Total Accretions			-7730	22598	29181	-13403	-9213	34725	28394	12722	10010	17647	4280	3580	132791
Total Diversions			0	118	3181	5717	66317	127465	140614	120415	84607	36657	13800	0	598891
							AMERICAN RIVER								
AT FAIROAKS	19.2L	64	177800	84470	158100	522100	624500	439200	79820	18910	14290	27600	50020	73130	2269940
Diversions			0	76	91	34	209	855	1722	1415	1026	494	230	0	6152
Unmeasured Accretions			1100	1766	3291	15834	25909	19255	2422	3375	936	2074	-680	-5850	69432
AT SACRAMENTO	6.1	65	178900	86160	161300	537900	650200	457600	80520	20870	14200	29180	49110	67280	2333220
							SUTTER BY-PASS								
BUTTE SLOUGH TO SUTTER BY-PASS	29.4R	47	25060	2520	48100	129200	170000	45830	10910	12980	5712	1530	1890	6797	460529
WADSWORTH CANAL	25.7L	48	1188	1086	804	2834	6028	9574	6436	6510	8374	5661	3140	998	52633
TISDALE WEIR	18.9R	38	16460	0	21960	159100	183600	0	0	0	0	0	0	0	381120
R.D. 1500 DRAIN	0.0R	49	2141	752	1779	5681	22120	29640	28140	32120	32270	10160	458	4102	169363
Diversions			0	365	1064	653	4034	7697	9155	9791	3315	410	211	100	36795
Unmeasured Accretions			-4489	-2898	-28889			3913	14169	9821	9719	7669	2022	-6440	
SACRAMENTO SLOUGH	-1.0R	50	40360	1095	42690	NR	NR	81260	50500	51640	52760	24610	7299	5357	
							BACK BORROW PIT								
COLUSA TROUGH AT HIGHWAY 20	37.0R	41	6298	3207	16402	31129	26259	56692	30264	42110	54215	18813	17199	10743	313331
Diversions			0	0	133	965	4423	6647	9353	9225	4379	210	89	77	35501
Unmeasured Accretions			1217	708	6757	18904	25458	23440	10000	13114	11461	3448	6523	2379	126409
COLUSA TROUGH AT COLLEGE CITY	22.7L	42	7515	3915	23026	49068	47294	73485	30911	45999	64297	22051	23633	13045	404239
KNIGHTS LANDING RIDGE CUT	0.4R	43	2083	0	6440	34680	28020	47100	83	286	266	0	0	47	119005
Diversions			0	83	4466	3639	17513	9439	14865	9132	7578	0	0	0	66715
Unmeasured Accretions			3529	-2955	-3458	-7885	742	1414	6457	959	-913	1549	4717	-278	3878
COLUSA BASIN DRAIN	0.0	44	8961	877	8662	2864	2503	18360	22420	37540	55540	23600	28350	12720	222397
HIGHWAY 20 TO OUTFALL GATES															
Total Accretions			4746	-2247	3299	11019	26200	24854	16457	14073	13548	4997	11240	2101	130287
Total Diversions			0	83	4599	4604	21936	16086	24218	18357	11957	210	89	77	102216
							YOLO BY-PASS								
FREMONT WEIR			0	0	329800	233600	0	0	0	0	0	0	0	0	563400
KNIGHTS LANDING RIDGE CUT	10.1R	43	2083	0	6440	34680	28020	47100	83	286	266	0	0	47	119005
CACHE CREEK AT YOLO	7.0R	66	1380	0	4460	26910	3990	0	0	0	0	0	0	0	36740
Diversions			0	0	0	0	106	290	916	875	863	190	0	0	3240
Unmeasured Accretions			-1043	4730	-335490	-139290	54576	-3990	2563	2219	2017	1042	389	693	-411584
YOLO BY-PASS NEAR WOODLAND	0.0	67	2420	4730	5210	155900	86480	42820	1730	1630	1420	852	389	740	304321
							YUBA RIVER								
YUBA RIVER AT NARROWS DAM		56	140600	48930	86940	395100	394800	258000	48100	25470	28400	16350	27700	39900	1510290
DEER CREEK NEAR SMARTVILLE		57	8490	1870	9050	14280	8610	2800	861	310	344	365	1040	2910	50930
Diversions			0	0	33	23	12350	13849	17305	17954	16994	14256	3230	3660	99654
Unmeasured Accretions			7010	4700	14143	29643	45340	12149	3244	2774	5350	6891	90	7350	138684
YUBA RIVER AT MARYSVILLE	0.9	58	156100	55500	110100	439000	436400	259100	34900	10600	17100	9350	25600	46500	1600250
							DELTA TRIBUTARIES								
COSUMNES RIVER AT MICHIGAN BAR		68	8860	9370	33190	96060	75760	30300	5060	920	312	714	2480	6130	269156
COSUMNES RIVER AT McCONNELL		69	8450	8280	33350	100300	78360	31980	2790	170	0	0	1920	5730	271330
DRY CREEK NEAR GALT		70	0	1040	10690	17200	5040	962	4	11	26	0	0	1	34974
MOKELUMNE RIVER AT WOODBRIDGE		71	11260	2590	5230	40990	80410	130300	6090	1740	4900	12550	19160	23740	338960
CALAVERAS RIVER AT JENNY LIND		72	2180	3900	23610	37200	9340	2880	341	0	0	0	320	2630	82401
STOCKTON DIVERTING CANAL AT STOCKTON (CALAVERAS RIVER)		73	101	1670	20780	36080	8160	1240	0	0	0	0	0	0	68031
SACRAMENTO RIVER AT SACRAMENTO		20	1457000	748200	117200	3082000	3217000	2007000	606800	522600	620600	637100	688700	862800	14567000
YOLO BY-PASS NEAR WOODLAND		67	2420	4730	5210	155900	86480	42820	1730	1630	1420	852	389	740	304321
SAN JOAQUIN RIVER NEAR VERNALIS		89	85090	47540	36820	82890	307500	512100	81670	44590	64720	95230	88800	91400	1538350
Total Measured Flow to Delta			1564321	814050	229280	3515360	3782950	2726402	669084	570741	691666	745732	798969	984411	17122966

TABLE 3

INVENTORY OF MONTHLY STREAM FLOW - SAN JOAQUIN RIVER AND TRIBUTARIES - 1948

Item	Mileage	Record in Table No.	Quantities in Acre-Feet												Annual Total
			Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
							SAN JOAQUIN RIVER								
INFLOW TO FRIANT RESERVOIR		74	30930	31580	43440	122690	267530	273360	105340	69110	65380	54120	43720	34840	1142040
Change in Storage		75	+9900	+900	-7000	+59400	+145200	+135600	-102500	-129800	-87800	-23700	+17700	+10700	+28600
COTTONWOOD CREEK NEAR FRIANT	269.53R	77	0	0	3	20	1	0	0	0	0	0	0	0	24
Diversions			0	0	62	6	9	45	59	34	2	0	27	37	281
Unmeasured Accretions			650	-240	-1771	1406	-5622	-14815	-24681	-27076	-10778	-640	-643	-283	-84493
BELOW FRIANT	268.13	76	21680	30440	48610	64710	116700	122900	183100	171800	142400	77180	25350	23820	1028690
Diversions			301	279	535	298	1073	3053	4230	4073	3217	886	229	181	18355
Unmeasured Accretions			471	-1615	-1521	-485	-4572	-12640	-13091	13949	-13371	-3155	-1403	-1057	-66388
AT WHITEHOUSE	219.83	78	21850	28546	46554	63927	111055	107207	165779	153778	125812	73139	23718	22582	943947
FRESNO SLOUGH BY-PASS	208.9L	79	0	0	0	0	2560	40	0	0	1	0	0	0	2601
Diversions			18072	23538	36593	46385	93143	86975	133154	124673	105702	61506	19367	18759	767867
Unmeasured Accretions			-1508	-458	-5421	-7892	-6082	-5722	-6765	-3905	-511	-9033	-251	-753	-48301
NEAR MENDOTA	206.2	80	2270	4550	4540	9650	14390	14550	25860	25200	19600	2600	4100	3070	130380
Diversions			1648	4990	4840	6805	13805	14324	26017	26448	20169	13603	4848	2973	140470
Unmeasured Accretions			120	442	324	-155	625	-37	525	1469	786	11087	768	132	16086
NEAR DOS PALOS	186.0	81	742	2	24	2690	1210	189	368	221	217	84	20	229	5996
Diversions			0	0	0	0	0	0	0	0	0	0	0	0	0
Unmeasured Accretions	-		-620	-2	-24	-1320	-653	-172	-290	-179	-167	-76	-20	-229	-3752
NEAR EL NIDO	168.0	82	122	0	0	1370	557	17	78	42	50	8	0	0	2244
Diversions			10	23	7	89	54	22	124	69	57	54	0	0	509
Unmeasured Accretions			7798	3653	3897	9129	8627	14315	6296	9607	15587	8956	4580	3550	95995
AT FREMONT FORD	129.5	84	7910	3630	3890	10410	9130	14310	6250	9580	15580	8910	4580	3550	97730
MUD SLOUGH	125.0L	85					NO RECORD	OF FLOW	DURING	1948					
MERCED RIVER NEAR STEVINSON	123.75R	92	8550	7440	8180	10800	29250	136300	12900	10290	11470	10150	7850	9180	262360
Diversions			13	137	207	49	568	170	638	648	378	211	0	0	3019
Unmeasured Accretions			1513	897	1197	709	-2152	-13840	1488	878	1698	1811	770	430	-4601
NEAR NEWMAN	123.7	86	17960	11830	13060	21870	35660	136600	20000	20100	28370	20660	13200	13160	352470
MERCED RIVER SLOUGH NEAR NEWMAN	122.2R	93	0	0	0	0	815	14220	1	0	0	0	0	0	15036
Diversions			1971	2751	4104	7173	8685	8429	9917	9935	7108	820	55	0	60948
Unmeasured Accretions			5631	4914	4145	5554	13228	11090	17724	16265	12764	11687	7057	5852	115911
NEAR GRAYSON	96.05	87	21620	13993	13101	20251	41018	153481	27808	26430	34026	31527	20202	19012	422469
TUOLUMNE RIVER AT TUOLUMNE CITY	91.0R	98	41871	17841	18099	20866	79295	174169	37418	21511	24159	48301	47455	52374	583359
Diversions			3380	608	7424	8832	11348	5561	16412	15198	7388	2200	652	176	79179
Unmeasured Accretions			5770	3475	1672	-2940	14962	1663	12297	3455	5415	11152	6245	5947	69113
AT HETCH HETCHY CROSSING	82.65	88	65881	34701	25448	29345	123927	323752	61111	36198	56212	88780	73250	77157	995762
STANISLAUS RIVER NEAR MOUTH	79.7R	103	17760	11730	10230	49420	199400	186800	25030	9070	7130	9880	12010	12640	551100
Diversions			14	980	1553	2537	2010	1725	3041	3365	1754	425	426	0	17830
Unmeasured Accretions			1463	2089	2695	6662	-13817	3273	-1430	2687	3132	-3005	3966	1603	9318
NEAR VERNALIS	76.7	89	85090	47540	36820	82890	307500	512100	81670	44590	64720	95230	88800	91400	1538350
FRIANT RESERVOIR TO VERNALIS															
Total Accretions			21288	13155	5193	10668	4544	-16885	-7927	-10748	14555	28784	21069	15192	98888
Total Diversions			25409	33306	55325	72174	130695	120304	193592	184443	145775	79705	25604	22126	1088458
							MERCED RIVER								
AT YOSEMITE VALLEY R.R. CROSSING	42.1	90	240	158	343	2086	28750	117600	2719	1156	1111	307	326	700	155496
Diversions			0	0	5	8	280	518	641	715	360	90	5	0	2622
Unmeasured Accretions			6131	5546	6388	6463	5700	21918	3890	2772	3406	3234	2648	3344	71440
AT CRESSEY	27.6	91	6371	5704	6726	8541	34170	139000	5968	3213	4157	3451	2969	4044	224314
Diversions			0	470	719	271	1473	1946	3620	2799	1215	233	477	11	13234
Unmeasured Accretions			2179	2206	2173	2530	-3447	-754	10552	9876	8528	6932	5358	5147	51280
NEAR STEVINSON	4.6	92	8550	7440	8180	10800	29250	136300	12900	10290	11470	10150	7850	9180	262360
YOSEMITE VAL. R.R. CROSSING TO STEVINSON															
Total Accretions			8310	7752	8561	8993	2253	21164	14442	12648	11934	10166	8006	8491	122720
Total Diversions			0	470	724	279	1753	2464	4261	3514	1575	323	482	11	15856
							TUOLUMNE RIVER								
AT LA GRANGE	50.5	94	27540	920	141	6334	64250	153400	8591	522	7163	28710	33850	40650	372071
Diversions			0	0	0	0	0	0	0	0	0	0	0	0	0
Unmeasured Accretions			1860	3342	3056	-1074	-2350	-4300	3159	1945	2015	4270	2230	810	14963
AT ROBERTS FERRY BRIDGE	39.9	95	29400	4262	3197	5260	61900	149100	11750	2467	9178	32980	36080	41460	387034
Diversions			0	0	0	0	14	38	97	70	31	0	0	0	250
Unmeasured Accretions			5830	3531	4481	5180	11084	15838	8537	5644	5763	6550	8110	6620	87168
AT HICKMAN BRIDGE	31.7	96	35230	7793	7678	10440	72970	164900	20190	8041	14910	39530	44190	48080	473952
DRY CREEK NEAR MODESTO	16.5R	99	1330	1080	3980	3880	8200	6770	2317	3380	3790	3510	1800	1600	41637
Diversions			4	0	8	0	20	41	117	152	90	19	0	0	451
Unmeasured Accretions			6014	6257	4580	5030	5820	8871	9230	6921	3720	5729	5530	4330	72032
AT MODESTO	15.92	97	42570	15130	16230	19350	86970	180500	31620	18190	22330	48750	51520	54010	587170
Diversions			0	224	114	187	418	633	564	612	601	171	149	0	3673
Unmeasured Accretions			-699	2935	1983	1703	-7257	-5698	6362	3933	2430	-278	-3916	-1636	-138
AT TUOLUMNE CITY	3.35	98	41871	17841	18099	20866	79295	174169	37418	21511	24159	48301	47455	52374	583359
LA GRANGE TO TUOLUMNE CITY															
Total Accretions			13005	16065	14100	10839	7297	14711	27288	18443	13928	16271	11954	10124	174025
Total Diversions			4	224	122	187	452	712	778	834	722	190	149	0	4374
							STANISLAUS RIVER								
AT ORANGE BLOSSOM BRIDGE	44.7	100	8781	4572	2200	67230	227700	160600	5891	1476	1319	3576	6395	6843	496583
Diversions			87	87	17	0	95	175	231	310	258	3	0	0	1263
Unmeasured Accretions			5416	3225	1599	-9050	-7105	3375	10240	4915	3031	3425	6825	4327	30223
AT RIVERBANK	32.0	101	14110	7710	3782	58180	220500	163800	15900	6081	4092	6998	13220	11170	525543
Diversions			0	179	169	0	271	509	978	900	486	38	15	0	3545
Unmeasured Accretions			3240	4539	6847	-5100	-3529	17009	6088	5719	6154	5180	1415	2940	50502
AT RIPON BRIDGE	16.0	102	17350	12070	10460	53080	216700	180300	21010	10900	9760	12140	14620	14110	572500
Diversions			298	1286	1073	1114	4239	4091	4837	4820	3501	1410	546	26	27241
Unmeasured Accretions			708	946	843	-2546	-13061	10591	8857	2990	871	-850	-2064	-1444	5841
NEAR MOUTH	4.3	103	17760	11730	10230	49420	199400	186800	25030	9070	7130	9880	12010	12640	551100
ORANGE BLOSSOM BRIDGE TO MOUTH															
Total Accretions			9364	8710	9289	-16696	-23695	30975	25185	13624	10056	7755	6176	5823	86566
Total Diversions			385	1552	1259	1114	4605	4775	6046	6030	4245	1451	561	26	32049

TABLE 4

ANNUAL IRRIGATED ACREAGE 1939-1948

SACRAMENTO-SAN JOAQUIN RIVER SYSTEM SERVICE AREA
AS COVERED BY SACRAMENTO-SAN JOAQUIN WATER SUPERVISION

Stream	Year	1939		1940		1941		1942		1943		1944		1945		1946		1947		1948	
	Crop	General	Rice	General	Rice	General	Rice	General	Rice	General	Rice	General	Rice	General	Rice	General	Rice	General	Rice	General	Rice
Sacramento River Redding to Sacramento		158768	63833	119730	64391	118581	85196	111226	107663	126266	115599	111868	122242	106395	115015	117556	124135	121590	123981	149734	128314
Colusa Trough	(1)	35	1062	225	700	270	1280	270	1520	600	2766	1540	4487	200	3882	3030	3694	1735	6474	3249	4745
Back Borrow Pit		1713	5772	3130	3259	3890	1969	2755	5647	2811	11684	965	9017	1585	5175	2062	7880	2295	9044	2455	7079
Knights Landing Ridge Cut		551	0	452	0	317	803	430	875	400	1005	305	3230	230	3320	1170	2795	1975	1087	685	1265
Yolo By-Pass above Highway 40		1986	2631	2049	0	1526	88	1300	0	1460	404	1235	1000	1594	500	620	200	1241	1895	1023	1000
Lower Butte Creek and Butte Slough	(1)	12263	607	9647	407	9621	0	8717	1045	8729	2024	7754	1760	7824	2110	8247	1846	4524	1115	4647	660
Sutter By-Pass and Sacramento Slough	(1)	7657	1635	8091	647	7827	1600	5551	1792	5384	3037	5889	4303	4712	6996	9380	4925	8835	3210	7918	2635
Feather River Oroville to Mouth		29234	26303	30117	23526	27658	26640	38477	25177	24089	46566	25235	49843	25106	47865	27189	51052	28264	49749	29534	43258
Yuba River Smartville to Mouth		6642	1898	7220	1270	7472	1345	6661	1125	6280	2310	7009	2401	8815	1085	8872	1956	8282	3630	8716	3115
American River Fairoaks to Mouth		864	0	3061	0	3046	0	3132	0	3112	0	3205	0	2935	0	2893	0	3670	0	3628	0
San Joaquin River Friant to Fremont Ford	(2)							NOT COVERED PRIOR TO 1946								305888	9727	336245	10563	325919	8670
San Joaquin River Fremont Ford to Vernalis		42379	420	39373	470	39866	484	41934	580	41143	342	42196	1464	41601	849	43094	1396	43076	1355	47300	535
Fresno Slough Fresno Slough By-Pass								NOT COVERED PRIOR TO 1946								19145	1868	17421	2698	19706	1579
Merced River Snelling to Mouth	(3)	3478	0	3123	0	3570	0	3302	0	3680	0	4509	0	4403	0	4484	0	5883	0	6494	0
Tuolumne River La Grange to Mouth	(3)	864	0	1072	0	1295	0	1619	0	1826	0	3161	0	3259	0	3564	0	3761	0	3745	0
Stanislaus River Melones to Mouth	(3)	6331	0	6902	0	6940	110	7095	130	7360	0	7915	0	6872	0	6343	0	6598	0	7916	0
San Joaquin River-Delta Uplands Vernalis to Stockton		18672	0	18457	0	19298	0	17932	0	19685	0	20547	0	19935	0	24545	0	25122	0	25551	0
Old San Joaquin River Delta Uplands		34956	0	29009	0	28842	0	28749	0	40607	0	32331	0	32139	0	34263	0	37859	0	40301	0
Tom Paine Slough Delta Uplands		3911	0	4007	0	3963	0	4357	0	5058	150	14676	235	5165	221	5733	317	5278	546	5077	468
Total above Delta																					
Sacramento River System		219713	103741	183722	94200	180208	118921	178519	144844	179131	185395	165005	198283	159396	185948	181019	198483	182411	200185	211589	192071
San Joaquin River System		53052	420	50472	470	51671	594	53950	710	54009	342	57781	1464	56135	849	382518	12991	412984	14616	410080	10784
Delta Uplands		57539	0	51473	0	52103	0	51038	0	65350	150	67554	235	57239	221	64541	317	68259	546	70929	468
Grand Total		330304	104161	285665	94670	283982	119515	283507	145554	298490	185887	290340	199982	272770	187018	628078	211791	663654	215347	692598	293323

(1) Figures for General Crops include acreage flooded for gun clubs.
(2) Figures exclude acreage in Madera Irrigation District.
(3) Figures exclude acreage in Merced, Turlock, Modesto, Waterford, Oakdale and South San Joaquin Irrigation Districts.

TABLE 5

RELATION OF GAGE HEIGHT TO STREAM FLOW - 1948 SEASON

SACRAMENTO-SAN JOAQUIN VALLEY STREAM GAGING STATIONS

STATION	Gage height, U.S.E.D. elevation, for rated flows of:								
	2000 cfs	3000 cfs	4000 cfs	5000 cfs	6000 cfs	7000 cfs	8000 cfs	9000 cfs	10000 cfs
Sacramento River									
at Sacramento	Flows under 30000 cfs are affected by tidal action and are rated by slope-velocity methods not applicable to this table.								
at Verona		8.6	9.9	10.8	11.6	12.3	12.9	13.5	14.1
at Wilkins Slough			24.6	26.0	27.4	28.7	30.1	31.4	32.7
at Colusa			38.6	39.8	40.8	41.9	42.9	43.9	44.9
at Butte City			69.8	70.4	70.9	71.3	71.8	72.2	72.6
near Red Bluff(1)		253.5	254.1	254.6	255.0	255.4	255.8	256.1	256.5
	200 cfs	500 cfs	1000 cfs	2000 cfs	3000 cfs	4000 cfs	5000 cfs	6000 cfs	7000 cfs
Feather River									
near Oroville(1)		185.5	187.1	189.3	191.1	192.8	194.5	195.9	197.3
at Nicolaus	20.3	20.8	21.6	22.7	23.7	24.5	25.2	25.9	26.6
American River									
at Fair Oaks(1)	65.1	65.8	66.4	67.3	68.1	68.8	69.4	70.0	70.6
San Joaquin River									
near Vernalis	12.8	13.6	14.6	16.2	17.4	18.5	19.5	20.4	21.2
at Hetch Hetchy Xing	17.4	18.3	19.4	21.3	22.9	24.2	25.5	26.7	27.7
near Grayson	26.2	27.3	28.6	31.5	33.7				
near Newman	52.9	53.7	54.8	56.5	58.2	59.8			
at Fremont Ford	59.3	60.9	62.6	65.1	66.9	68.5			
Merced River									
at Cressey Bridge(2)	2.0	3.4	5.2	7.5	9.2	10.6			
Tuolumne River									
at Modesto(1)	36.4	37.7	39.4						
Stanislaus River									
near Mouth	21.6	23.1	24.8	26.8	28.7	30.6			

(1) U.S.G.S. Datum.
(2) Assumed Datum.

TABLE 6

INFLOW TO SHASTA RESERVOIR - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	4520	3560	4750	11100	23020	10160	5280	2400	3730	3890	7510	3850
2	6790	4840	4890	15185	19720	9480	5490	3840	3440	2960	6200	4320
3	5740	4760	4860	15470	18000	9420	4630	3780	3340	4070	6350	4010
4	19130	5080	4770	16830	16800	10960	3190	4010	2990	4010	4300	3220
5	24390	4930	4870	16190	15850	11570	4110	3620	2260	3670	4020	4190
6	46540	3970	3620	15180	15820	13380	4640	3090	2020	3740	3700	4080
7	63050	3120	3270	13190	15440	13060	4780	2750	3680	3620	2910	5840
8	31440	4680	5170	14160	14050	10980	4800	2220	3650	3670	3780	5070
9	19790	5460	4690	18640	12260	10280	4730	3710	3320	3430	4090	4140
10	15440	4960	4390	21425	12920	11390	4370	3710	3620	2790	4060	4020
11	12720	4860	4840	18310	11870	10880	3130	3890	2960	3880	3600	3100
12	10970	4670	5890	16800	11670	9820	4160	3710	2190	3820	3990	6440
13	9340	4750	5930	16430	11430	8810	4620	3520	3090	3600	3300	7100
14	9020	3620	4880	24910	10920	9640	4540	3390	3120	4190	2830	5570
15	8260	3720	6010	30850	11520	8850	4690	2370	3390	3530	4170	5390
16	6720	4900	8070	28370	10260	8290	4460	3270	3690	2790	4430	5130
17	5710	4820	7900	26260	13620	7550	3240	3650	4890	2920	4480	4270
18	5230	5430	7470	22000	11730	8060	3000	3670	4590	3760	4010	3510
19	6150	5400	7570	19510	11730	6950	4150	3410	3870	3840	4330	2910
20	6190	5220	6110	18130	11100	6730	4440	3630	3750	3820	3230	4240
21	5980	5020	5440	19360	11340	7330	4350	2510	3670	3920	2890	4180
22	5990	4380	10180	18640	11060	7560	4100	2500	3640	3820	3880	3980
23	5920	4890	27700	17940	11220	6870	4300	3730	3700	3040	4050	3980
24	4850	5120	23820	16700	12210	6650	3370	3730	3700	2230	3990	3730
25	3770	5160	17540	14290	12080	6220	2500	3570	3650	3370	3250	3580
26	5465	5340	13320	14560	11990	5720	4030	3500	2810	3800	4010	3000
27	5170	5330	12190	15200	12640	5040	3860	3730	3660	3910	3070	4060
28	5340	5140	11310	22945	11410	5210	3920	2850	3700	4010	2690	3950
29	5200	3540	11790	25600	11100	5820	4250	2470	3910	3540	3880	4790
30	5190		12700	26600	9060	5140	3780	3480	3870	2410	3770	4190
31	4050		11600		9410		2850	3560		2250		4600
Mean	12067	4713	8630	19026	13008	8594	4121	3331	3463	3494	4026	4336
Runoff in Ac. Ft.	741950	271080	530660	1132120	799830	511380	253410	204830	206080	214810	239540	266660

NOTE: This is the total mean second feet flow inflowing to Shasta Reservoir as computed by the U. S. Bureau of Reclamation, taking into account change in storage, release, spill and evaporation; and represents the natural flow passing the dam site if the dam had not been constructed.

TABLE 7

DAILY CONTENT OF SHASTA RESERVOIR IN ACRE-FEET - 1948

Date	Figure given is amount in storage at end of day in thousands of acre-feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2283.1	2756.7	2833.6	3171.4	3745.5	3727.9	3620.9	3339.6	2917.5	2662.7	2513.5	2380.5
2	2289.1	2758.2	2837.5	3195.0	3743.2	3724.0	3616.3	3326.8	2904.2	2657.9	2513.9	2376.8
3	2293.0	2758.6	2841.2	3218.7	3737.4	3720.1	3609.9	3313.9	2890.5	2655.4	2514.5	2372.7
4	2323.5	2758.8	2844.9	3246.1	3729.5	3719.5	3600.7	3301.4	2876.2	2651.4	2510.9	2367.1
5	2364.4	2759.7	2847.5	3270.1	3719.5	3720.3	3593.3	3288.1	2860.2	2646.7	2506.7	2363.5
6	2449.3	2758.4	2847.7	3289.8	3709.3	3724.5	3587.4	3273.7	2843.8	2641.9	2501.9	2359.6
7	2565.4	2758.4	2847.1	3305.7	3698.4	3727.7	3581.7	3258.6	2830.7	2636.9	2495.5	2357.9
8	2620.1	2762.0	2850.3	3323.1	3684.8	3726.6	3576.1	3242.5	2817.7	2632.1	2490.7	2356.0
9	2650.8	2766.1	2852.7	3349.9	3667.7	3724.0	3570.3	3229.4	2805.1	2626.8	2486.6	2352.2
10	2670.6	2768.1	2854.5	3382.1	3656.3	3724.5	3563.9	3216.5	2793.0	2620.3	2482.4	2348.3
11	2685.3	2769.8	2856.9	3412.9	3647.2	3725.8	3554.8	3203.7	2780.1	2616.0	2477.4	2342.6
12	2696.6	2771.3	2861.5	3435.9	3637.7	3725.1	3547.9	3190.7	2768.1	2611.7	2473.1	2343.5
13	2704.7	2772.8	2866.1	3458.2	3627.9	3722.7	3541.8	3177.3	2757.1	2606.8	2467.3	2345.5
14	2712.3	2772.8	2868.7	3497.2	3631.7	3721.6	3535.5	3163.6	2747.9	2603.1	2460.8	2344.5
15	2718.4	2774.1	2873.6	3544.1	3645.9	3717.5	3529.4	3147.9	2739.4	2598.1	2456.8	2343.2
16	2721.4	2777.7	2882.8	3576.9	3651.1	3711.2	3522.9	3134.1	2731.6	2591.6	2453.3	2341.4
17	2722.6	2781.4	2892.1	3605.3	3663.3	3703.3	3514.1	3121.0	2726.7	2585.2	2449.9	2338.0
18	2723.3	2786.3	2900.5	3634.1	3671.8	3696.3	3505.3	3108.0	2722.0	2580.5	2445.6	2333.0
19	2725.4	2791.1	2909.3	3657.8	3680.1	3687.4	3498.2	3094.4	2716.3	2576.0	2442.1	2326.9
20	2729.9	2795.4	2915.1	3678.8	3687.4	3685.3	3491.5	3081.2	2710.6	2571.5	2436.4	2323.3
21	2733.9	2799.5	2920.6	3695.5	3695.2	3682.7	3484.7	3065.8	2704.9	2567.3	2429.9	2319.7
22	2738.1	2802.5	2933.8	3700.2	3702.3	3678.3	3473.9	3050.6	2699.4	2562.8	2425.4	2315.5
23	2742.4	2806.2	2982.4	3703.3	3709.6	3672.6	3462.0	3039.2	2694.5	2556.9	2421.1	2311.4
24	2744.7	2810.5	3023.2	3703.9	3718.8	3666.6	3448.3	3026.4	2689.9	2549.4	2416.8	2306.8
25	2744.9	2814.6	3051.5	3699.7	3725.8	3659.6	3432.9	3013.2	2685.5	2544.1	2411.1	2301.9
26	2747.7	2819.4	3071.5	3696.0	3730.6	3651.6	3420.5	2999.8	2679.8	2539.5	2406.9	2295.9
27	2749.7	2824.0	3088.6	3693.7	3736.6	3642.3	3407.7	3986.9	2675.9	2535.0	2401.0	2291.9
28	2751.8	2828.5	3105.7	3706.7	3738.4	3635.6	3394.9	2972.3	2672.3	2530.6	2394.2	2287.8
29	2753.9	2829.9	3121.0	3725.1	3738.2	3631.5	3382.8	2957.0	2669.4	2525.6	2389.8	2285.3
30	2756.1		3139.7	3741.1	3734.0	3626.1	3369.9	2943.6	2665.6	2518.3	2385.1	2281.6
31	2756.9		3156.1		3730.3		3355.2	2930.4		2510.7		2278.6
Monthly Change	+475.3	+73.0	+326.2	+585.0	-10.8	-104.2	-270.9	-424.8	-264.8	-154.9	-125.6	-106.5

NOTE: Reservoir water level recorder maintained by U. S. Bureau of Reclamation.

TABLE 8

FLOW OF SACRAMENTO RIVER AT KESWICK - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3760	3680	2940	3450	21700	11400	7920	10200	10200	5290	6270	6160
2	4160	4150	2960	3890	21600	11400	7890	10200	10200	5280	5940	6220
3	3870	4380	2960	4060	21400	11400	7910	10300	10200	5220	6000	6060
4	4090	5300	2960	3970	21400	11400	7910	10200	10100	5840	6040	6100
5	4390	4420	3700	4250	21400	11200	7890	10200	10200	6160	6070	6290
6	5890	4760	3630	5740	21300	11400	7890	10200	10100	6280	6090	6040
7	6330	3660	3630	5670	21200	11400	7810	10200	10100	6020	6040	6630
8	4550	2920	3630	5900	21200	11400	7730	10200	10000	5970	6100	6290
9	4230	3410	3720	6060	21200	11500	7700	10200	9810	5980	6040	6180
10	5690	4070	3610	6050	19200	11400	7650	10200	9570	5900	6020	6120
11	5460	4150	3650	3300	16500	10200	7660	10200	9350	5940	6080	6080
12	5380	3970	3710	5530	16500	10200	7690	10200	8220	5900	6070	6100
13	5360	3680	3780	5630	16500	10000	7730	10200	8510	5970	6100	6180
14	5250	3750	3700	6060	11100	10300	7710	10100	7690	5920	6020	6160
15	5250	3340	3680	7950	2850	10800	7740	10100	7560	5980	6200	6060
16	5250	3350	3910	11400	7640	11500	7750	10200	7560	5920	6160	6040
17	5080	2880	3500	13600	7650	11500	7740	10200	7430	5880	6140	6080
18	4910	3010	3400	7980	7700	11400	7510	10200	6830	5980	6460	6030
19	5020	3040	3360	7880	7650	11400	7800	10200	6670	5990	6120	5980
20	4290	3060	3390	7850	7650	8080	7820	10200	6500	5990	6080	6080
21	3840	3000	2760	10300	7650	8310	7910	10200	6290	5920	6090	6060
22	3820	2980	4250	16900	7650	9520	9310	10100	6320	5940	6060	6120
23	3690	2980	4420	16800	7650	9520	10200	9530	6130	5920	6180	6080
24	3570	3000	4160	16800	7650	9500	10100	10200	5940	5940	6150	6120
25	3520	3000	3840	16700	8450	9500	10200	10200	5840	5940	6100	6060
26	3940	2960	3610	16700	9240	9490	10200	10200	5640	6000	6150	6060
27	4000	2920	3660	16800	9390	9500	10200	10200	5560	5940	6100	6200
28	4210	2860	2690	17100	10300	8660	10200	10200	5400	6200	6120	6100
29	4120	2880	4580	17500	11300	7910	10200	10200	5280	5950	6140	6200
30	4030		3620	19400	11300	7890	10200	10200	5590	6030	6170	6150
31	3610		3450		11400		10200	10200		5960		6180
Mean	4534	3502	3576	9707	13400	10300	8528	10170	7826	5908	6110	6136
Runoff in Ac. Ft.	278800	201400	219900	577600	823800	613100	524400	625400	465700	363300	363600	377300

NOTE: This is a permanent station maintained throughout the year under Federal-State cooperation by the Water Resources Branch of the U. S. Geological Survey. It is located at Mile 250.5 above Sacramento. These flows include releases from Shasta Reservoir.

TABLE 9

FLOW OF SACRAMENTO RIVER NEAR REDDING* - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3770	3570	3010	3370	21420	11030	7180	9820	9760	4950	6480	6100
2	4450	4040	3030	3680	21190	11060	7150	9820	9790	4770	5900	6100
3	3940	4270	3020	4160	20960	10960	7200	9790	9760	4910	5870	6000
4	4320	5160	2990	4060	20780	11130	7200	9760	9760	5110	6020	6000
5	4580	4350	3660	4100	20690	10790	7230	9790	9760	5650	6020	6300
6	5930	4630	3610	5700	20600	10930	7260	9700	9760	5770	6050	6150
7	6730	3840	3630	5650	20550	10960	7230	9700	9790	5500	6070	6620
8	4660	3000	3620	5900	20550	10930	7120	9700	9670	5390	6100	6300
9	4130	3280	3710	6170	20500	10990	7120	9730	9490	5480	6050	6050
10	5570	3940	3640	6240	19000	11200	7060	9640	9240	5480	6070	5950
11	5320	4040	3620	3980	16060	9700	7060	9670	9040	5500	6070	5970
12	5270	3880	3720	5270	15960	9730	7090	9700	7950	5550	6330	6020
13	5300	3660	3780	5670	15990	9490	7150	9700	8230	5700	6120	6000
14	5200	3720	3760	6330	11580	9750	7120	9640	7420	5670	6220	6150
15	5200	3400	3640	7870	e2670	10210	7180	9610	7100	5530	6170	6050
16	5180	3420	4070	10640	7030	10990	7180	9670	7290	5500	6200	6100
17	4990	2890	3600	14630	7120	11030	7150	9700	7020	5750	6250	6150
18	4900	3050	3450	8030	7200	10930	6840	9730	6500	5430	6460	5850
19	4990	3060	3430	7820	7120	10890	7230	9790	6320	5820	6050	5870
20	4350	3030	3410	7710	7120	8160	7230	9760	6370	6020	6070	6020
21	3870	3050	e2860	8890	7090	7390	7400	9760	6150	5720	6070	5820
22	3860	3020	4180	16700	7010	8860	8410	9790	6180	5850	6050	5870
23	3730	3030	5100	16710	6980	8830	9820	9070	5940	5870	6100	6020
24	3610	3030	4300	16640	6980	8830	9730	9820	5870	5950	6120	6020
25	3390	3040	3890	16600	7620	8830	9760	9790	5630	5850	6100	6050
26	4060	3030	3670	16530	8450	8830	9790	9880	5430	5820	6070	6050
27	3990	2990	3640	16530	8890	8830	9760	9850	5320	5920	6070	6250
28	4200	2940	e2910	16860	9670	8180	9760	9790	5140	6070	6100	5900
29	4150	2940	4400	17420	10700	7180	9760	9820	5080	5970	6120	6120
30	4050		3720	19020	10960	7200	8820	9880	5160	5970	6100	6070
31	3620		3460		10960		9790	9820		6000		6020
Mean	4558	3493	3630	9629	12884	9794	7961	9732	7531	5628	6116	6062
Runoff in Ac. Ft.	280288	200928	223203	572993	792210	582792	489488	598402	448112	346061	363913	372779

* Also known as Sacramento River at Churn Creek Pumps.

NOTE: U. S. Bureau of Reclamation station located at mile 240.7 above Sacramento. Subsequent to October 1, 1948, station was maintained by the Division of Water Resources. Records for 1948 were compiled by the Bureau of Reclamation. Station is located below the diversion dam of Anderson-Cottonwood Irrigation District.

TABLE 10

FLOW OF SACRAMENTO RIVER AT BALLS FERRY - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	4200	3980	3450	4660	27120	12640	7560	9860	9890	5140	6570	6180
2	13550	4390	3470	4860	25170	12450	7480	9890	9860	4900	6200	6330
3	7890	4630	3390	7650	24180	12420	7560	9920	9860	5070	6410	6360
4	10360	5410	3400	9790	23850	12580	7480	9890	9790	5240	6330	6310
5	14670	4790	3850	8070	23320	13290	7560	9920	9830	6010	6250	6800
6	13770	4990	3900	9040	23080	13690	7620	9830	9790	6010	6310	6780
7	19810	4510	3920	9240	22990	12900	7510	9830	9860	5780	6250	7960
8	13660	3540	3920	9900	22660	12640	7370	9860	9670	5730	6250	7650
9	8100	4440	4050	13110	22430	12550	7320	9830	9670	5350	6050	6670
10	8220	4740	3930	14790	21410	12770	7240	9730	9290	5650	6330	6380
11	7270	4650	3900	11740	17610	12070	7180	9700	8960	5720	6050	6360
12	6860	4400	3980	8300	17490	11520	7130	9730	7910	5730	6410	6910
13	6570	4170	4580	8340	17400	11010	7070	9700	8170	5730	6100	7650
14	6250	4210	6220	17670	14570	11010	7050	9670	7540	5820	6280	7620
15	6100	4060	4850	17790	4670	11230	6990	9630	6840	5850	6330	6860
16	5990	4200	6690	15850	8040	12130	7020	9730	7250	5780	6620	6150
17	5680	3660	7840	19720	9040	12030	6990	9730	7080	5770	6310	6490
18	5560	3680	5470	12490	9140	11970	6750	9730	6760	5760	6410	6070
19	5520	3670	8050	11270	8790	11910	7070	9790	6430	5720	6410	6360
20	5020	3630	5140	10530	8670	9340	7070	9760	6400	5800	6310	6460
21	4420	3600	3840	11810	8730	7870	7180	9760	6170	5680	6360	6280
22	4420	3570	4940	23010	8370	9630	7890	9830	6100	5720	6310	6200
23	4250	3600	33330	21170	8190	9570	9760	9320	5970	5810	6310	6200
24	4110	3570	16890	19510	8130	9510	9790	9830	5830	5930	6380	7290
25	3940	3580	10140	18970	8610	9480	9860	9890	5390	5730	6360	6250
26	4440	3540	7160	18570	9540	9480	9890	9990	5430	5670	6310	6280
27	4420	3490	6000	18920	10080	9480	9860	9920	5360	5710	6280	6830
28	4600	3490	5270	30160	11070	8960	9830	10050	5120	5860	6310	6280
29	4640	3490	5580	28730	12320	7620	9860	10080	5000	5800	6360	6540
30	4580		5470	27830	13060	7560	9890	10050	5010	5870	6360	6780
31	4200		4840		12900		9860	9890		5970		6540
Mean	7196	4058	6371	14783	14601	11043	8022	9817	7541	5687	6317	6639
Runoff in Ac. Ft.	442459	233418	391741	879662	897792	657153	493277	603658	448727	349711	375913	408244

NOTE: U. S. Bureau of Reclamation station located at Mile 224.5 above Sacramento. Records for 1948 were compiled by the Bureau. Subsequent to October 1, 1948, station was maintained and operated by Division of Water Resources.

TABLE 11

FLOW OF SACRAMENTO RIVER NEAR RED BLUFF (IRON CANYON) - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	4500	4400	3810	6350	32700	14900	8670	10500	10400	5800	6860	6560
2	13300	4680	3830	6300	29600	14600	8590	10500	10400	5530	7590	6820
3	12200	5120	3770	9620	28200	14800	8590	10500	10500	5620	7020	6960
4	10300	5960	3740	11500	27600	14900	8560	10500	10400	5880	6940	6860
5	21100	5480	4030	11300	27000	17200	8590	10400	10500	6780	6810	7160
6	15400	5590	4360	11400	26600	17200	8650	10400	10400	6660	6800	7430
7	23300	5450	4380	11300	26400	15600	8590	10400	10400	6560	6750	7620
8	23700	4160	4400	11800	25900	15000	8350	10400	10300	6350	6680	8870
9	12200	4810	4500	18000	25400	14900	8270	10400	10100	6340	6720	7340
10	10600	5300	4440	20400	24900	14900	8160	10400	9890	6350	6740	7040
11	9460	5280	4360	17400	20500	14600	8050	10400	9690	6370	6540	7020
12	8590	4930	4400	10800	20000	13700	8020	10400	8810	6370	6830	7640
13	8050	4810	4720	11000	20000	13000	8020	10400	8590	6420	6490	9060
14	7590	4700	7030	22400	18300	12700	7940	10300	8480	6500	6700	8570
15	7320	4620	5750	26800	8080	13000	7920	10300	7510	6500	6820	7800
16	7060	4620	6250	21600	8850	13700	7970	10300	7860	6480	7060	7300
17	6720	4400	10300	24700	11400	13600	7970	10400	7860	6420	6980	7040
18	6500	4190	6620	17900	12000	13500	7780	10300	7810	6340	7030	6860
19	6370	4210	9160	14700	11500	13300	7890	10400	7320	6320	7100	6880
20	6050	4160	6270	13800	11200	11500	7940	10400	7240	6370	6820	7060
21	5280	4140	5100	13500	11300	9210	7970	10400	6980	6300	6840	6900
22	5120	4010	5040	25900	11100	10700	8400	10400	6930	6340	6750	6780
23	4950	4160	35300	25900	10400	10800	10500	10600	6770	6410	6740	6780
24	4830	4010	29800	22800	10400	10800	10500	10300	6620	6380	6860	6720
25	4700	3990	16100	21800	10800	10700	10500	10600	6420	6320	6750	6880
26	4720	3940	10500	21300	11600	10700	10500	10500	6220	6240	6750	7280
27	4910	3860	8430	21500	12200	10600	10500	10600	6080	6220	6740	8120
28	5020	3900	7940	32400	13300	10300	10500	10500	5840	6360	6720	7570
29	5150	3900	6790	38100	14400	8760	10500	10500	5660	6390	6850	7380
30	5080		7720	36800	15800	8700	10500	10500	5520	6480	6800	7840
31	4890		6710		15400		10500	10500		6460		7460
Mean	8870	4579	7921	18640	17830	12930	8884	10430	8250	6318	6836	7342
Runoff in Ac. Ft.	545400	263400	487000	1109000	1097000	769300	546200	641500	490900	388500	406800	451400

NOTE: This is a permanent station maintained throughout the year under Federal-State cooperation by the Water Resources Branch of the U. S. Geological Survey. It is located near the Iron Canyon dam site, Mile 198.6 above Sacramento.

TABLE 12

FLOW OF SACRAMENTO RIVER AT VINA BRIDGE - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	4860	5170	4340	8580	39280	16740	9150	10470	10410	5710	6440	6600
2	9210	5140	4260	8530	34200	16190	9120	10470	10360	5440	7860	6660
3	18340	5500	4180	11290	32710	16090	8960	10520	10330	5460	7280	6720
4	10510	6000	4130	12990	30150	16740	9040	10470	10300	5590	7050	6910
5	24160	6630	4110	16200	29900	20140	8960	10470	10270	6200	6860	7020
6	19160	6090	4690	13420	29650	20380	8930	10470	10330	6430	6880	7720
7	27060	6230	4650	13200	29000	18290	8900	10380	10240	6550	6660	7390
8	35110	5070	4680	13620	28230	17080	8820	10360	10220	6180	6580	9100
9	18400	4890	4770	24240	27220	16650	8650	10410	10130	6210	6600	7980
10	13620	6030	4840	23660	26510	16460	8620	10380	9940	6180	6580	7470
11	12340	5930	4700	22400	23350	16370	8510	10330	9680	6220	6550	7250
12	10800	5680	4700	14650	21460	15260	8480	10330	9430	6260	6350	7250
13	9850	5400	4890	13850	21330	14560	8420	10300	8350	6310	6580	9460
14	9210	5140	6420	19780	21030	14020	8230	10300	8690	6390	6600	8960
15	8680	5200	7180	43440	14490	14000	8200	10270	7800	6400	6770	8510
16	8340	5140	6070	32440	9270	14190	8230	10300	7680	6370	7160	7700
17	8000	5270	11810	29420	13280	14470	8200	10330	7710	6230	7000	7360
18	7690	4830	9200	26090	14420	14300	8200	10300	8040	6230	7020	7300
19	7300	4860	9710	19470	13740	14140	7840	10300	7620	6170	7220	7050
20	7220	4810	8330	17860	13270	13820	7980	10360	7350	6150	6800	7020
21	6210	4750	6530	17150	13210	10800	7950	10360	7160	6170	6800	7020
22	5880	4630	5410	25500	12740	10800	8030	10360	6960	6110	6740	6860
23	5690	4830	23960	32000	12320	11500	9630	10640	6830	6240	6690	6940
24	5530	4740	62970	27090	12320	11450	10410	10130	6640	6260	6800	6880
25	5360	4620	25980	25240	12510	11360	10500	10550	6420	6230	6880	6940
26	5210	4550	15830	24000	13320	11280	10500	10550	6230	6130	6690	7390
27	5540	4460	12030	23440	14000	11220	10470	10550	6020	6110	6690	8840
28	5560	4430	10610	28590	14590	11030	10440	10470	5870	6130	6630	7530
29	5760	4420	8800	55890	15310	10040	10440	10440	5640	6330	6660	7810
30	5680		10490	50860	17120	9260	10440	10440	5490	6330	6660	7980
31	5560		9270		17300		10470	10440		6350		7920
Mean	10704	5188	9985	23163	20233	14288	9056	10401	8271	6164	6803	7534
Runoff in Ac. Ft.	658205	298398	613972	1378314	1244111	850188	556808	639579	492186	378987	404793	463226

NOTE: U. S. Bureau of Reclamation station located at Mile 166.5 above Sacramento. Records for 1948 were compiled by the Bureau. Subsequent to October 1, 1948, station was maintained and operated by the Division of Water Resources.

WY=

TABLE 13

FLOW OF SACRAMENTO RIVER AT HAMILTON CITY (GIANELLA BRIDGE) - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	4930	5200	4440	8140	38380	15280	7350	8280	8360	5220	6170	6770
2	6560	5190	3960	7970	33870	14550	7270	8250	8310	5130	7220	6800
3	18110	5430	3500	9780	30880	14480	7150	8280	8280	5090	6950	6950
4	10780	5780	3630	12110	29300	15280	7170	8250	8310	5180	6670	6920
5	20650	6600	3530	15510	28910	18340	7150	8250	8280	5600	6530	6920
6	19630	6050	3800	12900	28280	19630	7100	8220	8310	6060	6450	7400
7	23510	6220	3960	12720	27900	17540	7150	8190	8250	6130	6240	7350
8	33930	5420	3970	12740	27230	16020	7020	8190	8220	5910	6210	8670
9	21170	4860	4030	22640	26260	15320	6850	8330	8170	5870	6190	7940
10	14100	5980	4070	22420	25640	15110	6770	8250	8080	5840	6190	7350
11	12630	6010	3990	22090	23260	15110	6620	8110	7940	6200	6170	7170
12	10940	5760	3870	15460	20550	14200	6550	8140	7720	6310	6070	7170
13	9710	5480	4090	13700	20000	13240	6480	8110	6800	5930	6090	8780
14	9090	5220	5050	17270	19570	12540	6480	8110	6970	6020	5970	8750
15	8560	5240	6720	39950	14480	12220	6380	8110	6530	6130	6090	8590
16	8190	5190	6070	31790	7650	12220	6330	8220	4170	6190	6550	7910
17	7890	5360	10290	27710	10990	12480	6330	8250	6340	6060	6570	7580
18	7500	4920	9130	25760	12700	12280	6310	8190	6620	6040	6600	7350
19	7230	4940	8380	19460	11960	12090	6050	8170	6570	6040	6750	7150
20	7130	4870	8190	17660	11560	11870	6170	8190	6310	6030	6450	7150
21	6590	4810	6310	16820	11530	9190	6210	8190	6360	5970	6410	7150
22	5990	4690	5100	22380	11250	8780	6240	8220	6260	5870	6330	7120
23	5840	4820	13370	30200	10600	9480	7270	8450	6240	5930	6310	7100
24	5650	4810	58680	26420	10350	9370	8170	8080	6050	5940	6330	7020
25	5450	4640	26960	24710	10470	9290	8220	8390	5950	5940	6330	7100
26	5240	4590	16050	23850	11160	9200	8280	8610	5880	5940	6290	7150
27	5620	4530	11830	23280	11900	9150	8250	8330	5710	5830	6290	8470
28	5540	4480	10050	25780	12540	9150	8220	8330	5710	5810	6290	8530
29	5690	4460	8540	48180	13240	8320	8250	8280	5350	5940	6330	7830
30	5640		9720	48060	15110	7470	8190	8310	5180	5940	6480	7890
31	5550		8900		15840		8280	8390		5970		7830
Mean	10485	5226	9038	21915	18818	12640	7105	8247	6907	5873	6384	7554
Runoff in Ac. Ft.	644717	300599	555737	1304072	1157094	752143	436886	507121	411040	361116	379880	463861

NOTE: U. S. Bureau of Reclamation station located at Mile 149.5 above Sacramento. Records for 1948 were compiled by the Bureau. Subsequent to October 1, 1948, station was maintained and operated by the Division of Water Resources.

TABLE 14

FLOW OF SACRAMENTO RIVER AT ORD FERRY - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	5350	5810	4900	9310	43700	15900	7860	8600	8600	5450	6310	7050
2	6290	5540	4620	8960	37400	15200	7760	8600	8550	5540	7150	6870
3	16900	5790	3970	10500	33400	15000	7630	8470	8520	5330	7270	7150
4	12300	6080	4020	13000	31600	15600	7630	8570	8550	5410	6940	7120
5	17300	6870	3950	16300	30700	18000	7530	8520	8520	5680	6830	7150
6	16600	6460	4060	14200	30000	20300	7530	8520	8550	6250	6670	7530
7	22900	6690	4350	13800	29500	18600	7510	8440	8520	6270	6690	7680
8	34800	6230	4440	13500	29000	16800	7460	8420	8500	6170	6610	8340
9	22700	5370	4420	21800	27600	15800	7240	8500	8390	6060	6520	8600
10	15100	6120	4530	23200	26800	15600	7170	8440	8340	6080	6460	7730
11	13300	6360	4420	23700	25000	15500	7010	8320	8160	6250	6480	7410
12	11700	6210	4260	18300	21400	14700	6920	8370	7960	6570	6290	7410
13	10600	5940	4460	14700	20800	13900	6830	8320	7200	6100	6380	8550
14	9930	5730	5040	15100	20300	13200	6780	8320	7170	6210	6210	9120
15	9300	5700	6940	39400	16800	12900	6650	8370	6890	6290	6360	8810
16	8910	5600	6650	39200	9390	12800	6540	8420	6460	6360	6570	8260
17	8570	5830	9520	30200	11600	13000	6570	8470	6760	6310	6850	7780
18	8210	5500	10900	29800	13200	12900	6540	8440	6870	6250	6850	7600
19	7930	5390	8420	21800	13000	12800	6340	8390	6830	6250	6920	7270
20	7730	5350	9390	19300	12500	12600	6400	8420	6480	6230	6830	7220
21	7220	5260	7100	18100	12400	10600	6420	8420	6480	6250	6670	7320
22	6570	5180	5810	20900	12200	9280	6480	8440	6460	6100	6690	7270
23	6420	5180	9820	31800	11600	9960	6960	8600	6360	6150	6690	7150
24	6230	5240	65200	28700	11200	9930	8370	8440	6230	6270	6690	7100
25	6040	5140	35500	26100	11300	9850	8500	8520	6190	6190	6670	7080
26	5810	5040	18900	25000	11800	9770	8550	8600	6060	6230	6610	7510
27	6020	4940	13900	24400	12500	9690	8550	8630	5920	6080	6610	8810
28	6020	4940	11800	24900	13000	9610	8500	8630	5810	6060	6630	9340
29	6100	4900	10400	47500	13700	9070	8520	8570	5640	6190	6630	8180
30	6100		16500	55000	15200	8030	8500	8570	5390	6210	6670	7980
31	6060		10200		16100		8520	8600		6270		8180
Mean	10810	5669	10270	23280	20150	13230	7412	8482	7212	6099	6658	7766
Runoff in Ac. Ft.	664500	326100	631500	1385000	1239000	787200	455700	521500	429200	375000	396200	477200

NOTE: Station maintained and operated by Division of Water Resources. Records of flows in excess of 40,000 second feet were computed by extending the rating curve. Station is located at Mile 130.8R above Sacramento.

TABLE 15

FLOW OF SACRAMENTO RIVER AT BUTTE CITY - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	5130	5840	4790	9540	49800	16300	8020	8840	8940	5590	6410	7160
2	5440	5340	4640	9200	40800	15600	7880	8860	8890	5690	6970	7040
3	14100	5590	3970	10000	35800	15300	7690	8820	8860	5500	7550	7360
4	13400	5910	3900	12800	33500	16000	7690	8860	8860	5570	7110	7390
5	13900	6630	3970	15700	32300	17900	7620	8820	8840	5650	7040	7320
6	21700	6520	3820	14700	31600	20400	7570	8820	8860	6300	6900	7640
7	20700	6540	4160	14100	31000	19200	7500	8790	8840	6410	6790	7880
8	31300	6390	4210	13800	30300	17600	7520	8770	8790	6370	6650	8760
9	27800	5360	4210	19600	29000	16600	7300	8770	8670	6240	6540	8910
10	16700	5690	4230	23700	28100	16300	7230	8790	8620	6260	6540	7930
11	14000	6190	4270	23900	26600	12600	7110	8720	8500	6370	6570	7640
12	12200	6100	4120	21200	23000	15500	6970	8670	8310	6790	6410	7570
13	11000	5910	4200	15600	22200	14600	6880	8670	7640	6300	6500	8310
14	10200	5740	4560	15100	21600	14000	6790	8650	7390	6320	6320	7000
15	9560	5590	6280	41500	19400	13500	6700	8650	7320	6410	6460	8980
16	9100	5500	6540	57500	12200	13300	6590	8650	6790	6460	6720	8430
17	8790	5590	7860	35100	12100	13600	6590	8700	7000	6430	7000	8020
18	8360	5480	11200	34100	14700	13400	6610	8720	7110	6350	6930	7760
19	8100	5250	8290	24700	15200	13200	6460	8700	7110	6320	7060	7500
20	7810	5230	9540	20600	14100	13100	6430	8740	6810	6320	6950	7460
21	7480	5170	7430	19500	13600	11400	6460	8740	6700	6350	6770	7480
22	6790	5130	6170	20400	13200	9660	6480	8740	6680	6240	6770	7410
23	6520	5030	7160	31800	12200	10300	6810	8820	6570	6240	6720	7360
24	6300	5150	49000	30900	11500	10200	8360	8860	6430	6280	6720	7320
25	6100	5030	46200	27700	11400	10000	8670	8740	6320	6240	6770	7340
26	5820	4950	22100	26300	11600	9950	8790	8890	6240	6280	6680	7590
27	5820	4890	15300	25500	12700	9820	8820	8910	6100	6130	6680	8600
28	5930	4830	12500	25600	13200	9780	8770	8860	6020	6080	6680	9630
29	5970	4790	11200	41700	13900	9390	8820	8840	5860	6150	6630	8460
30	6080		10400	55300	15200	8240	8790	8860	5550	6260	6770	8190
31	6020		10600		16400		8770	8940		6300		8410
Mean	10907	5564	9897	24571	21555	13678	7506	8781	7487	6200	6754	7850
Runoff in Ac. Ft.	670700	320100	608600	1462000	1325000	813900	461500	539900	445500	381200	401900	482700

NOTE: Station is maintained jointly by Division of Water Resources and the Water Resources Branch of the U. S. Geological Survey. Stream flow measurements were also made during 1948 by the U. S. Bureau of Reclamation. Station is above Butte City Bridge and is at Mile 115.8 above Sacramento.

TABLE 16

FLOW OF SACRAMENTO RIVER AT COLUSA - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	5300	5990	5050	10800	33800	16600	8150	8200	8350	5730	6520	6770
2	5340	5710	5020	10200	32300	16300	7880	8190	8310	5820	6680	6930
3	8960	5610	4560	9970	31100	15800	7720	8160	8260	5730	7470	7060
4	14700	5790	4280	12000	30200	15900	7590	8140	8240	5720	7270	7150
5	11800	6100	4350	13900	29800	16900	7510	8170	8230	5800	7120	7130
6	19100	6600	4220	15600	29300	19700	7380	8170	8250	6240	6980	7160
7	19400	6340	4510	14400	29100	20700	7300	8190	8290	6500	6930	7570
8	23700	6420	4660	13900	28800	19400	7260	8180	8220	6580	6800	7540
9	28100	5830	4620	15000	28000	17900	7100	8150	8160	6430	6680	8480
10	21700	5410	4630	21900	27000	16900	6980	8220	8090	6360	6640	7980
11	15800	6000	4670	23600	26000	16500	6930	8220	8050	6410	6630	7550
12	13300	6070	4540	22300	23800	16200	6760	8210	7930	6690	6590	7380
13	11500	5930	4530	17600	21800	15300	6680	8270	7710	6610	6520	7430
14	10400	5750	4720	15100	21000	14500	6590	8230	7140	6420	6490	8840
15	9670	5550	5620	20400	20200	13800	6530	8190	7250	6470	6500	8640
16	9120	5560	6760	30800	15700	13400	6400	8220	6760	6570	6620	8430
17	8710	5530	6790	29700	11300	13400	6330	8220	6700	6590	6860	7900
18	8340	5660	10500	28700	12600	13400	6340	8310	6840	6530	6950	7590
19	8070	5390	9170	26300	13400	13200	6250	8280	7040	6490	6950	7450
20	7800	5360	9160	21800	13100	12900	6090	8270	6850	6440	7040	7300
21	7680	5340	8300	19500	12800	12500	6160	8210	6700	6470	6810	7240
22	7130	5280	7000	18700	12600	10500	6190	8230	6650	6430	6790	7210
23	6740	5240	6320	23300	12300	10300	6240	8290	6600	6390	6750	7180
24	6530	5280	22100	28800	11800	10400	7240	8490	6550	6460	6750	7140
25	6350	5280	35000	27600	11600	10200	7850	8150	6440	6460	6770	7150
26	6110	5210	29400	25900	11600	10000	7970	8350	6400	6460	6750	7330
27	5930	5140	20900	24900	12000	9880	8060	8350	6250	6430	6670	7660
28	6050	5090	16100	24300	13400	9790	8050	8380	6160	6340	6680	8980
29	6030	5060	13600	27400	13900	9570	8040	8350	6120	6330	6690	8570
30	6100		11700	33700	14800	8660	8060	8310	5860	6420	6680	8080
31	6040		11800		16100		8080	8380		6470		8150
Mean	10690	5639	9503	20940	20040	14020	7152	8248	7280	6348	6786	7644
Runoff in Ac. Ft.	657500	324300	584300	1246000	1232000	834000	439800	507100	433200	390300	403800	470000

NOTE: Station is maintained jointly by the Division of Water Resources and the Water Resources Branch of the U. S. Geological Survey. Stream flow measurements were also made during 1948 by the U. S. Bureau of Reclamation. Station is at Colusa Bridge below Colusa Weir and is at Mile 89.4 above Sacramento.

TABLE 17

FLOW OF SACRAMENTO RIVER BELOW WILKINS SLOUGH - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	5450	6530	4990	12200	22600	14300	7190	6890	7670	6520	6700	6770
2	5380	6330	4830	11300	22400	14400	6760	6980	7700	6430	6820	7000
3	6480	6020	4680	10800	22200	14000	6500	6980	7660	6480	7400	7120
4	12600	5990	4140	11500	22100	13900	6400	6920	7640	6420	7780	7270
5	12100	6320	4000	13300	21900	14500	6380	6920	7650	6490	7610	7300
6	14900	6930	3890	14900	21800	16200	6280	6940	7720	6680	7430	7340
7	18200	6920	3890	14500	21700	17700	6370	7030	7850	7130	7320	7630
8	20100	6920	4100	14300	21700	17400	6300	7040	7880	7230	7210	7820
9	22200	6650	4440	14300	21500	16500	6300	7000	7840	7100	7060	8290
10	21200	6030	4170	18200	21300	15500	6140	6990	7880	6920	6950	8500
11	18500	6280	4080	20300	21000	15000	6080	7010	7900	6910	6870	7980
12	15700	6580	4110	20200	20500	14600	5910	6960	7860	7030	6850	7700
13	13700	6520	4210	18900	19800	14000	5830	7020	7760	7220	6740	7600
14	12400	6340	4470	16700	19300	13300	5770	7050	7260	6840	6730	8300
15	11400	6140	5120	17200	18700	12600	5700	7040	7210	6780	6670	8920
16	10600	6020	6740	21300	16100	12100	5510	7010	7100	6970	6730	8770
17	10000	5980	7040	21300	12000	11900	5380	6990	6890	7030	6950	8440
18	9550	6070	8820	21200	11900	12000	5360	7090	6970	6980	7130	8070
19	9080	5890	10100	20900	12700	11900	5300	7190	7260	6880	7130	7840
20	8720	5720	9080	20000	12800	11800	5050	7160	7340	6760	7180	7680
21	8410	5620	9190	19300	12600	11500	5030	7180	7180	6730	7100	7610
22	8020	5590	7920	18900	12200	10300	4960	7200	7160	6680	6970	7600
23	7500	5530	6870	20000	11900	9230	4990	7260	7160	6620	6900	7550
24	7220	5450	12600	21500	11300	9200	5480	7430	7180	6690	6870	7490
25	7000	5390	23600	21600	11000	9080	6620	7350	7140	6750	6860	7500
26	6740	5280	23300	21500	10800	8930	6910	7380	7070	6640	6900	7630
27	6500	5220	21300	21400	10900	8790	6980	7480	7040	6670	6880	7880
28	6530	5140	18100	21200	11100	8650	6980	7540	6940	6590	6840	8620
29	6560	5000	15300	21600	11500	8580	6920	7600	6860	6520	6830	9300
30	6600		13400	22500	12200	8050	6910	7580	6760	6570	6760	8850
31	6620		12700		13400		6830	7600		6630		8640
Mean	10837	6014	8748	18093	16545	12530	6101	7155	7384	6771	7006	7904
Runoff in Ac. Ft.	666400	345900	537900	1077000	1017000	745600	375100	440000	439400	416300	416900	486000

NOTE: Station is maintained jointly by the Division of Water Resources and the Water Resources Branch of the U. S. Geological Survey. Stream flow measurements were also made during 1948 by the U. S. Bureau of Reclamation. Station is located at Mile 62.9 above Sacramento, 0.3 of a mile below Wilkin's Slough pumping plant of Reclamation District 108, and 1.3 miles below Tisdale Weir.

TABLE 18

FLOW OF SACRAMENTO RIVER AT KNIGHTS LANDING - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	5540	6860	5090	12300	22800	14800	7460	7060	8030	6920	7130	7270
2	5470	6580	4950	11700	22500	15400	6910	7300	8130	6770	7330	7310
3	5370	6100	4820	10900	22300	14900	6690	7230	8170	6760	7740	7540
4	10700	5930	4320	10800	22200	14500	6520	7160	8090	6700	8340	7710
5	12200	6130	4060	12300	22100	14900	6490	7180	8160	6790	8140	7660
6	13100	6780	3940	14200	22000	16900	6480	7220	8200	6880	7870	7670
7	17800	6900	3780	14500	21600	19300	6640	7280	8340	7320	7880	7800
8	19600	6980	3980	14400	21600	19200	6520	7380	8500	7390	7710	8090
9	21800	6800	4480	14200	21600	17400	6600	7510	8490	7220	7600	8340
10	21100	6090	4390	16500	21700	16000	6430	7520	8680	6920	7390	8870
11	18900	6170	4210	19300	21600	15500	6400	7500	8740	6990	7400	8350
12	15700	6620	4230	20400	21300	15100	6290	7510	8760	7100	7370	7960
13	13600	6630	4370	20100	20500	14800	6170	7520	8530	7480	7210	7790
14	12100	6470	4720	18000	20100	14100	6090	7480	8120	7070	7210	8170
15	11500	6310	4930	17200	19600	13500	5950	7480	8010	6780	7200	9020
16	10800	6170	6590	20900	17800	13100	5840	7460	8000	7050	7310	9140
17	10300	6110	7210	20300	13100	12800	5580	7430	7850	7160	7590	8960
18	10000	6160	8450	20700	11300	12800	5540	7380	8120	7300	7830	8410
19	9470	6070	10400	21300	12200	12900	5470	7580	8660	7130	7810	8020
20	9150	5880	9300	20800	12800	12600	5300	7510	8700	6920	7830	7910
21	8790	5810	9490	19900	12600	12400	5230	7530	9020	6930	7860	7830
22	8440	5900	8370	19200	12500	11500	5190	7480	8680	6900	7650	7800
23	7890	5780	7400	19600	12600	9680	5290	7630	8350	6900	7820	7690
24	7570	5630	9730	21300	12200	9130	5420	7720	8040	6980	7460	7650
25	7360	5570	21800	21800	11500	8920	6320	7780	8020	7080	7380	7650
26	7100	5440	22800	21400	11200	9040	6910	7620	7870	7100	7440	7930
27	6840	5390	21100	22000	12500	9060	7120	7820	7700	7080	7480	8290
28	6740	5310	17700	20900	11500	9040	7170	7860	7400	6940	7290	9370
29	6830	5190	14800	21300	12100	8970	7340	7940	7240	6850	7320	10200
30	6790		13100	22600	13100	8470	7220	8010	7050	6820	7260	9660
31	6800		12400		14000		7140	8060		6940		9260
Mean	10820	6130	8610	18030	16980	13220	6314	7521	8188	7005	7562	8236
Runoff in Ac. Ft.	665200	352600	529400	1073000	1044000	786900	388200	462400	487200	430800	450000	506400

NOTE: Station is maintained jointly by the Division of Water Resources and the Water Resources Branch of the U. S. Geological Survey. Stream flow measurements were also made during 1948 by the U. S. Bureau of Reclamation. It is located at the Knights Landing Railroad Bridge, Mile 34.0 above Sacramento, below the point of discharge to the river of Colusa Basin drainage via the Back Borrow Pit of Reclamation Districts 108 and 787.

TABLE 19

FLOW OF SACRAMENTO RIVER AT VERONA - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	8290	10100	9130	24200	52800	31200	11700	8240	9330	10200	9640	8990
2	8150	9640	8720	22600	53300	30500	10700	8410	9370	10000	9890	9330
3	9800	9590	8450	22200	53300	31000	10200	8350	9370	9910	11700	9550
4	16400	9790	8040	24400	53100	31600	9910	8350	9350	9820	12100	10000
5	20600	10300	7640	26500	52600	32000	9640	8280	9380	9640	11900	10300
6	27000	11100	7450	28200	52400	32900	9370	8430	9350	9820	11200	10300
7	31700	11600	7270	28800	52500	33500	9260	8430	9500	10300	10600	10700
8	36300	11400	7350	27300	52700	34300	9260	8600	9700	10500	10000	11000
9	42800	11000	7540	26400	52100	34000	9180	8620	9730	10400	9730	11400
10	45000	10700	7720	32800	50600	33700	8960	8790	9840	10000	9790	11800
11	41300	10900	7380	42200	48700	32900	8790	8840	10000	9880	9680	11200
12	34200	10800	7340	46000	46700	31200	8430	8670	10100	9880	9640	10500
13	28300	10600	7670	45500	44600	29900	8180	8720	9950	10200	9320	10000
14	24000	10300	8920	42000	42900	28200	7990	8770	9750	10300	9300	12100
15	20400	9970	10800	38400	42000	26600	7770	8740	9450	9980	9010	13800
16	17900	9840	12000	41000	40000	25100	7620	8840	9640	9980	9060	13100
17	16600	9930	13100	46700	36500	23800	7380	8650	9550	10000	9950	12700
18	15500	10100	14600	54000	34500	22700	7240	8720	9750	10100	10500	12700
19	14400	10000	15800	56500	34100	21800	7060	8860	10500	9880	10600	12000
20	13300	9790	15500	55700	33400	21000	6820	8910	10800	9540	10400	11100
21	12800	9680	14700	54100	32500	20300	6620	8910	11200	9330	10100	10700
22	12500	9570	13200	53000	31000	19300	6560	8890	11500	9330	9680	10700
23	11900	9380	11700	52800	29300	17200	6500	8890	11500	9320	9380	10500
24	11500	9450	15800	53200	28200	15400	6500	8960	11300	9380	9500	10300
25	11000	9450	34300	53100	28600	14700	7290	9040	11200	9520	9480	10000
26	10500	9520	38900	52400	29600	14000	7940	8910	11000	9350	9470	10100
27	10000	9370	38400	51400	30600	13900	8160	9010	10800	9450	9180	10800
28	9980	9350	34900	50700	30900	13400	8240	9160	10700	9350	9180	12900
29	10100	9280	30700	50300	29800	12800	8230	9260	10600	9300	8910	14100
30	10300		27400	51400	28600	12600	8310	9400	10500	9330	8620	13300
31	10500		25300		29700		8140	9380		9610		12500
Mean	19130	10090	15410	41790	40570	24720	8321	8775	10160	9794	9917	11241
Runoff in Ac. Ft.	1176000	580200	947500	2487000	2494000	1471000	511600	539600	604400	602200	590100	691200

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

TABLE 20

FLOW OF SACRAMENTO RIVER AT SACRAMENTO - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	9120	13300	11800	30500	63100	40500	17200	7910	9140	11300	11000	10400
2	8990	12000	12000	29600	63200	41200	15800	8280	9340	11100	11100	11000
3	12800	11700	10300	30600	62900	42700	14400	8560	9540	11000	12200	11400
4	21900	12000	9750	33200	63100	43500	13800	8650	9630	10900	15300	11900
5	28000	12500	9080	34100	63600	42900	13000	8380	9720	10400	15300	12900
6	32300	13700	8820	36300	64900	42000	12300	8740	9650	10400	13700	12200
7	35000	14900	7660	36300	67300	44500	13000	9150	9650	10800	12200	13300
8	43600	14900	8970	34500	66800	45600	11800	9100	9650	11000	12000	13200
9	51800	14400	8980	32900	63800	45700	11500	8830	9620	11000	11300	13600
10	51600	14000	9330	37900	61300	45600	11200	8760	9560	10700	11200	14200
11	48300	14500	8980	50200	59100	43900	10800	8560	9860	10600	11200	14000
12	41000	14200	8770	53700	57500	41500	10100	8290	9990	10200	11400	13200
13	33600	13600	9400	53600	56100	39500	9240	8310	9890	10400	11000	12500
14	30100	13100	11200	50300	55900	37300	8640	8430	9870	11000	11000	14600
15	25700	12700	14600	46800	55000	35600	8470	8490	9450	10600	10700	17700
16	23000	12400	16100	49200	53600	33500	8730	8450	9780	10500	10400	16900
17	21400	12700	17700	57000	52100	32400	8450	8400	9510	9090	11300	15900
18	20200	13300	19800	69100	48500	31200	8230	8430	9880	10800	12100	16500
19	19200	13300	21000	70100	45600	30100	8070	8280	10500	10700	12800	15600
20	17800	12900	21900	68900	44200	29100	7720	8330	11300	8740	11900	14200
21	17200	12600	20400	67500	42800	28300	7660	8790	12100	9860	10900	13400
22	16700	12700	18300	67100	40500	27100	7520	8640	12100	9880	11100	13400
23	16000	11600	17100	66800	38500	25000	7440	8230	12100	9790	10800	13200
24	15400	12200	20400	65400	39000	22700	6960	8110	11700	9630	11100	12900
25	14600	12700	38400	64400	41100	22000	7250	8350	11900	9700	11200	12600
26	13800	12600	44100	64400	43200	21100	7700	8300	11600	9800	10900	12700
27	13100	12200	43800	63700	45100	20600	7710	8190	11400	9950	10600	13900
28	12800	12400	40900	63600	44200	19800	7460	8240	11400	10300	10800	15900
29	12900	12100	36600	63300	41200	18900	8180	8580	11600	10200	10600	18200
30	13100		33300	62500	39100	18200	7850	8780	11500	10200	10100	17200
31	13500		31700		39700		7750	8960		10700		16400
Mean	23700	13000	19100	51780	52320	33730	9870	8500	10400	10400	11570	14030
Runoff in Ac. Ft.	1457000	748200	1172000	3082000	3217000	2007000	606800	522600	620600	637100	688700	862800

NOTE: This represents the flow of the Sacramento River past Sacramento (below the City of Sacramento intake) to the Delta. Additional water flows to the Delta via East Borrow Pit of Yolo-By-Pass. (See Tables 61 and 67.) Daily mean flows are computed from newly derived curves which take into account tidal fluctuations during low stages. This is a Division of Water Resources station, located at Mile 0.4 above M Street Bridge.

TABLE 21

FLOW OF COTTONWOOD CREEK NEAR COTTONWOOD - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	110	203	195	570	1890	695	193	53	49	73	95	62
2	220	199	188	598	1470	674	188	56	53	67	126	62
3	1130	195	180	968	1320	660	193	53	53	75	115	65
4	628	192	177	1150	1260	667	197	51	46	122	109	67
5	1160	199	170	1120	1190	653	188	49	46	119	109	89
6	2820	199	166	942	1180	653	218	46	44	109	102	126
7	4810	195	160	848	1160	584	209	44	44	95	89	133
8	4510	195	160	1240	1080	538	188	44	42	75	84	213
9	2040	256	174	1990	989	564	180	42	42	70	81	209
10	1350	243	170	2570	919	611	172	40	44	75	81	168
11	1010	218	156	1580	877	786	156	40	42	92	78	145
12	831	195	156	1210	877	660	148	40	42	105	75	137
13	692	188	166	1080	814	611	137	40	46	112	75	205
14	584	192	188	3170	779	584	122	40	46	112	73	267
15	515	188	184	4600	737	544	112	40	42	105	75	213
16	445	218	214	3700	709	477	105	44	49	81	89	176
17	403	247	326	2830	744	429	102	46	65	75	98	160
18	374	247	282	2190	758	400	95	49	95	73	105	148
19	346	251	278	1770	716	356	87	49	122	67	102	137
20	326	256	247	1530	723	330	78	49	122	73	87	126
21	310	239	226	1490	716	320	75	49	112	84	84	122
22	292	230	222	2370	660	300	70	53	119	105	84	119
23	273	256	2400	1880	618	276	67	81	122	84	78	102
24	260	251	2260	1520	597	262	70	60	115	78	75	87
25	251	239	1360	1320	611	253	75	53	105	67	73	89
26	235	226	840	1220	604	244	78	51	95	56	70	141
27	230	214	668	1130	639	235	65	51	85	60	67	276
28	222	207	591	1610	681	222	62	49	80	65	67	465
29	218	203	620	4230	702	213	46	49	75	70	65	378
30	214		620	3490	870	213	46	46	68	67	62	441
31	214		591		793		51	56		70		320
Mean	872	219	462	1864	893	467	122	48.8	70.3	83.3	85.8	176
Runoff in Ac. Ft.	53600	12580	28430	110900	54910	27800	7480	3000	4190	5120	5100	10810

NOTE: Station maintained and operated by Water Resources Branch of the U. S. Geological Survey. Cottonwood Creek is a west-side tributary to Sacramento River at Mile 222.2R.

TABLE 22

FLOW OF BATTLE CREEK NEAR COTTONWOOD - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	260	275	249	552	990	860	519	258	207	222	280	251
2	1560	282	239	564	875	855	503	265	207	229	407	257
3	710	278	242	602	835	885	468	252	202	229	324	277
4	1540	282	230	668	820	948	448	246	207	229	324	266
5	1190	285	233	602	825	2540	440	239	210	232	286	257
6	745	299	227	560	870	1490	448	230	207	238	277	271
7	1230	285	233	527	900	1170	425	222	210	229	271	337
8	1020	282	249	824	820	1060	403	227	197	227	263	331
9	642	395	242	897	770	1120	388	236	199	232	266	271
10	543	320	239	1710	725	1000	380	227	204	229	260	260
11	475	268	233	1270	715	890	384	227	207	235	254	260
12	433	265	236	770	725	855	384	227	210	232	271	690
13	403	255	242	682	725	795	373	227	202	229	254	437
14	380	249	316	2260	750	780	366	219	199	246	260	311
15	373	258	292	2150	745	735	359	224	202	260	311	302
16	359	299	282	1350	790	700	359	230	204	260	337	271
17	348	288	465	1160	1010	673	359	219	233	251	302	277
18	337	282	351	1000	1060	673	348	213	239	251	283	266
19	334	285	373	906	900	650	341	219	233	251	268	254
20	323	268	312	865	890	632	334	219	222	257	274	257
21	316	262	295	922	845	646	323	219	222	260	260	263
22	312	275	292	1160	750	593	323	224	227	260	246	246
23	316	312	4530	1040	760	576	312	249	227	260	254	246
24	302	285	1900	860	815	564	299	227	230	251	254	243
25	306	271	999	810	860	568	306	216	224	260	254	254
26	292	249	700	785	900	568	302	213	230	246	251	324
27	271	249	614	780	906	552	292	219	224	248	248	407
28	285	246	585	2710	895	539	282	219	224	248	251	289
29	285	262	568	1670	930	527	285	216	230	257	251	274
30	285		610	1110	936	531	278	213	227	263	251	271
31	282		568		930		258	213		257		266
Mean	531	280	553	1059	847	832	364	228	216	244	276	296
Runoff in Ac. Ft.	32640	16090	34010	63010	52100	49540	22390	13990	12830	15030	16450	18220

NOTE: Station maintained and operated by Water Resources Branch of the U. S. Geological Survey. Battle Creek is an east-side tributary to Sacramento River opposite Mile 221.5L.

TABLE 23

FLOW OF REDBANK CREEK AT FOOTHILLS - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1			7	13	29	15	7					0
2			7	13	23	14	7					0
3			7	11	21	14	6					0
4			7	26	19	14	6					0
5			7	21	18	14	6					0
6			7	17	17	14	6					0
7			7	15	16	13	6					0
8			7	28	16	13	6					0
9			7	27	15	13	6					0
10			7	24	15	13	5					0
11			7	20	14	14	5					0
12			7	17	14	13	4	N	N	N	N	0
13			7	16	14	12	3	0	0	0	0	0
14			8	55	14	12	3					0
15			8	35	14	12	2					0
16			14	26	13	11	2					0
17			14	22	13	11	2	F	F	F	F	0
18			12	20	13	11	1	L	L	L	L	
19			12	18	13	10	1	O	O	O	O	
20			11	17	14	10	0	W	W	W	W	
21			11	18	15	10	0					
22			13	23	14	9	0					
23			36	18	13	8	0					
24			23	17	13	8	0					
25			18	16	12	8	0					
26			15	15	12	8	0					
27			14	15	12	7	0					
28		7	13	17	16	7	0					
29		7	14	51	14	7	0					
30			14	48	18	7	0					
31			13		18		0					
Mean			11.4	22.8	15.5	11.6	2.7	0	0	0	0	
Runoff in Ac. Ft.			702	1359	956	658	167	0	0	0	0	

NOTE: U. S. Bureau of Reclamation station located approximately 15 miles above the mouth. This creek is tributary to the Sacramento River at Mile 191.2R. Records for 1948 were compiled by the Bureau. Subsequent to October 1, 1948, station was maintained and operated by the Division of Water Resources. Recorder installed February 27, 1948 and removed December 18, 1948.

TABLE 24

FLOW OF CRAIG CREEK NEAR MOUTH - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1						e233	17	10	13	1	2	6
2						e211	16	10	13	1	9	7
3						e208	15	10	13	1	7	10
4					N	e237	17	10	13	1	7	9
5					O	e277	17	10	13	1	5	10
6						280	17	11	13	1	5	16
7					R	e298	17	10	12	1	5	12
8					E	e251	17	10	12	1	5	28
9					C	227	16	12	11	1	5	13
10					O	219	14	10	10	1	5	14
11					R	209	11	10	8	1	5	18
12					D	153	9	10	6	1	5	17
13						122	7	10	3	1	4	
14				N		102	6	10	4	2	5	
15				O	93	104	5	10	2	2	6	
16					73	124	2	10	1	1	8	
17				R	101	115	2	10	2	1	6	
18				E	131	107	1	11	2	1	6	
19				C	107	90	1	12	2	1	7	
20				O	96	69	3	13	1	1	6	
21				R	98	34	5	13	1	1	6	
22				D	80	35	2	13	1	1	6	
23					75	34	11	15	1	1	5	
24					76	33	11	11	1	1	5	
25					84	32	10	14	1	1	5	
26					102	30	10	16	1	1	5	
27					117	29	10	14	1	1	5	
28					155	27	10	13	1	1	5	
29					201	21	10	14	1	1	6	
30					e275	18	10	14	1	1	6	
31					e267		10	14		1		
Mean						130	10	12	5.5	1.1	5.6	
Runoff in Ac. Ft.						7740	613	714	325	65	331	

NOTE: U. S. Bureau of Reclamation station located approximately 0.2 miles above the mouth. This creek is tributary to the Sacramento River at Mile 187.6L. Records for 1948 were compiled by the Bureau. Subsequent to October 1, 1948, station was maintained and operated by the Division of Water Resources. Recorder installed April 7, 1948, and removed December 13, 1948. No record of flows prior to May 15 due to unrated backwater conditions.

e Estimated.

TABLE 25

FLOW OF BUTLER SLOUGH NEAR MOUTH - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					95	18	3	0	5	10	9	9
2					80	13	2	0	7	10	12	8
3					71	11	2	0	6	11	9	12
4					66	23	4	0	4	11	8	14
5					63	49	4	0	6	12	6	15
6					60	32	3	0	6	8	6	16
7				10	59	18	2	0	4	10	6	13
8				16	56	13	2	0	5	11	6	17
9				46	53	12	2	0	3	8	6	15
10				38	51	11	2	0	3	6	6	12
11				25	27	9	0	0	6	6	5	
12				14	22	8	0	0	7	9	5	
13				11	21	6	0	0	7	10	5	
14				53	22	5	0	0	9	11	6	
15				e100	15	5	0	0	8	12	7	
16				56	17	10	0	0	8	11	8	
17				60	21	10	0	0	11	12	6	
18				31	23	9	0	0	12	9	6	
19				16	20	9	0	0	12	6	6	
20				13	19	10	0	0	13	5	7	
21				12	18	9	0	5	13	7	7	
22				55	15	5	0	5	12	6	6	
23				70	15	6	0	8	10	4	6	
24				47	16	6	0	7	9	5	6	
25				39	18	5	0	4	10	8	6	
26				35	18	3	0	7	11	9	7	
27				34	16	3	0	8	9	12	7	
28				e87	24	3	0	7	8	8	7	
29				e147	22	4	0	7	8	10	8	
30				e124	30	4	0	7	9	8	9	
31					27		0	6		8		
Mean					35	10	1	2	8	9	7	
Runoff in Ac. Ft.					2142	652	52	141	478	541	405	

NOTE: U. S. Bureau of Reclamation station located approximately 0.4 miles above the mouth. This creek is tributary to the Sacramento River at Mile 185.0L. Records for 1948 were compiled by the Bureau. Subsequent to October 1, 1948, station was maintained and operated by the Division of Water Resources. Recorder installed April 6, 1948, and removed December 13, 1948.

e Estimated.

TABLE 26

FLOW OF ANTELOPE CREEK NEAR MOUTH - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	12	10	7	51	210	56	7	2	3	5	15	13
2	215	9	7	48	134	40	7	2	5	5	20	13
3	144	9	6	110	96	38	6	2	4	6	18	19
4	111	10	6	202	76	185	6	2	3	4	15	18
5	156	14	5	158	62	e393	7	2	3	5	12	17
6	181	23	5	118	57	234	8	2	3	5	11	24
7	221	23	5	79	55	123	7	2	3	5	11	21
8	247	18	5	118	51	83	6	2	3	4	10	27
9	134	18	6	e377	44	66	5	2	2	4	10	24
10	88	36	6	182	36	53	6	2	2	4	11	
11	62	23	6	150	29	43	5	2	3	6	11	
12	47	17	5	107	27	35	3	2	2	7	11	
13	37	15	7	79	26	28	2	2	2	6	11	
14	30	14	19	e414	29	23	2	2	2	6	11	
15	25	13	28	e583	32	21	3	2	3	7	14	
16	22	14	46	297	34	23	3	2	2	6	19	
17	18	14	266	198	49	23	3	2	4	10	16	
18	15	13	109	142	70	21	2	2	5	9	15	
19	16	12	81	108	54	18	2	3	5	7	15	
20	16	11	59	86	47	18	2	2	5	7	15	
21	14	11	38	93	44	18	2	3	4	6	15	
22	14	10	24	91	37	14	2	3	4	6	14	
23	13	9	e656	169	35	14	2	5	4	6	14	
24	12	9	e792	113	38	14	2	4	3	6	14	
25	12	8	e379	85	43	12	2	4	3	6	14	
26	11	8	129	70	46	11	1	4	4	7	14	
27	11	7	118	65	46	12	1	4	4	7	14	
28	11	7	85	e349	70	11	1	4	4	8	14	
29	11	7	69	e666	55	11	1	4	3	9	14	
30	11		78	e740	128	8	1	3	4	11	14	
31	11		63		119		2	3		12		
Mean	62	13	100	192	61	55	3	3	3	7	14	
Runoff in Ac. Ft.	3824	777	6179	11401	3727	3271	216	163	200	401	817	

NOTE: U. S. Bureau of Reclamation Station located approximately 2.3 miles above the mouth. This creek is tributary to the Sacramento River at Mile 180.7L. Records for 1948 were compiled by the Bureau. Subsequent to October 1, 1948, station was maintained and operated by the Division of Water Resources. Recorder removed December 10, 1948.

e Estimated.

TABLE 27

FLOW OF IRRIGATION DRAIN INTO ANTELOPE CREEK - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					0.2	2.3	0.3	0	0	2.0	0.8	0
2					0	2.3	0.5	0	0	1.7	0	0
3					0	2.3	0.6	0	0.6	1.7	0	0
4					0	4.0	0.5	0	0.2	1.3	0	0
5					0	1.7	0	0.1	0.4	1.4	0	0
6					0	2.8	0	0	0.2	1.4	0	0
7					0	2.3	0.1	0.3	0.8	0.9	0	0
8					0.3	2.2	0.2	0.4	1.2	1.2	0	0
9					0.2	2.2	0.2	0.1	0.9	1.4	0	0
10					0.2	2.2	1.1	0.3	0.6	0.7	0	0
11					0.2	2.2	0.6	0	0.2	0.9	0	
12					0.2	2.1	1.1	0.1	1.3	1.1	0	
13					0.2	1.8	0.9	0.3	1.4	1.2	0	
14				2.6	0.3	2.0	0	0.7	1.6	1.4	0	
15				2.8	0.5	3.0	0	1.4	1.6	1.3	0	
16				0.1	0.7	1.6	0	1.0	1.6	1.3	0	
17				0	0.8	2.0	0.2	0.6	2.0	1.6	0	
18				0	0.9	2.6	0	0.6	2.0	1.6	0	
19				0	1.2	2.0	0	0.6	1.9	1.5	0	
20				0	1.3	2.4	0	0.2	1.9	1.5	0	
21				0	1.5	2.0	0	0	1.9	1.5	0	
22				0	1.7	0.6	0	0.3	1.8	1.6	0	
23				0	2.0	0.5	0	1.0	1.8	1.5	0	
24				0	0.1	0.2	0	0.9	1.7	1.3	0	
25				0	0.1	0.2	0.6	0.2	1.6	1.2	0	
26				0	1.8	0.7	0.2	0	1.6	1.0	0	
27				0	3.4	0.1	0	0.7	1.7	1.0	0	
28				1.3	3.9	0.9	0.4	1.1	1.6	1.1	0	
29				15.2	3.4	1.4	0.3	1.2	1.8	1.2	0	
30				1.0	5.0	0.4	0.1	0.9	2.1	0.9	0	
31					3.0		1.1	1.2		1.0		
Mean					1.1	1.7	0.3	0.4	1.3	1.3	0	
Runoff in Ac. Ft.					66	103	18	28	75	80	2	

NOTE: U. S. Bureau of Reclamation station located just above the confluence of this drain with Antelope Creek, to which it is tributary at a point approximately 0.5 mile above the mouth of Antelope Creek. Records for 1948 were compiled by the Bureau. Subsequent to October 1, 1948, station was maintained and operated by the Division of Water Resources. Recorder installed April 13, 1948, and removed December 10, 1948.

TABLE 28

FLOW OF NORTH FORK OF MILL CREEK NEAR MOUTH - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					25	17	10.0	2.7	2.1	1.5	2.5	1.8
2					17	18	9.8	2.7	0	4.0	7.4	1.9
3					16	21	8.3	2.8	0	3.0	3.9	2.5
4					16	23	6.8	1.5	0	3.9	3.6	2.4
5					17	87	6.5	0.5	0	4.7	2.5	2.4
6					21	42	5.9	0.8	0.2	4.7	2.4	3.0
7					25	31	8.3	0.4	0.7	4.2	2.1	2.8
8					17	24	4.7	0.2	1.2	3.0	1.9	3.6
9					14	29	4.9	0.1	1.1	1.5	1.6	2.8
10					13	24	4.0	0	0.4	2.2	1.8	
11					12	17	4.0	0.5	1.4	3.7	1.6	
12					13	16	4.0	1.2	3.0	1.8	1.5	
13					13	14	3.7	0.5	2.2	1.8	1.5	
14					15	15	4.5	2.2	1.8	1.8	1.5	
15					15	12	5.7	1.4	4.2	1.4	2.5	
16					17	12	5.7	0.5	4.9	1.5	3.3	
17					28	12	3.4	0.5	5.3	4.0	2.8	
18					28	12	3.3	1.1	5.3	3.0	2.4	
19					19	12	4.0	0.9	5.3	2.5	2.2	
20					16	12	3.3	0.2	5.9	2.4	2.5	
21					15	12	3.1	1.3	3.9	1.6	2.2	
22					14	10	1.0	3.4	2.2	2.2	2.1	
23					16	9.8	1.3	3.6	1.2	2.4	2.1	
24					17	10	1.3	3.7	1.6	1.2	2.1	
25					21	10	2.4	3.6	2.1	2.5	2.1	
26					23	10	2.7	3.6	4.3	2.2	1.9	
27				17	25	10	2.4	3.4	4.7	1.9	1.9	
28				48	19	12	2.7	1.8	2.7	2.5	1.8	
29				60	18	12	1.6	1.4	1.8	3.1	1.9	
30				35	19	10	2.4	1.5	1.0	2.7	1.8	
31					18		2.1	1.8		2.4		
Mean					18	18	4.3	1.6	2.3	2.6	2.4	
Runoff in Ac. Ft.					1115	1103	265	99	140	161	142	

NOTE: U. S. Bureau of Reclamation station located approximately 0.5 mile above the mouth. This creek is tributary to the Sacramento River at Mile 179.3L. Records for 1948 were compiled by the Bureau. Subsequent to October 1, 1948, station was maintained and operated by the Division of Water Resources. Recorder installed April 27, 1948, and removed December 10, 1948.

TABLE 29

FLOW OF MILL CREEK NEAR MOUTH - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	132	137	139	370	670	505	308	40	14	14	100	99
2	457	137	135	406	576	540	281	39	13	12	281	99
3	413	133	133	509	540	580	243	34	10	11	153	123
4	363	140	130	552	544	617	213	34	8	10	130	109
5	779	153	127	588	588	1230	193	33	7	11	104	112
6	884	149	123	548	674	842	176	33	6	12	92	128
7	1328	139	123	389	703	732	153	33	3	10	95	125
8	1075	137	125	486	564	650	144	32	3	9	91	151
9	654	149	132	513	482	724	139	32	4	8	93	125
10	479	146	125	929	427	658	133	29	14	6	89	
11	376	133	106	787	416	552	137	26	14	7	89	
12	317	130	97	576	442	532	130	24	14	7	89	
13	269	132	105	494	449	479	125	22	13	8	82	
14	218	130	120	791	482	464	119	21	10	8	81	
15	235	135	102	1328	471	427	117	18	9	10	123	
16	221	157	140	1045	524	389	105	21	11	10	125	
17	208	151	281	916	687	370	97	30	9	9	120	
18	198	151	151	808	674	363	89	32	13	17	106	
19	186	155	195	707	528	351	86	31	10	36	101	
20	181	146	190	666	482	382	81	27	11	36	104	
21	174	142	114	687	449	392	76	25	5	38	99	
22	169	186	108	816	406	344	71	22	5	38	96	
23	164	186	1523	770	442	329	68	21	4	39	96	
24	160	162	2635	621	513	341	67	20	4	39	96	
25	157	153	1360	613	596	354	61	18	4	40	95	
26	149	153	1105	560	617	341	58	17	4	40	96	
27	142	149	916	548	609	329	54	16	9	40	95	
28	142	153	745	975	544	323	50	14	14	40	93	
29	142	146	580	1021	509	323	46	12	16	43	97	
30	140		427	791	540	314	43	16	16	43	97	
31	139		382		517		40	15		43		
Mean	343	147	409	694	537	493	119	25	9	22	107	
Runoff in Ac. Ft.	21126	8469	25139	41277	33055	29310	7345	1561	549	1376	6363	

NOTE: U. S. Bureau of Reclamation station located approximately 0.8 mile above the mouth. This creek is tributary to the Sacramento River at Mile 178.0L. Records for 1948 were compiled by the Bureau. Subsequent to October 1, 1948, station was maintained and operated by the Division of Water Resources. Recorder removed December 10, 1948.

TABLE 30

FLOW OF CHAMPLIN SLOUGH NEAR MOUTH - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2.5	2.1.	1.9		6.0	3.2	2.5	1.9	2.0	2.0	1.9	1.3
2	2.5	2.1	1.9		3.6	3.2	2.6	2.2	3.1	3.1	0.8	1.4
3	2.5	2.0	1.9		1.5	3.2	2.1	2.4	2.3	2.3	0.7	2.0
4	2.4	2.2	1.8		1.3	4.0	2.1	2.2	3.0	2.6	0.9	1.6
5	2.4	2.2	1.9		1.3	7.0	2.5	1.1	3.1	1.6	1.0	1.7
6	2.6	2.2	1.9		1.2	4.3	2.4	1.7	2.4	2.8	1.0	1.9
7	2.4	2.8	1.9		1.1	3.4	2.2	1.4	0.8	3.3	1.0	1.8
8	2.4	2.2	2.0		1.6	3.2	2.4	1.6	0.9	3.0	1.0	2.0
9	2.9	2.0	2.0		1.9	3.1	1.7	1.9	2.6	2.9	1.0	1.4
10	2.9	1.9	1.9		2.0	3.2	1.8	1.9	3.0	3.0	1.0	
11	2.5	1.9	1.9		2.5	3.2	1.5	2.3	2.6	3.0	1.1	
12	2.2	1.9	2.0		1.5	3.1	2.1	1.4	2.2	3.6	0.9	
13	2.0	1.9	2.0		1.3	2.7	1.7	1.5	1.7	3.2	0.9	
14	2.0	1.9	2.0	e41.0	1.4	2.8	1.7	1.1	1.6	3.3	0.8	
15	1.9	1.9	2.3	e46.0	2.3	2.2	1.9	0.9	1.7	3.9	1.3	
16	1.9	1.9	4.3	3.2	2.8	2.6	1.4	1.3	1.3	3.4	1.3	
17	1.9	1.9	14.0	1.9	3.1	2.7	1.4	0.9	2.5	2.3	1.3	
18	1.9	1.9	5.0	1.4	3.3	2.6	1.3	1.1	3.0	2.8	1.1	
19	1.9	2.0	6.0	1.2	3.4	2.2	1.1	1.5	3.6	1.3	1.1	
20	1.9	2.0	4.5	1.1	3.4	2.8	0.7	2.3	3.7	1.2	1.1	
21	1.9	1.9	4.1	1.1	3.2	3.0	0.5	3.2	3.2	1.2	1.1	
22	1.9	1.9	4.1	1.3	3.2	3.2	1.1	3.0	2.8	1.2	1.1	
23	1.9	1.9		1.3	3.0	3.2	1.4	4.1	2.8	1.3	1.1	
24	1.9	1.9		1.1	3.2	2.9	1.9	4.1	2.3	1.3	1.0	
25	1.9	1.9		1.1	3.3	3.0	1.1	2.8	2.3	1.9	1.0	
26	2.0	1.9		1.1	3.4	2.6	1.7	1.7	2.4	1.9	1.2	
27	2.0	1.7		1.1	3.5	2.3	1.9	2.6	1.4	1.7	0.7	
28	2.1	1.8		40.0	3.5	2.5	2.2	2.0	3.3	1.5	0.7	
29	2.1	1.9		75.0	3.2	3.6	1.3	2.1	3.0	1.1	0.7	
30	2.1			18.0	3.4	2.8	2.3	3.0	2.6	2.0	1.5	
31	2.1				3.3		1.9	2.6		1.8		
Mean	2.2	2.0			2.7	3.1	1.7	2.1	2.3	2.3	1.0	
Runoff in Ac. Ft.	133.9	114.4			164.0	186.1	107.9	126.5	139.6	139.2	62.1	

NOTE: U. S. Bureau of Reclamation station located approximately 1.1 miles above its confluence with Toomes Creek, to which it is tributary at a point 0.4 mile above the mouth of Toomes Creek. Records for 1948 were compiled by the Bureau. Subsequent to October 1, 1948, station was maintained and operated by the Division of Water Recources. Recorder removed March 23, 1948, installed April 13, 1948, and removed again December 10, 1948.

TABLE 31

FLOW OF TOOMES CREEK NEAR MOUTH - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1						39	2	2	2	2	2	2
2						32	2	3	2	2	3	2
3						31	2	2	2	2	3	2
4						42	2	2	2	2	3	3
5						300	2	3	2	2	3	3
6						129	2	2	2	2	3	3
7						66	2	2	2	2	3	3
8						46	2	2	2	2	3	3
9						39	2	2	2	3	3	3
10						38	2	2	2	2	3	
11						36	2	2	2	2	2	
12						24	2	2	2	3	2	
13						17	2	2	2	3	2	
14						13	2	2	2	3	2	
15						13	2	2	2	3	2	
16						16	2	2	2	3	2	
17						17	2	2	2	3	2	
18						16	2	2	2	3	2	
19						15	2	2	2	3	2	
20						10	2	2	2	3	2	
21						2	2	3	2	3	2	
22						3	2	3	2	3	2	
23						4	2	3	2	3	2	
24						4	3	3	2	3	2	
25						4	3	3	2	3	2	
26					9	3	3	3	2	2	2	
27					12	3	3	3	2	2	2	
28					18	3	3	3	2	2	2	
29					25	2	3	3	2	2	2	
30					52	2	3	3	2	2	2	
31					49		3	3		2		
Mean						32	2	2	2	2	2	
Runoff in Ac. Ft.						1922	139	151	119	153	137	

NOTE: U. S. Bureau of Reclamation Station located approximately 0.6 mile above the mouth. This creek is tributary to the Sacramento River at Mile 171.0L. Records for 1948 were compiled by the Bureau. Subsequent to October 1, 1948, station was maintained and operated by the Division of Water Resources. Recorder installed April 19, 1948 and removed December 10, 1948. No record of flows prior to May 26 due to unrated backwater conditions.

TABLE 32

FLOW OF DEER CREEK NEAR MOUTH - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1						397	81	11	3	32	91	97
2						374	79	10	3	28	195	97
3						363	67	10	3	30	141	120
4						364	62	7	3	39	136	117
5						707	67	7	4	41	100	127
6						634	71	6	4	40	87	138
7						522	71	5	4	36	82	124
8						477	67	7	4	40	78	147
9						432	60	9	4	38	72	133
10						390	58	9	4	34	71	
11						349	53	7	4	40	78	
12					553	310	50	9	4	45	79	
13					522	276	48	6	4	45	78	
14					530	242	42	6	4	48	81	
15					510	217	33	6	4	57	130	
16					477	217	28	5	4	52	180	
17					497	212	22	5	9	48	147	
18					555	198	20	5	29	48	133	
19					530	190	16	5	34	48	121	
20					497	180	12	5	32	48	120	
21					480	180	14	5	28	50	115	
22					442	169	9	5	29	45	108	
23					413	153	7	5	28	45	106	
24					409	141	7	5	28	46	108	
25					416	132	11	5	30	53	108	
26					432	124	13	5	36	52	106	
27					427	111	11	5	35	51	102	
28					418	99	14	5	33	52	99	
29					413	82	10	5	34	58	100	
30					413	72	9	3	32	67	99	
31					411		11	3		62		
Mean						277	36	6	16	46	108	
Runoff in Ac. Ft.						16491	2227	379	946	2813	6448	

NOTE: U. S. Bureau of Reclamation station located approximately 0.7 mile above the mouth. This creek is tributary to the Sacramento River at Mile 168.5L. Records for 1948 were compiled by the Bureau. Subsequent to October 1, 1948, station was maintained and operated by the Division of Water Resources. Recorder installed May 12, 1948 and removed December 10, 1948.

TABLE 33

FLOW OF CHICO CREEK NEAR MOUTH - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1							20	2		0		0
2							20	3		0		0
3							20	2		0		0
4							20	2		0		0
5							20	3		0		0
6							22	e1		0		6
7							21	e1		0		5
8							20	e1		0		14
9							19	e1		0		14
10							17	e1		0		9
11							17	e1		0		7
12							15	1	N	0	N	6
13							14		0	0	0	
14							13	N		0		
15							11	0		4		
16							9			3		
17							7	R	F	1	F	
18							7	E	L	0	L	
19							7	C	0	0	0	
20							7	0	W	1	W	
21							6	R		3		
22							6	D		2		
23							4			2		
24						26	5			1		
25						24	5			1		
26						22	5	0		0		
27						20	4	0		0		
28						20	4	0		0		
29						23	4	0		0		
30						21	1	0		0		
31							3	0		0		
Mean							11		0	1.5	0	
Runoff in Ac. Ft.							700		0	36	0	

NOTE: U. S. Bureau of Reclamation station located approximately 1.5 miles above the mouth. This creek is tributary to the Sacramento River at Mile 141.5L. Records for 1948 were compiled by the Bureau. Subsequent to October 1, 1948, station was maintained and operated by the Division of Water Resources. Recorder installed June 23, 1948 and removed December 13, 1948.

e Estimated.

TABLE 34

FLOW OF STONY CREEK NEAR HAMILTON CITY - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0			0	983	127						
2	0			0	571	121						
3	0			0	481	117						
4	0			0	415	129						
5	0			0	330	129						
6	0			0	302	120						
7	100			0	297	113						
8	600			8.3	294	105						
9	370			318	265	98						
10	200			275	222	90						
11	130			267	168	86						
12	90	N	N	210	164	79	N	N	N	N	N	N
13	70	O	O	190	150	74	O	O	O	O	O	O
14	50			340	114	57						
15	40			1680	99	33						
16	30			1270	72	19						
17	20	F	F	935	62	14	F	F	F	F	F	F
18	10	L	L	760	73	21	L	L	L	L	L	L
19	0	O	O	616	105	4.8	O	O	O	O	O	O
20	0	W	W	507	126	0	W	W	W	W	W	W
21	0			492	143	0						
22	0			602	132	0						
23	0			607	123	0						
24	0			511	111	0						
25	0			436	99	0						
26	0			408	86	0						
27	0			373	86	0						
28	0			366	87	0						
29	0			801	89	0						
30	0			1210	106	0						
31					131							
Mean	55.2	0	0	439	209	51.2	0	0	0	0	0	0
Runoff in Ac. Ft.	3390	0	0	26150	12860	3050	0	0	0	0	0	0

NOTE: U. S. Geological Survey station located on Stony Creek about 5 miles above mouth. Prior to February 1946 station was located 8 miles above mouth. Flow to the Sacramento River is cut off during the irrigation season by an earth fill installed by Glenn-Colusa Irrigation District to transport water from their main canal across Stony Creek. Stony Creek is a west-side tributary at Mile 136.3R. Water diverted from Stony Creek by G.C.I.D. amounted to: 1000 acre-feet in April, 7870 acre-feet in May and 3050 acre-feet in June. This station is above G.C.I.D. canal crossing.

TABLE 35

FLOW OVER MOULTON WEIR FROM SACRAMENTO RIVER TO BUTTE BASIN - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13					NO FLOW OVER WEIR DURING 1948							
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
31												
Mean	0	0	0	0	0	0	0	0	0	0	0	0
Runoff in Ac. Ft.	0	0	0	0	0	0	0	0	0	0	0	0

NOTE: Elevation of crest is 76.75 U.S.E.D. datum; length of crest is 500 feet. Weir is on left bank at Mile 104.0.

TABLE 36

FLOW OVER COLUSA WEIR FROM SACRAMENTO RIVER TO BUTTE BASIN - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0		0	0	17100							
2	0		0	0	8640							
3	0		0	0	4260							
4	0		0	0	1960							
5	0		0	0	1030							
6	0		0	0	680							
7	0		0	0	340							
8	0		0	0	170							
9	360		0	0	0							
10	0		0	0	0							
11	0		0	0	0							
12	0	N	0	0	0	N	N	N	N	N	N	N
13	0	O	0	0	0	O	O	O	O	O	O	O
14	0		0	0	0							
15	0		0	85	0							
16	0		0	6880	0							
17	0	F	0	3100	0	F	F	F	F	F	F	F
18	0	L	0	1030	0	L	L	L	L	L	L	L
19	0	O	0	130	0	O	O	O	O	O	O	O
20	0	W	0	0	0	W	W	W	W	W	W	W
21	0		0	0	0							
22	0		0	0	0							
23	0		0	0	0							
24	0		680	280	0							
25	0		14400	28	0							
26	0		700	0	0							
27	0		0	0	0							
28	0		0	0	0							
29	0		0	1130	0							
30	0		0	17100	0							
31	0		0		0							
Mean	11.6	0	509	992	1102	0	0	0	0	0	0	0
Runoff in Ac. Ft.	714	0	31300	59030	67800	0	0	0	0	0	0	0

NOTE: Elevation of crest is 61.80 U.S.E.D. datum; length of crest is 1650 feet. Weir is on left bank at Mile 92.4.

TABLE 37

FLOW OF BUTTE SLOUGH TO SACRAMENTO RIVER - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	216	174	2260	0	0	434	167	273	549	216	67
2	0	349	246	2160	0	0	355	169	276	449	266	58
3	0	299	248	2200	0	0	397	172	190	565	299	54
4	0	249	258	881	0	0	392	163	216	565	366	131
5	0	233	210	632	0	0	363	166	239	565	432	101
6	0	200	181	466	0	0	381	149	277	466	432	66
7	0	333	194	299	0	0	397	146	240	432	399	44
8	0	249	129	432	0	0	425	158	220	382	316	105
9	0	316	194	100	0	0	458	117	242	249	233	0
10	0	299	128	0	0	0	470	122	233	183	216	52
11	0	233	156	0	0	0	492	127	244	150	249	86
12	366	299	160	0	0	965	556	176	246	133	216	90
13	898	233	201	0	0	33	633	242	126	0.4	233	74
14	1150	299	178	0	0	83	631	250	276	5.3	249	0
15	1200	249	376	0	0	166	645	233	337	575	249	0
16	1150	249	436	0	33	200	615	218	340	178	100	0
17	964	283	399	0	832	133	528	247	291	147	200	40
18	532	266	212	0	382	83	494	274	278	90	166	57
19	432	333	565	0	233	100	427	271	370	14	166	71
20	399	299	499	0	366	116	415	251	397	38	183	76
21	416	283	609	0	299	183	370	310	442	32	200	83
22	432	283	614	0	416	466	382	284	399	34	166	88
23	416	332	513	0	416	299	399	242	399	350	133	109
24	399	190	0	0	466	266	290	244	565	178	134	114
25	432	201	0	0	565	249	292	270	565	193	90	124
26	416	180	0	0	449	233	231	240	665	178	93	138
27	366	203	0	0	283	216	219	253	665	182	69	152
28	316	198	1400	0	150	233	243	253	732	281	80	125
29	266	139	2230	0	0	283	247	270	648	265	76	325
30	382		2810	0	0	366	237	308	632	245	88	466
31	383		2200		0		204	263		233		853
Mean	362	258	501	314	158	156	407	218	367	255	210	121
Runoff in Ac. Ft.	22450	14860	30780	18700	9699	9269	25040	13400	21860	15680	12520	7430

NOTE: This is the discharge to the Sacramento River at Mile 84.0 Left and is measured at and regulated by the gravity culverts at the mouth of the slough. These flows, together with those shown in Tables 47 and 48 are, during the summer months, made up almost entirely of return water from lands irrigated by Feather River diversions. Discharge from the Sacramento River to Butte Basin over Moulton and Colusa weirs is shown in Tables 35 and 36. This is a Division of Water Resources station.

TABLE 38

FLOW OVER TISDALE WEIR FROM SACRAMENTO RIVER TO SUTTER BY-PASS - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0		0	0	13200							
2	0		0	0	11100							
3	0		0	0	9800							
4	0		0	0	8700							
5	0		0	0	7900							
6	0		0	0	7900							
7	0		0	0	7200							
8	700		0	0	7200							
9	6550		0	0	6550							
10	1050		0	0	5350							
11	0		0	270	4200							
12	0	N	0	1900	2650	N	N	N	N	N	N	N
13	0	0	0	180	800	0	0	0	0	0	0	0
14	0		0	0	0							
15	0		0	100	0							
16	0		0	7900	0							
17	0	F	0	9800	0	F	F	F	F	F	F	F
18	0	L	0	8700	0	L	L	L	L	L	L	L
19	0	O	0	7900	0	O	O	O	O	O	O	O
20	0	W	0	3650	0	W	W	W	W	W	W	W
21	0		0	800	0							
22	0		0	0	0							
23	0		0	400	0							
24	0		0	5900	0							
25	0		6550	6550	0							
26	0		4200	5350	0							
27	0		320	4200	0							
28	0		0	3150	0							
29	0		0	3650	0							
30	0		0	9800	0							
31	0		0		0							
Mean	267	0	357	2670	2990	0	0	0	0	0	0	0
Runoff in Ac. Ft.	16460	0	21960	159100	183600	0	0	0	0	0	0	0

NOTE: Elevation of crest is 45.45 U.S.E.D. datum; length of crest is 1155 feet. Weir is on left bank at Mile 64.2L.

TABLE 39

FLOW OF RECLAMATION DISTRICT 70 DRAIN - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				0	54	108	0	48	81	34	0	0
2				0	48	108	32	41	78	14	0	0
3				0	68	183	35	36	78	14	0	0
4				0	60	180	43	51	101	16	13	0
5				0	68	137	41	51	108	12	13	0
6				0	53	101	34	48	107	9.8	0	0
7				0	46	101	43	54	106	28	0	0
8				0	57	103	44	53	104	16	0	0
9				0	69	91	42	53	104	20	13	0
10				13	69	90	50	58	99	15	0	0
11				27	69	90	36	57	93	19	0	0
12	N	N	N	8.2	70	90	39	55	96	14	7.1	0
13	0	0	0	7.3	57	38	37	41	69	16	6.6	0
14				0	72	78	35	56	75	6.2	0	0
15				17	72	78	36	49	75	8.4	0	0
16				0	75	78	37	48	75	10	0	0
17	F	F	F	27	79	78	39	54	92	10	0	0
18	L	L	L	18	79	78	39	51	116	10	13	0
19	O	O	O	0	101	78	39	54	117	12	0	0
20	W	W	W	28	111	78	39	50	111	12	0	19
21				15	112	81	39	55	104	12	0	0
22				21	78	78	39	54	100	9.6	0	0
23				17	78	78	37	57	104	6.8	0	0
24				15	78	78	30	46	116	6.8	0	5.9
25				5.6	78	69	30	50	93	9.6	0	0
26				0	91	82	46	45	77	9.6	6.6	0
27				0	108	72	58	49	68	9.6	6.6	19
28				0	50	62	49	50	56	6.8	6.6	0
29				0	25	59	40	54	64	6.8	6.6	0
30				0	70	62	32	45	62	9.6	6.6	0
31					78		29	23		9.6		0
Mean	0	0	0	7.3	71.7	91.2	37.7	49.5	90.9	12.7	3.3	1.4
Runoff in Ac. Ft.	0	0	0	434	4409	5429	2317	3047	5411	780	196	87

NOTE: This is the drainage from Reclamation District 70 returned to the Sacramento River at Mile 68.8 Left. This is a combination irrigation and drainage plant and discharges both to the Sacramento River and to an irrigation canal. The above flow includes gravity as well as pumped drainage.

TABLE 40

FLOW OF RECLAMATION DISTRICT 108 DRAIN AT ROUGH AND READY BEND - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	23	58	0	124	134	490	266	267	349	70	50	36
2	0	0	0	0	164	497	241	262	349	48	0	0
3	0	0	0	0	99	497	250	289	349	0	0	0
4	61	0	0	0	0	498	247	275	349	84	0	45
5	0	0	0	0	190	488	250	287	349	57	0	0
6	0	0	0	0	132	758	242	264	382	0	0	0
7	58	0	0	0	144	479	319	291	406	62	96	0
8	0	116	75	0	139	479	288	291	405	36	0	44
9	0	0	0	110	171	463	304	287	486	39	0	38
10	0	0	96	0	159	458	312	300	438	0	0	0
11	99	0	0	215	172	363	291	300	434	71	40	0
12	0	0	0	102	174	357	268	330	525	0	0	53
13	0	0	0	90	176	319	278	308	418	86	0	0
14	64	0	0	0	170	196	268	294	432	64	78	0
15	0	0	0	0	177	352	261	353	444	46	0	0
16	0	0	0	0	244	281	273	274	459	48	0	0
17	0	0	0	0	250	283	249	340	459	0	0	78
18	85	0	0	78	285	295	232	320	460	58	56	0
19	0	0	0	0	384	281	230	327	552	39	0	0
20	0	0	0	0	381	275	239	347	445	0	58	34
21	48	0	0	83	414	274	244	351	457	0	0	0
22	0	124	0	93	461	209	245	290	422	0	0	73
23	0	98	0	0	639	233	178	351	362	57	0	0
24	0	0	0	0	441	242	179	387	339	0	0	0
25	70	0	0	0	441	241	179	349	215	0	0	0
26	0	0	0	133	420	210	271	349	143	59	0	91
27	0	0	0	0	434	255	229	349	124	0	89	92
28	49	0	0	102	425	275	255	349	97	0	0	112
29	0	0	0	111	387	281	332	349	86	64	0	90
30	0		0	145	579	262	232	404	49	0	0	0
31	0		0		749		267	348		0		33
Mean	18.0	13.7	5.5	46.2	295	353	255	319	359	31.9	15.6	26.4
Runoff in Ac. Ft.	1105	785	339	2749	18120	21010	15710	19600	21390	1960	926	1624

NOTE: This is the drainage from Reclamation District 108 discharged to the Sacramento River at Mile 44.0 Right. Additional drainage from Reclamation District 108 is sometimes discharged to Back Borrow Pit at Mile 20.2 Left.

TABLE 41

FLOW OF COLUSA TROUGH AT COLUSA-WILLIAMS HIGHWAY*- 1948 297,319 water year

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	78	64	44	145	270	1688	499	541	744	587	313	184
2	74	66	51	142	458	1667	440	541	737	493	395	241
3	85	62	54	151	417	1507	433	539	750	446	322	227
4	96	62	52	169	251	1489	438	537	761	457	283	167
5	153	62	231	193	138	1708	465	598	748	419	262	121
6	197	66	179	154	76	1849	516	625	773	366	246	105
7	193	66	178	526	54	1903	511	623	759	298	283	119
8	191	66	237	495	96	1849	543	659	778	254	260	127
9	172	68	268	436	127	1609	560	697	824	218	235	134
10	174	69	281	408	151	1273	566	691	866	239	271	103
11	157	69	303	398	85	1144	568	710	887	309	296	73
12	112	71	319	341	88	1009	554	712	906	414	281	52
13	93	73	340	446	114	887	528	729	891	305	298	59
14	88	73	345	427	146	755	501	737	891	212	349	59
15	88	62	357	807	216	695	501	790	940	241	397	66
16	86	62	395	1423	227	651	493	740	936	302	431	59
17	85	62	414	1412	218	659	484	697	1024	208	366	69
18	83	49	395	1044	388	664	473	701	1119	207	345	57
19	81	41	357	949	484	628	465	710	1183	210	300	46
20	78	41	294	883	578	594	455	704	1231	246	303	44
21	78	48	237	807	777	600	448	682	1221	256	288	28
22	76	49	199	731	801	488	438	697	1209	245	262	28
23	74	49	370	693	806	404	433	706	1133	260	252	38
24	76	41	547	617	670	359	429	723	1087	300	246	41
25	78	41	503	503	649	379	435	721	1037	296	237	86
26	76	25	427	389	607	402	493	750	965	275	233	205
27	69	22	199	313	607	412	512	723	858	275	229	678
28	73	40	180	218	611	414	577	716	790	279	241	771
29	78	48	176	237	624	423	503	754	725	284	233	552
30	69		176	237	1002	473	469	746	560	290	214	465
31	64		161		1503		528	731		294		412
Mean	102	56	267	523	427	953	492	684	911	306	289	175
Runoff in Ac. Ft.	6298	3207	16402	31129	26259	56692	30264	42110	54215	18813	17199	10743

* Also known as Colusa Trough at Highway 20 and Colusa Trough at Tahoe Ukiah Highway.

NOTE: This station is operated by State Division of Water Resources with cooperation by U. S. Bureau of Reclamation. 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, Maxwell and Jacinto Irrigation Districts. Flow reaches Sacramento River via Back Borrow Pit, (See Table 44).

TABLE 42

FLOW OF COLUSA TROUGH (BACK BORROW PIT)NEAR COLLEGE CITY - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	82	72	48	380	640	1927	550	566	872	e640	428	309
2	85	72	61	313	800	2027	473	563	875	e580	521	330
3	96	69	77	243	919	2013	440	539	868	e530	500	351
4	112	64	49	278	804	1974	476	524	878	e530	431	304
5	149	75	182	415	698	2041	506	584	868	e500	393	241
6	198	82	361	548	600	2118	548	661	885	e450	372	185
7	216	80	265	612	514	2185	575	678	916	e380	393	150
8	214	75	283	657	476	2214	578	722	919	e290	390	157
9	196	72	312	790	506	2189	563	783	933	e260	369	167
10	194	74	340	970	530	2057	590	793	1008	e280	372	148
11	196	71	369	916	497	1873	641	776	1059	e350	390	136
12	174	66	377	889	440	1707	622	797	1123	e450	346	89
13	159	69	396	811	410	1538	587	804	1130	e350	317	90
14	155	90	458	667	382	1293	494	783	1130	e250	372	92
15	136	90	491	971	399	1027	661	824	1164	e290	467	101
16	111	90	464	1642	443	868	440	838	1195	e350	530	96
17	109	94	354	1820	452	831	396	742	1222	e250	509	99
18	107	87	295	1722	548	834	419	739	1358	e250	464	105
19	99	53	223	1396	767	807	402	831	1453	e250	428	80
20	94	50	174	1149	879	749	385	770	e1450	278	425	79
21	92	55	186	1021	1063	732	428	770	e1440	291	419	55
22	90	83	290	924	1157	607	410	749	e1420	281	393	26
23	89	61	229	809	1184	413	422	766	e1350	325	366	36
24	85	77	605	776	1034	364	422	776	e1200	393	366	53
25	87	58	834	742	943	388	396	804	e1180	422	356	85
26	82	52	763	702	943	384	452	817	e1160	390	366	157
27	75	18	695	632	950	446	491	831	e1000	325	346	527
28	71	22	668	578	967	458	559	797	e900	248	312	848
29	85	53	654	686	987	473	634	848	e860	253	273	606
30	79		637	679	1214	511	506	855	e600	288	301	479
31	72		469		1698		518	861		393		396
Mean	122	68	374	825	769	1235	503	748	1080	359	397	212
Runoff in Ac. Ft.	7515	3915	23026	49068	47294	73485	30911	45999	64297	22051	23633	13045

NOTE: U. S. Bureau of Reclamation station located on Back Borrow Pit at Mile 22.7. Records for 1948 were compiled by Bureau. Subsequent to October 1, 1948, station was maintained and operated by the Division of Water Resources.

e Estimated.

TABLE 43

FLOW OF KNIGHTS LANDING RIDGE CUT - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0		0	69	472	1395	0	1.2	7.9			0
2	0		0	7.7	530	1560	0	2.1	7.7			0
3	0		0	0	643	1617	0	1.2	4.2			0
4	0		0	3.2	608	1632	0	0.7	1.4			0
5	0		0	70	525	1745	0	2.1	0			0
6	1.5		0	310	445	1810	0	5.2	0.9			0
7	21		0	450	369	1865	0	7.7	4.8			0
8	49		0	472	285	1895	0	11	6.1			0
9	77		12	540	296	1915	0	16	6.5			0
10	100		24	717	314	1860	0.7	14	7.0			0
11	128		23	725	296	1710	3.7	9.1	3.3			0
12	147	N	12	696	235	1510	3.7	6.1	5.0	N	N	0
13	152	O	7	660	200	1255	3.3	2.8	6.1	O	O	0
14	158		0	557	146	846	0.7	1.8	8.2			0
15	117		0	595	138	700	0	1.4	5.6			0
16	60		0	1020	149	251	0	3.8	0.5			0
17	28	F	0	1305	190	91	0	2.2	2.2	F	F	0
18	12	L	0	1420	255	47	0	1.4	7.0	L	L	0
19	0	O	0	1305	426	27	0	6.1	21.0	O	O	0
20	0	W	0	1065	545	11	0	5.6	24.0	W	W	0
21	0		0	815	643	3.2	0.7	3.3	4.8			0
22	0		0	717	767	0	1.6	1.4	0			0
23	0		0	622	717	0	0.9	1.4	0			0
24	0		0	566	500	0	2.2	2.1	0			0
25	0		227	545	404	0	0	3.3	0			0
26	0		610	512	462	0	0.9	4.3	0			0
27	0		580	452	575	0	3.3	4.8	0			0
28	0		540	401	650	0	5.2	3.8	0			0
29	0		525	393	645	0	9.1	4.2	0			15
30	0		472	475	679	0	4.8	7.0	0			8.9
31	0		215		1020		0.9	7.4				0
Mean	33.9	0	105	583	456	792	1.3	4.6	4.5	0	0	0.8
Runoff in Ac. Ft.	2083	0	6440	34680	28020	47100	83	286	266	0	0	47

NOTE: Knights Landing Ridge Cut diverts water from the Back Borrow Pit of Reclamation District 108 at a point above the Outfall Gates, into the Yolo By-Pass above Elkhorn. Winter flows are uncontrolled. Summer flows for irrigation are controlled at the Outfall Gates and at the junction with Yolo By-Pass by weir boards and gates. Station has been operated cooperatively since 1941 by the Division of Water Resources and the U. S. Geological Survey. It is located 0.4 miles above Knights Landing Outfall Gates.

TABLE 44

FLOW OF COLUSA BASIN DRAINAGE TO SACRAMENTO RIVER AT KNIGHTS LANDING - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	148	135	12	495	0	0	361	381	651	643	455	410
2	118	66	12	437	0	0	361	390	702	583	535	354
3	165	3	12	512	0	280	285	364	230	498	555	390
4	0	3	12	0	0	175	301	354	642	457	445	380
5	0	4	12	0	0	0	319	391	610	463	405	300
6	0	5	12	0	0	0	352	464	626	424	410	308
7	0	5	12	0	0	0	433	518	640	361	445	198
8	0	6	23	0	0	0	433	580	666	340	455	184
9	0	6	118	0	0	0	439	635	685	248	455	178
10	0	7	185	0	0	0	451	730	760	195	460	195
11	0	7	179	0	0	0	526	660	749	195	475	213
12	0	8	122	0	0	0	526	690	783	284	470	167
13	0	8	318	0	0	0	521	628	808	332	450	178
14	0	9	365	0	0	280	451	636	841	275	434	117
15	585	9	355	0	0	823	342	631	930	183	484	0
16	510	10	328	0	0	541	290	736	942	203	560	166
17	386	10	315	0	0	600	270	736	987	255	615	208
18	347	11	233	0	0	637	270	588	1100	433	556	188
19	287	11	220	0	0	673	248	714	1270	505	513	180
20	253	11	165	0	0	800	256	718	1490	425	510	149
21	200	12	112	0	0	1020	283	658	1550	390	490	188
22	192	12	155	0	0	850	304	592	1340	383	495	110
23	169	12	208	0	105	400	288	592	1340	380	490	101
24	140	12	416	0	408	196	325	627	1310	434	475	92
25	158	12	0	0	364	368	265	657	1320	490	475	105
26	164	12	0	0	105	364	288	688	1320	510	460	140
27	139	12	0	0	0	248	350	718	1140	494	465	215
28	138	12	0	0	0	360	399	698	991	410	445	435
29	141	12	0	0	0	317	465	718	838	360	420	565
30	143		0	0	280	326	428	718	733	350	390	0
31	135		466		0		471	718		394		0
Mean	146	15.2	141	48.1	40.7	309	365	611	933	383	476	207
Runoff in Ac. Ft.	8961	877	8662	2864	2503	18360	22420	37540	55540	23600	28350	12720

NOTE: This is the drainage from Colusa Basin passing down the Back Borrow Pit of Reclamation Districts 108 and 787 and entering the Sacramento River at Mile 34.15R, just above the Knights Landing gaging station. It does not include any drainage from Reclamation District 787 entering the Back Borrow Pit via Sycamore Slough outlet (See Table 45 for Sycamore Slough contribution). Irregularities in the flow are due to checking operations at the Knights Landing Outfall Gates whereby a portion of the flow of the Back Borrow Pit is diverted to the Knights Landing Ridge Cut. This diversion is shown in Table 43. Total flow to Sacramento River is sum of Tables 44 and 45. This is a Division of Water Resources station.

TABLE 45

FLOW OF SYCAMORE SLOUGH INTO COLUSA BASIN DRAIN - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1							0	26	23	23	20	1
2							0	26	23	23	20	0
3							0	26	23	23	20	0
4							0	26	23	23	20	1
5							0	26	23	23	20	0
6							2	26	23	23	20	0
7							2	26	23	23	20	1
8							3	26	23	23	15	0
9							5	26	23	23	15	0
10							5	26	23	23	15	1
11							5	25	23	23	15	0
12	N	N	N	N	N	N	5	25	23	23	15	0
13	O	O	O	O	O	O	25	25	23	23	15	1
14							25	25	23	23	15	0
15							25	25	23	23	15	0
16							25	25	23	20	0	1
17	F	F	F	F	F	F	25	25	23	20	0	0
18	L	L	L	L	L	L	26	25	23	20	0	0
19	O	O	O	O	O	O	26	25	23	20	0	1
20	W	W	W	W	W	W	26	25	23	20	0	0
21							26	24	23	20	0	0
22							26	24	23	20	0	1
23							27	24	23	20	0	0
24							27	24	23	20	0	0
25							27	24	23	20	0	1
26							27	24	23	20	0	0
27							27	24	23	20	0	0
28							27	24	23	20	0	1
29							27	24	23	20	0	0
30							27	24	23	20	0	0
31							27	24		20		1
Mean	0	0	0	0	0	0	16.9	25.0	23.0	21.5	8.7	0.4
Runoff in Ac. Ft.	0	0	0	0	0	0	1041	1535	1368	1319	516	22

NOTE: Flow and leakage estimated from observations and measurements made during 1948. This water is discharged below Outfall Gates and is not included in the flow shown in Table 44. A drainage pumping plant, operating on a float switch, was installed at this location, and was in operation during November and December.

TABLE 46

FLOW OVER FREMONT WEIR FROM SACRAMENTO RIVER TO YOLO BY-PASS - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				0	12200							
2				0	17500							
3				0	17500							
4				0	16100							
5				0	12200							
6				0	10900							
7				0	10900							
8				0	10900							
9				0	8400							
10				0	1200							
11				0	0							
12	N	N	N	0	0	N	N	N	N	N	N	N
13	0	0	0	0	0	0	0	0	0	0	0	0
14				0	0							
15				0	0							
16				0	0							
17	F	F	F	0	0	F	F	F	F	F	F	F
18	L	L	L	17500	0	L	L	L	L	L	L	L
19	0	0	0	33400	0	0	0	0	0	0	0	0
20	W	W	W	28700	0	W	W	W	W	W	W	W
21				18800	0							
22				10900	0							
23				9700	0							
24				13500	0							
25				14800	0							
26				9700	0							
27				3500	0							
28				2300	0							
29				1200	0							
30				2300	0							
31					0							
Mean	0	0	0	5540	3800	0	0	0	0	0	0	0
Runoff in Ac. Ft.	0	0	0	329800	233600	0	0	0	0	0	0	0

NOTE: Station is located on Sacramento River at Mile 23.0R. Elevation of crest is 33.5 U.S.E.D. datum; length is 9120 feet.

TABLE 47

FLOW OF BUTTE SLOUGH TO SUTTER BY-PASS - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	161	37	171	1090	7800	935	127	182	205	35	21	75
2	222	35	150	870	10100	970	164	203	210	32	23	80
3	234	31	156	764	9250	982	167	207	165	33	32	79
4	257	27	139	803	7800	992	160	201	177	35	49	92
5	297	27	128	957	6300	1018	165	207	206	35	42	92
6	468	33	143	1230	5000	1060	164	218	190	32	36	98
7	788	34	101	1120	3930	1120	185	213	168	32	31	120
8	986	33	132	1050	3220	1166	190	202	158	30	47	133
9	1110	31	108	1090	7710	1190	170	198	153	21	37	107
10	1220	28	141	1350	2400	1193	180	217	152	15	33	107
11	1330	30	145	1420	2170	1199	182	214	139	13	30	85
12	1150	29	155	1480	1970	1193	207	225	118	13	30	66
13	889	28	119	1600	1810	1125	210	221	116	16	27	48
14	702	28	132	1640	1690	990	190	210	62	44	26	57
15	577	29	165	1720	1550	848	180	196	45	52	25	87
16	473	31	132	1990	1350	761	168	207	36	21	26	102
17	352	31	156	3800	808	734	150	222	30	16	29	96
18	251	28	328	4900	810	727	129	228	33	13	28	74
19	200	26	313	4680	908	695	154	207	36	14	26	73
20	164	25	248	4200	885	677	160	200	36	14	26	78
21	136	25	246	3650	838	641	175	232	36	29	24	78
22	110	25	188	3280	810	462	200	229	34	29	17	75
23	99	26	161	3030	776	359	204	205	37	31	16	69
24	86	36	430	2820	710	367	203	208	45	25	17	68
25	74	97	1580	2670	660	345	170	212	49	25	29	74
26	67	148	4450	2530	641	318	180	225	50	23	35	104
27	54	141	4500	2370	659	292	184	221	55	24	40	150
28	50	71	3620	2250	680	274	210	218	51	22	42	228
29	46	101	2650	2130	730	262	200	226	46	17	47	303
30	43		1800	2640	830	212	190	201	42	14	62	290
31	38		1350		920		182	191		15		239
Mean	408	43.8	782	2171	2770	770	177	211	96.0	24.8	31.8	110
Runoff in Ac. Ft.	25060	2520	48100	129200	170000	45830	10910	12980	5712	1530	1890	6797

NOTE: This is discharge from Butte Slough to Sutter By-Pass. During low flow periods gates at head of Slough are regulated (Table 37) which forces water under Long Bridge as shown in this table. Normal summer flows are primarily from Feather River sources. During flood periods Sacramento River water enters Butte Basin above Butte City by bank spill and over Moulton and Colusa weirs. The purpose of the summer regulation is to make water available for use on Sutter By-Pass lands (below Long Bridge) and Butte Slough Irrigation Company in R.D. 70. This station is maintained and operated by the Division of Water Resources.

TABLE 48

FLOW OF WADSWORTH CANAL TO SUTTER BY-PASS - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	18	14	2.4	65	38	210	90	78	118	133	96	22
2	19	15	2.4	64	33	230	99	71	118	136	83	22
3	18	15	2.4	62	30	228	96	66	128	148	71	21
4	18	16	2.1	50	27	202	118	73	128	163	42	20
5	18	17	0.6	58	26	263	130	78	118	145	36	20
6	18	19	0	46	16	243	130	92	133	118	37	20
7	21	18	0	29	75	219	135	96	123	106	37	20
8	28	17	0	30	69	219	138	122	133	108	55	20
9	24	19	1.5	62	78	213	136	120	128	90	81	20
10	24	17	0.3	62	82	217	147	114	126	99	95	18
11	24	18	0	44	62	193	136	108	131	115	95	18
12	24	19	0.6	36	64	156	111	112	138	108	94	18
13	24	9.5	3.6	34	86	150	92	98	128	88	99	18
14	24	27	4.8	35	69	125	92	114	120	89	85	18
15	23	30	4.2	71	41	128	109	122	118	99	81	18
16	22	31	6.6	83	49	153	105	106	145	89	84	16
17	20	31	19	94	64	151	81	109	190	81	59	6.7
18	21	31	13	62	82	142	86	117	197	81	36	8.4
19	20	31	12	49	101	135	89	114	210	66	32	8.4
20	20	32	12	43	151	131	95	112	186	62	30	8.4
21	19	32	12	39	172	147	101	101	140	69	29	8.4
22	18	32	12	39	175	135	105	98	142	82	28	2.4
23	18	30	19	36	170	104	88	112	151	78	27	0
24	18	16	67	32	145	88	84	96	165	64	26	15
25	18	0	39	30	136	89	105	126	151	44	26	0
26	10	1.5	27	29	140	99	125	115	172	44	26	8.4
27	13	2.4	23	36	158	111	101	122	121	52	25	32
28	15	3.0	26	32	145	122	84	114	128	61	24	27
29	15	4.2	30	36	117	112	78	126	118	66	23	23
30	13		29	41	193	112	81	122	118	78	21	24
31	14		34		245		78	128		92		22
Mean	19.3	18.9	13.1	47.6	98.0	161	105	106	141	92.1	52.8	16.2
Runoff in Ac. Ft.	1188	1086	804	2834	6028	9574	6436	6510	8374	5661	3140	998

NOTE: This is the discharge (measured at Weir #4) to the East Borrow Pit of the Sutter By-Pass at Mile 16.0 (north from Chandler). This flow is made up entirely of Feather River drainage or return flows. This flow and flow from Butte Slough (Table 47) makes up the entire Feather River contribution to the Sutter By-Pass. See footnote Table 47. This station is maintained and operated by the Division of Water Resources.

TABLE 49

FLOW OF RECLAMATION DISTRICT 1500 DRAIN - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	20	0	0	27	111	951	516	530	562	468	0	0
2	0	0	0	0	277	336	411	488	561	437	0	0
3	28	0	0	105	258	402	449	495	561	288	48	43
4	0	0	0	29	201	414	464	561	493	370	40	119
5	39	0	0	65	0	431	443	452	537	318	30	118
6	0	111	0	18	117	1226	510	544	470	318	40	115
7	100	65	0	23	251	608	531	434	539	269	45	113
8	0	0	0	38	0	599	497	514	537	306	28	0
9	0	0	0	41	477	454	574	457	536	189	0	106
10	128	0	0	59	116	341	497	537	535	212	0	98
11	0	108	0	100	253	372	597	472	534	210	0	42
12	38	0	0	132	320	566	528	483	530	208	0	31
13	252	0	0	114	315	539	489	537	530	198	0	52
14	72	0	0	89	225	358	466	520	531	190	0	31
15	143	33	0	88	174	371	422	485	577	125	0	58
16	6.4	62	0	80	413	565	425	512	583	50	0	29
17	13	0	0	63	313	371	425	463	586	55	0	93
18	19	0	40	158	375	444	417	536	597	121	0	11
19	88	0	120	63	464	440	394	541	627	156	0	80
20	0	0	40	124	646	542	472	548	628	163	0	16
21	35	0	70	123	543	485	472	549	562	78	0	53
22	30	0	55	123	373	397	456	550	592	66	0	33
23	20	0	45	122	834	417	422	550	422	68	0	0
24	3.5	0	234	64	478	358	440	540	568	67	0	0
25	0	0	181	250	406	351	417	550	504	80	0	32
26	0	0	0	113	416	564	336	552	591	38	0	136
27	0	0	0	121	424	557	436	542	499	66	0	204
28	24	0	0	165	427	541	424	565	494	6.4	0	111
29	21	0	64	187	314	463	361	564	494	0	0	96
30	0		0	180	657	480	452	563	490	0	0	101
31	0		48		973		444	562		0		147
Mean	34.8	13.1	28.9	95.5	360	498	458	522	542	165	7.7	66.7
Runoff in Ac. Ft.	2141	752	1779	5681	22120	29640	28140	32120	32270	10160	458	4102

NOTE: This is the drainage from Reclamation District 1500 discharged to West Borrow Pit of Sutter By-Pass and thence via Sacramento Slough (in the By-Pass) to Sacramento River. (Table 50.)

TABLE 50

FLOW OF SACRAMENTO SLOUGH TO SACRAMENTO RIVER - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	422	0	0			933	627	872	906	795	140	0
2	460	0	186			1710	595	835	889	824	111	0
3	0	0	0			1120	768	728	849	788	80	0
4	0	0	0	N	N	816	821	828	866	760	82	0
5	0	0	0	O	O	1160	813	790	897	720	184	0
6	0	0	0			848	811	858	860	711	180	0
7	0	0	0	R	R	1110	857	815	872	687	146	46
8	0	0	0	E	E	581	839	868	884	631	172	0
9	0	130	0	C	C	1770	875	816	880	612	201	0
10	0	0	0	O	O	1790	908	878	872	538	141	152
11	0	0	0	R	R	2180	952	890	867	495	141	0
12	4370	174	0	D	D	2370	862	817	867	307	357	115
13	4110	66	0			2190	843	854	883	286	168	171
14	3000	64	0	S	S	2160	863	856	898	557	328	0
15	1750	118	0	L	L	1890	843	825	871	497	348	0
16	1150	0	0	O	O	1600	873	841	872	258	0	90
17	965	0	0	U	U	1600	900	756	903	201	0	156
18	859	0	43	G	G	1600	905	842	876	171	0	0
19	836	0	0	H	H	1260	906	825	965	333	294	120
20	760	0	55			1320	882	849	835	380	174	148
21	516	0	61	F	F	1330	887	861	938	223	204	46
22	576	0	64	L	L	1290	868	866	973	165	229	207
23	366	0	51	O	O	1240	840	854	964	108	0	144
24	213	0	0	O	O	1090	869	832	885	137	0	143
25	0	0	0	D	D	1060	884	844	884	225	0	45
26	0	0	883	E	E	993	705	827	855	166	0	231
27	0	0	2790	D	D	996	683	791	871	225	0	115
28	0	0	4350			986	744	877	867	108	0	0
29	0	0	4900			979	734	893	894	108	0	128
30	0		4560			995	736	898	858	166	0	326
31	0		3580				769	879		226		318
Mean	656	19.0	694			1366	821	840	887	400	123	87.1
Runoff in Ac. Ft.	40360	1095	42690			81260	50500	51640	52760	24610	7299	5357

NOTE: This is the discharge to the Sacramento River at Mile 21.2L via Sacramento Slough. This is the entire outflow of the Sutter By-Pass area and R.D. 1500. During high water periods the slough is entirely submerged as it lies within the By-Pass area. Sharp rises in river elevation will cause zero or negative flow. See Tables 38, 47, 48 and 49, which, when combined, will give the measured flow entering the By-Pass area. This station is operated by the Division of Water Resources.

TABLE 51

FLOW OF FEATHER RIVER NEAR OROVILLE - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1580	2270	2530	5470	12600	8900	3550	1980	1760	2090	2940	1700
2	5950	2670	2680	6220	11300	9270	3440	1940	1720	2050	4410	1660
3	5920	2780	2750	7960	10900	9800	3220	1950	1730	1970	3310	2040
4	9220	2930	2650	7290	10800	9360	3060	1950	1700	2060	2760	1840
5	17500	2900	2590	6730	11600	10200	2820	1930	1700	2340	2070	2060
6	12200	2850	2560	6410	13300	9270	2950	1910	1690	2360	1730	2300
7	21000	2570	2150	5750	14700	9280	2960	1900	1690	2380	1400	2180
8	20300	2220	2340	5580	12600	9080	2850	1910	1680	2360	1880	2340
9	10800	2590	2330	15100	11000	9980	2740	1900	1700	2350	1840	1880
10	7280	2770	2180	17900	10200	9300	2370	1880	1700	2260	2160	1800
11	5890	2480	2200	13600	10000	8610	2370	1860	1660	2350	1780	1400
12	5070	2600	2270	11100	10200	8330	2440	1850	1660	2380	1980	1660
13	4550	2460	3260	9630	10800	8000	2370	1840	1650	2380	1580	4840
14	4000	2400	3420	10600	11600	7830	2350	1840	1650	2400	1320	3120
15	3770	2640	2540	18200	11000	7760	2320	1810	1650	2420	2300	2420
16	3550	2930	2820	19800	11400	7440	2280	1800	1680	2330	2300	2420
17	3090	3050	2920	31100	13600	7080	2250	1810	1660	2320	2350	2500
18	2660	2900	2480	25100	12800	6310	2200	1800	1600	2100	2100	1420
19	2700	2870	3090	19600	11300	5640	2150	1800	1680	2210	2000	1320
20	2990	2810	2520	17600	10700	5290	2140	1800	1710	2220	1690	1760
21	2810	2320	2280	16400	9980	5250	2120	1790	1740	2260	1300	1570
22	2790	2700	2210	18200	8710	4520	2130	1790	1680	2320	1880	1500
23	2720	2600	8260	17200	9080	4330	2140	1800	1790	2330	1860	1460
24	2510	2920	13800	15000	10400	4020	2120	1800	1860	2060	1900	1100
25	2240	2980	8430	13800	11500	3970	2110	1790	1930	2260	1470	1140
26	2330	2870	5800	13700	11800	3830	2100	1780	1960	2320	1700	1220
27	2400	2860	5000	13900	11800	3530	2120	1770	2160	2300	1400	1900
28	2480	3040	4780	15000	10600	3490	2060	1760	2020	2290	950	1580
29	2780	2800	4620	14300	8910	3880	2010	1790	2080	2340	1560	1420
30	2830		5150	14200	10500	3680	1990	1760	2140	2440	1850	1440
31	2370		5470		9710		1980	1750		2230		1430
Mean	5751	2717	3809	13750	11140	6908	2442	1840	1768	2274	1992	1885
Runoff in Ac. Ft.	353600	156300	234200	818100	685100	411000	150200	113100	105200	139800	118600	115900

NOTE: This is a permanent station maintained throughout the year under Federal-State cooperation by the Water Resources Branch of the U. S. Geological Survey. It is located at highway crossing about 4.5 miles above Oroville on right bank, at Mile 71.0.

TABLE 52

FLOW OF FEATHER RIVER NEAR GRIDLEY - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1780	2380	2600	4930	10600	6600	1380	75	93	1490	1890	1740
2	2730	2500	2630	5180	11300	6720	1340	68	95	1380	3520	1590
3	6390	2670	2650	7170	10600	7280	1220	68	75	1510	2680	1920
4	6840	2690	2560	6860	10400	6980	1060	63	70	1350	2550	1840
5	17100	2820	2460	6600	10900	7530	860	62	68	1700	1900	1880
6	13100	2780	2570	6110	12200	7000	840	65	68	1800	1550	2220
7	15300	2640	2340	5520	13800	5690	845	75	63	1840	1190	2000
8	23200	2260	2130	5010	12400	6730	800	77	62	1840	1280	2300
9	12400	2380	2330	10990	10600	7140	640	82	70	1840	1590	2020
10	8410	2630	2140	18100	9420	7060	515	68	62	1770	1690	1780
11	6260	2460	2160	14400	9170	6310	370	60	77	1790	1550	1650
12	5020	2470	2230	11500	9170	6190	395	62	75	1840	1580	1150
13	4490	2370	2690	9860	9240	5620	455	60	86	1820	1410	3200
14	3980	2460	3410	9350	10060	5470	340	52	90	1850	1640	3280
15	3620	2480	2550	15600	9430	5340	325	51	80	1940	1450	2420
16	3460	2780	2350	18500	9440	5130	300	52	115	1860	2140	2250
17	3150	2950	2890	25750	10600	4860	245	52	235	1830	2250	2410
18	2700	2830	2460	25900	11400	4280	220	52	320	1680	2050	1750
19	2480	2730	2690	20800	9590	3680	180	52	375	1540	1980	1400
20	2850	2700	2440	18500	9050	3040	140	52	515	1550	1780	1470
21	2820	2380	2160	16600	8460	3020	95	50	710	1630	1500	1630
22	2710	2540	2130	18000	7380	2550	90	45	785	1630	1550	1520
23	2710	2520	3800	17800	7140	2180	90	55	1010	1790	1840	1460
24	2560	2760	14600	15720	7930	1940	90	57	1060	1680	1820	1310
25	2440	2880	9270	14200	9020	1570	87	58	1130	1540	1710	1180
26	2320	2880	6260	13500	9550	1580	95	60	1120	1640	1590	1190
27	2440	2810	4960	13320	9500	1450	125	62	1130	1640	1550	1750
28	2440	2930	4510	14400	8530	1250	130	55	1260	1640	2150	1680
29	2730	2820	4360	14600	6850	1500	100	51	1360	1700	1190	1500
30	2830		4490	14100	7370	1550	90	82	1400	1910	1750	1410
31	2460		3600		7760		90	90		1910		1500
Mean	5603	2638	3562	13295	9641	4575	437	61.7	455	1707	1811	1819
Runoff in Ac. Ft.	344600	151700	219000	791200	592800	272200	26900	3790	27100	105000	107700	111900

NOTE: Station is maintained and operated by the Division of Water Resources. It is located at Gridley Bridge, Mile 49.7 above mouth.

TABLE 53

FLOW OF FEATHER RIVER AT YUBA CITY (5TH ST. BRIDGE) - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1960	2810	3020	5610	14200	7950	1400	224	182	1800	1820	1960
2	2060	2720	2900	5820	12200	7800	1310	222	184	1850	3320	1910
3	5960	3060	2910	7770	11000	8550	1250	203	191	1820	3470	1990
4	4720	4000	2900	8650	10400	8800	1140	191	195	1730	3140	2220
5	11580	3270	2890	8780	10600	8900	1020	201	170	1850	2730	2040
6	14600	3300	2860	8120	11500	8150	856	199	180	2120	2350	2370
7	13200	3290	2830	7310	22100	7900	875	208	180	2120	2000	2430
8	21100	3060	2470	6260	13700	8100	848	212	172	2110	1680	2470
9	21500	2850	2700	8540	11800	8350	780	228	171	2100	1940	2500
10	12400	3220	2580	16900	10200	8750	650	215	177	2030	2040	2160
11	8220	3150	2520	18600	9450	7800	583	189	178	1970	2140	2060
12	6200	2960	2500	13800	9350	7200	537	182	177	2050	1780	1620
13	5320	2940	2780	10400	9450	6700	526	184	193	2180	1980	2580
14	4720	2880	3870	9000	10700	6200	491	174	180	2180	1500	2070
15	4280	2860	3860	10700	10500	5900	460	186	189	2230	1390	3120
16	4050	3000	3470	15600	10400	5600	448	201	189	2190	2300	2600
17	3870	3200	4310	23000	11100	5200	425	178	252	2110	2470	2600
18	3500	3190	3860	30800	12200	4650	390	171	420	2000	2430	2600
19	3180	3120	3600	26600	11200	4220	372	171	531	1680	2320	1820
20	3330	3060	3620	21200	10300	3770	330	176	715	1620	2190	1560
21	3420	3020	3140	18400	9650	3580	304	188	985	1730	1890	1920
22	3300	2830	2840	18400	8550	3300	272	184	1220	1730	1660	1710
23	3290	3020	2910	19100	7750	2700	263	180	1180	1810	2000	1640
24	3240	2960	11500	17600	8400	2400	260	177	1470	1950	2060	1510
25	3060	3170	14200	15000	9650	2100	265	174	1470	1550	2070	1200
26	2790	3170	9080	13600	10800	1890	277	174	1520	1690	1680	1230
27	2940	3120	6270	13200	11100	1810	265	177	1500	1690	1880	1640
28	2920	3160	5420	14100	10300	1530	249	184	1550	1740	1570	2640
29	3020	3250	5140	14800	8550	1470	247	188	1720	1760	1190	2050
30	3210		5000	14600	7650	1550	217	174	1740	1990	1730	1710
31	3120		5520		9150		224	180		2040		1620
Mean	6131	3091	4305	14080	10770	5427	566	190	639	1917	2091	2050
Runoff in Ac. Ft.	377000	177800	264700	837500	662300	322900	34800	11690	38040	117900	124400	126100

NOTE: This station is maintained and operated by the Division of Water Resources. It is located at Yuba City-Marysville (5th Street) Bridge, Mile 28.0 above mouth. Backwater from the Yuba River at times affects the stage-discharge relationship of this station.

TABLE 54

FLOW OF FEATHER RIVER BELOW SHANGHAI BEND - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2100	3750	4200	8200	21500	e13300	2060	400	350	2180	2380	2260
2	2100	3540	3950	8450	18000	12400	2180	405	350	2250	3680	2250
3	4260	4010	3950	10800	16900	14100	2450	385	355	2160	4180	2320
4	6650	4150	3900	12100	16200	15000	2320	360	330	2180	3720	2620
5	9200	4320	3820	12500	16700	14800	2050	400	300	2220	3300	2480
6	16400	4420	3720	11500	18300	13900	1870	400	335	2500	2850	2730
7	17200	4450	3680	10600	21000	12700	1850	400	350	2500	2500	2980
8	31000	4120	3320	9260	21900	13700	1780	400	350	2480	2180	2960
9	30400	3850	3500	11400	17900	13900	1650	415	385	2480	2420	3120
10	17600	4420	3420	25300	15800	14900	1400	385	430	2420	2480	2660
11	12000	4350	3300	28800	14800	13400	1250	360	425	2400	2540	2500
12	9400	4000	3300	22000	14700	12200	1160	340	355	2510	2120	2090
13	8050	3950	3620	16800	15100	11700	1100	345	365	2610	2250	2680
14	7150	3850	5450	14500	17100	10600	1020	340	355	2620	1910	4950
15	6450	3800	5850	16100	17000	10000	920	340	470	2720	1720	4070
16	5600	3980	5050	22700	16200	9350	910	380	470	2680	2500	3550
17	5500	4250	6500	34400	17800	8640	875	360	660	2610	2920	3500
18	5000	4250	5850	47200	19900	7820	750	360	1050	2510	2880	3720
19	4550	4150	5180	42400	17900	7150	695	355	1200	2220	2730	2950
20	4600	4170	5470	33400	16200	6620	620	350	1400	2160	2610	2620
21	4680	4120	4570	28700	15700	6150	600	360	1700	2260	2280	2880
22	4560	3850	4120	28700	14400	5750	565	350	1950	2270	1970	2720
23	4550	4170	4120	29900	13000	5200	555	355	1920	2300	2220	2630
24	4450	4150	13400	27600	13700	4600	535	345	2180	2480	2350	2480
25	4220	4400	18800	23300	16000	4220	535	335	2000	2100	2340	2170
26	3900	4340	12850	21100	17800	3850	535	350	1920	2180	2000	2180
27	4020	4280	9250	20300	17800	3600	515	360	1920	2160	2100	2590
28	4000	4300	8050	21700	17200	3380	450	380	2020	2400	1920	3720
29	4100	4400	7680	22800	14300	4500	450	455	2080	2420	1550	3070
30	4320		7400	22500	12900	e3520	410	365	2120	2680	1900	2660
31	4230		8020		15200		405	355		2550		2550
Mean	8137	4131	5977	21500	16740	9365	1112	371	1003	2394	2483	2860
Runoff in Ac. Ft.	500300	237600	367500	1279000	1029000	557300	68360	22790	59690	147200	147800	175900

e Month of June estimated.

NOTE: This station is maintained by the Division of Water Resources. It is located on the right bank at Mile 23.0 above mouth. Station is rated above 25000 c.f.s. by means of simultaneous measurements of Yuba River and Feather River at Marysville with appropriate time lag between Marysville and Shanghai Bend.

TABLE 55

FLOW OF FEATHER RIVER AT NICOLAUS - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2500	3820	4140	8780	23500	14600	3030	312	268	1830	2380	2130
2	2240	3570	3890	8720	21200	13500	2790	308	268	1890	2860	2160
3	5920	4040	3850	10500	19600	14400	2720	281	276	1860	4150	2140
4	7240	4240	3840	13000	17800	15300	2590	250	281	1940	3580	2450
5	10400	4640	3750	14100	17600	15400	2330	254	254	1860	3400	2390
6	17600	4880	3670	13600	18600	14900	2020	263	254	2110	2950	2660
7	17100	4980	3620	12600	20200	13900	1850	268	286	2180	2570	3000
8	23000	4690	3390	10900	22500	14500	1860	286	290	2140	2160	2910
9	27800	4340	3350	11400	21000	14600	1720	299	308	2140	2230	3180
10	22600	4980	3400	21600	18000	15200	1490	299	326	2120	2370	2770
11	15900	5060	3210	27500	16400	14500	1370	272	344	2120	2380	2460
12	11400	4500	3230	25300	15700	13100	1210	245	312	2180	2100	2150
13	8860	4320	3460	21300	15600	12500	1160	237	294	2280	2070	2130
14	7560	4170	4990	18000	16600	11400	1090	245	299	2340	1850	4830
15	6680	3990	5990	17200	17800	10800	986	245	344	2390	1610	4360
16	6110	4070	5480	21300	18000	10100	937	272	380	2450	2010	3660
17	6010	4330	6380	27000	18300	9340	895	272	420	2380	2630	3580
18	5610	4340	6460	38500	19600	8470	797	245	666	2360	2820	3980
19	5110	4200	5510	40200	19400	7720	727	241	832	2170	2680	3210
20	4600	4160	5890	34300	18100	7120	624	237	965	2040	2450	2770
21	4720	4070	4970	33800	17200	6760	570	233	1190	2060	2190	2790
22	4580	3810	4360	29000	15700	6360	540	237	1420	2130	1860	2800
23	4510	3990	4080	29800	14000	5600	504	245	1500	2130	1980	2680
24	4460	4150	11400	29300	14300	4910	486	237	1620	2270	2010	2500
25	4260	4240	20500	27100	15900	4460	470	237	1690	2090	2190	2280
26	4020	4300	16900	25200	17200	4080	470	237	1560	2090	1990	2210
27	3940	4210	12000	24100	18000	4020	465	254	1560	2160	1940	2640
28	3970	4230	9300	24200	17600	3640	400	263	1640	2220	1870	4020
29	3970	4330	8500	24800	15600	3190	362	308	1680	2280	1570	3440
30	4240		8400	25200	13800	3190	330	308	1760	2360	1610	2850
31	4280		8520		15200		312	263		2430		2630
Mean	8425	4298	6336	22280	17740	9919	1197	263	776	2161	2349	2895
Runoff in Ac. Ft.	518100	247200	389600	1326000	1091000	590200	73600	16170	48190	132900	139800	178000

NOTE: Station maintained jointly by Division of Water Resources and Water Resources Branch of the U. S. Geological Survey. It is located on left bank at Mile 9.3L above mouth.

TABLE 56

FLOW OF YUBA RIVER AT NARROWS DAM - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	225	449	950	2760	6020	4960	1470	415	370	295	495	465
2	575	730	830	2870	5480	6470	1450	410	410	295	710	475
3	725	764	784	4500	5390	7420	1470	420	397	295	710	445
4	1510	854	764	4240	5230	7660	1280	425	390	290	725	315
5	7340	900	753	3730	5770	6480	1100	445	410	285	725	305
6	4960	930	742	3730	6920	5160	1080	430	410	245	725	475
7	7980	900	730	3130	8140	6540	1040	405	423	225	725	570
8	12700	838	730	2790	6740	6720	999	405	468	225	725	525
9	5730	791	720	6030	5720	7100	955	405	487	225	510	470
10	3580	960	730	10400	5180	6910	920	405	390	225	375	570
11	2770	797	720	6790	4810	5650	890	405	360	250	305	300
12	2210	741	730	5010	5340	5830	880	420	355	290	310	300
13	1810	730	730	4210	6130	4840	773	420	400	290	310	570
14	1600	730	1080	4050	7940	4570	744	420	520	275	305	735
15	1410	730	1370	5300	6760	4170	731	400	480	245	465	735
16	1340	730	1420	7330	7860	3730	715	445	560	230	445	735
17	1210	730	1490	18100	8820	3110	625	460	720	230	475	826
18	1130	744	1340	12600	7340	3160	580	435	720	225	505	991
19	1070	822	1440	9080	6540	3290	525	405	715	195	475	935
20	1020	838	1260	8220	6200	3290	580	405	715	225	350	920
21	985	940	1180	8220	5600	2940	590	405	715	220	300	930
22	985	910	1160	9340	4760	2850	595	395	715	205	370	905
23	970	1150	1460	8660	5120	2550	570	385	715	180	375	735
24	950	1070	4000	7080	6580	2400	555	405	575	210	375	735
25	925	1010	3120	6360	7740	2340	555	445	300	365	300	735
26	890	970	2280	6510	8540	2530	515	425	300	355	350	730
27	890	960	2100	6920	8420	2200	450	420	415	445	315	735
28	880	982	2180	7460	6580	1930	420	420	295	425	315	735
29	880	970	2200	7040	5340	1720	400	400	295	475	450	740
30	880		2340	6730	5780	1580	415	390	295	150	440	740
31	767		2480		6280		420	370		155		735
Mean	2287	851	1414	6640	6422	4337	784	414	477	266	465	649
Runoff in Ac. Ft.	140600	48930	86940	395100	394800	258000	48180	25470	28400	16350	27700	39900

NOTE: This is a permanent station maintained throughout the year under Federal-State cooperation by the Water Resources Branch of the U. S. Geological Survey. For total flow of Yuba River near Smartville combine with flows in Table 57.

TABLE 57

FLOW OF DEER CREEK NEAR SMARTVILLE - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	34	21	24	55	154	120	24	6.3	3.0	7.4	26	3.9
2	408	19	23	63	115	115	16	6.6	3.8	8.7	36	3.8
3	303	19	22	215	100	99	14	6.3	5.0	6.6	59	22
4	252	22	20	460	92	84	19	5.9	5.4	5.0	24	18
5	267	26	20	288	83	82	24	5.4	5.2	5.0	30	55
6	148	48	19	316	70	78	16	5.2	5.2	5.0	30	55
7	1100	38	16	146	61	74	14	4.5	5.6	5.0	27	31
8	472	30	18	126	98	71	13	4.2	6.6	4.7	23	46
9	203	125	28	612	148	72	11	5.0	28	4.4	22	16
10	137	89	21	904	174	64	10	6.8	8.4	4.0	23	6.8
11	72	42	18	279	188	48	10	4.7	6.6	4.7	20	5.9
12	58	33	19	165	161	38	12	3.8	5.0	5.0	21	26
13	56	29	285	128	137	33	13	3.3	4.5	5.2	18	341
14	51	28	356	116	99	33	14	3.2	4.2	5.4	18	113
15	54	29	199	116	86	34	22	3.0	3.6	6.1	26	51
16	48	30	284	231	78	34	51	3.2	4.0	6.3	24	38
17	46	28	188	643	78	32	18	3.0	4.2	5.9	24	181
18	37	27	92	189	128	30	9.0	6.7	3.9	5.6	18	69
19	33	25	182	132	231	28	10	2.6	3.9	5.6	13	31
20	36	24	79	108	405	29	12	2.5	3.9	6.3	4.5	20
21	59	24	59	262	291	30	9.4	4.8	3.8	5.9	4.2	14
22	83	23	48	373	207	20	9.4	7.8	4.7	5.6	3.8	11
23	87	24	309	229	150	16	9.0	7.1	5.6	5.9	3.6	9.0
24	79	22	1260	140	125	7.1	14	6.1	6.3	5.4	3.4	8.4
25	31	21	376	105	118	14	14	6.1	6.8	5.9	3.4	8
26	22	20	195	92	124	22	11	6.3	5.9	8.1	3.3	17
27	19	20	120	105	120	23	8.7	6.6	5.4	5.6	3.4	50
28	19	29	90	112	113	22	7.1	6.8	5.2	11	3.8	56
29	22	29	74	176	113	20	6.1	4.0	5.2	5.4	3.8	62
30	21		61	313	161	39	6.8	4.7	4.7	6.3	3.9	49
31	21		56		132		6.6	3.6		7.1		48
Mean	138	32.6	147	240	140	47.0	14.0	5.04	5.79	5.94	17.4	47.3
Runoff in Ac. Ft.	8490	1870	9050	14280	8610	2800	861	310	344	365	1040	2910

NOTE: This is a permanent station maintained throughout the year under Federal-State cooperation by the U. S. Geological Survey. For total flow of Yuba River near Smartville combine with flows in Table 56.

TABLE 58

FLOW OF YUBA RIVER AT MARYSVILLE (SIMPSON LANE BRIDGE) - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	315	670	1050	2520	7200	5660	1300	210	153	153	143	401
2	460	670	976	2870	6600	6100	1210	210	153	149	394	432
3	1510	790	898	4260	6200	6890	1250	206	151	151	321	465
4	1040	868	850	4640	6000	7340	1170	210	149	151	444	498
5	6490	958	834	4670	6200	7160	963	210	147	143	606	436
6	7060	1070	817	4320	7000	5840	880	200	161	151	666	514
7	6840	1110	800	3640	8200	6170	823	190	170	133	714	531
8	12000	1000	806	3080	7800	6650	779	180	196	120	714	634
9	7000	1030	822	4990	7000	6880	732	170	235	111	718	652
10	5000	1310	817	11600	6000	7070	695	160	258	106	615	579
11	3730	1110	800	8000	5600	6140	638	155	221	109	498	518
12	2910	922	800	6000	6000	5800	671	150	174	128	390	401
13	2330	850	976	5000	6700	5280	579	149	163	153	334	527
14	1990	834	1710	4820	8150	4660	523	153	198	163	315	849
15	1770	828	1880	5770	7750	4360	502	153	261	153	318	918
16	1570	839	1900	8630	7900	3880	506	149	258	133	344	854
17	1450	839	2420	15900	8790	3320	477	155	428	137	420	885
18	1350	828	1830	15000	8630	3100	394	167	510	135	465	1080
19	1240	850	1970	12000	7990	3180	318	157	523	133	489	1090
20	1170	904	1760	10000	7580	3140	283	153	544	111	489	1010
21	1140	946	1510	9500	6900	3060	315	143	579	116	420	952
22	1160	1020	1400	10000	5900	2900	321	149	584	126	368	929
23	1150	1150	1450	10000	5580	2590	311	145	579	120	358	902
24	1130	1180	5790	9000	6440	2250	292	141	579	107	361	813
25	1070	1110	5100	7500	7550	2120	299	147	308	109	361	756
26	1020	1070	3200	7200	8680	2250	286	165	211	198	334	760
27	996	1050	2610	7000	8760	2040	230	178	208	213	324	1070
28	970	1080	2460	7600	7820	1830	220	196	216	292	321	1260
29	958	1100	2370	8000	6290	1570	210	241	165	311	315	1010
30	958		2360	7800	5960	1410	200	178	153	274	347	880
31	904		2540		6860		210	163		124		843
Mean	2538	965	1791	7377	7098	4355	567	172	288	152	430	756
Runoff in Ac. Ft.	156100	55500	110100	439000	436400	259100	34900	10600	17100	9350	25600	46500

NOTE: Station is maintained jointly by the Division of Water Resources and the Water Resources Branch of the U. S. Geological Survey. Station is at 7th Street Bridge at Mile 0.9L above mouth. Stage-discharge relationship is affected at times by variable back-water from the Feather River.

TABLE 59

FLOW OF BEAR RIVER NEAR WHEATLAND - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	35	66	10	508	1570	418	45	2.8	3.7	17	87	85
2	190	137	10	433	1280	386	31	5.2	3.8	19	78	67
3	362	186	10	908	1140	362	31	3.3	4.0	20	102	95
4	171	236	5.6	1030	1160	347	19	2.5	1.6	19	113	142
5	233	458	5.2	1570	1120	344	10	1.2	3.8	19	134	121
6	142	499	5.0	1580	1080	332	2.8	1.0	1.6	19	130	338
7	776	481	4.4	1250	1030	335	3.9	1.4	1.9	19	63	170
8	1610	445	7.2	1080	1040	311	4.7	.8	2.0	19	62	333
9	652	590	6.4	1860	1010	270	4.2	2.0	2.7	18	65	184
10	409	635	6.8	4530	1000	265	4.8	4.0	2.7	19	59	157
11	270	486	4.2	2160	1000	268	2.8	3.7	3.6	26	57	125
12	170	421	4.4	1580	899	252	6.5	2.6	.2	24	58	101
13	157	377	18	1300	735	250	18	2.3	3.8	24	53	338
14	159	314	29	1180	596	286	20	2.3	2.8	29	56	318
15	186	223	142	1110	462	190	16	.5	4.7	69	68	209
16	245	208	246	1160	362	184	7.2	.4	5.2	69	83	168
17	494	198	377	1940	374	177	8.6	.3	7.4	69	101	368
18	486	89	243	1620	532	166	15	1.0	6.9	69	317	272
19	411	69	348	1250	635	133	13	3.2	6.9	68	153	162
20	102	64	246	1150	904	148	11	3.3	3.5	68	88	130
21	91	57	157	1130	811	146	11	2.2	2.9	67	78	124
22	89	34	77	2000	645	151	11	3.5	6.9	63	73	122
23	87	35	41	1960	568	137	10	2.0	6.1	59	67	114
24	86	38	2100	1690	528	130	11	4.4	18	58	64	107
25	84	40	1780	1440	477	116	15	4.4	25	56	62	100
26	79	37	756	1320	166	85	8.1	3.5	29	55	64	119
27	77	36	740	1250	112	88	4.6	2.7	31	56	64	622
28	72	43	762	1300	118	84	4.4	4.2	20	61	67	364
29	71	13	610	1400	366	52	5.6	4.0	17	58	63	199
30	68		468	1690	462	59	4.5	3.8	17	59	51	162
31	66		512		519		3.4	3.7		99		146
Mean	262	225	314	1479	732	216	11.7	2.65	8.19	45.0	86.0	196
Runoff in Ac. Ft.	16130	12920	19300	88020	45030	12840	720	163	487	2760	5120	12020

NOTE: This is a permanent station maintained throughout the year under Federal-State cooperation by the Water Resources Branch of the U. S. Geological Survey. The Bear River flows into the Feather River above Nicolaus at Mile 12.0L.

TABLE 60

FLOW OF RECLAMATION DISTRICT 1001 DRAIN INTO CROSS CANAL* - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				0	0	23						0
2				0	0	29						0
3				0	0	31						0
4				0	0	19						0
5				0	0	23						0
6				0	0	0						0
7				0	0	0						0
8				0	0	0						0
9				40	0	0						0
10				0	0	0						0
11				0	0	38						0
12	N	N	N	0	0	0	N	N	N	N	N	0
13	O	O	O	0	0	0	O	O	O	O	O	0
14				0	0	0						0
15				0	0	0						0
16				0	0	0						0
17	F	F	F	28	0	0	F	F	F	F	F	0
18	L	L	L	0	0	0	L	L	L	L	L	26
19	O	O	O	0	0	0	O	O	O	O	O	0
20	W	W	W	0	56	0	W	W	W	W	W	0
21				0	0	0						0
22				0	100	0						0
23				0	0	0						0
24				0	74	0						0
25				0	0	0						0
26				0	0	0						0
27				0	0	0						48
28				0	0	0						38
29				0	0	0						0
30				39	0	0						51
31					75							0
Mean	0	0	0	3.6	9.8	5.4	0	0	0	0	0	5.2
Runoff in Ac. Ft.	0	0	0	212	605	323	0	0	0	0	0	323

* Cross Canal, the main drain between Reclamation Districts 1000 and 1001, joins the Sacramento River at Mile 19.6L

NOTE: This is drainage returned to the Sacramento River via the cross-canal by pumping and gravity.

TABLE 61

FLOW OVER SACRAMENTO WEIR FROM SACRAMENTO RIVER TO YOLO BY-PASS - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13					NO FLOW OVER WEIR DURING 1948							
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
31												
Mean	0	0	0	0	0	0	0	0	0	0	0	0
Runoff in Ac. Ft.	0	0	0	0	0	0	0	0	0	0	0	0

NOTE: Elevation--fixed crest 25.0 U.S.E.D.--Movable crest (top of needles) 31.0 U.S.E.D. Weir has 48 gates, each 38 feet in length. Weir is on right bank at Mile 4.2R above Sacramento.

TABLE 62

FLOW OF RECLAMATION DISTRICT 1000 DRAIN (#3 PLANT) - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13	Records sufficient to compute only monthly flows.											
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
31												
Mean	0	0	6.5	6.2	72.9	20.8	9.3	13.3	24.4	13.6	0	21.5
Runoff in Ac. Ft.	0	0	403	369	4485	1238	573	819	1454	837	0	1325

NOTE: This is drainage from Reclamation District 1000 returned to Sacramento River by pumping and gravity at Mile 6.85L. Additional water returned to Sacramento River from same district at Mile 2.1L (See Table 63), and at Mile 16.0L. Plant operates automatically on float switch.

TABLE 63

FLOW OF RECLAMATION DISTRICT 1000 DRAIN (2ND BANNON SLOUGH) - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0		0	0	0	130		0	0	161		0
2	0		0	42	23	157		0	37	154		0
3	0		0	0	0	92		0	0	135		0
4	0		0	0	0	0		0	63	108		0
5	0		0	35	0	0		0	39	110		0
6	0		0	0	0	0		0	39	107		0
7	24		0	0	0	0		0	40	94		0
8	0		0	0	0	0		0	28	89		0
9	0		0	60	0	0		0	62	71		0
10	0		0	21	0	0		0	42	0		0
11	0		0	0	0	0		0	39	74		0
12	56	N	0	56	0	0	N	0	28	96	N	0
13	36	O	0	0	0	0	O	0	63	56	O	0
14	53		0	42	0	0		0	74	71		0
15	0		0	0	0	0		0	103	108		0
16	24		21	0	0	0		0	62	0		0
17	0	F	0	0	0	0	F	0	52	0	F	0
18	0	L	0	0	0	0	L	0	123	0	L	0
19	0	O	0	0	0	0	O	0	126	42	O	0
20	46	W	0	0	0	0	W	0	123	0	W	0
21	0		0	0	134	0		0	139	0		0
22	0		0	0	152	0		0	90	0		0
23	0		0	0	117	0		0	117	0		0
24	0		35	0	94	0		0	96	0		0
25	0		0	0	0	0		0	131	0		0
26	0		0	0	88	0		0	99	0		0
27	0		0	0	0	0		0	114	0		296
28	0		30	0	0	0		0	128	0		121
29	0		33	0	37	0		0	178	0		46
30	0		0	0	227	0		0	168	0		0
31	0		0		336			21		0		0
Mean	7.7	0	3.8	8.5	39.0	12.6	0	0.7	80.0	47.6	0	14.9
Runoff in Ac. Ft.	474	0	236	508	2396	752	0	42	4766	2928	0	918

NOTE: This is drainage from Reclamation District 1000 returned to the Sacramento River by pumping at Mile 2.1L. Additional water returned to Sacramento River at Mile 6.85L (see Table 62). Water returned to the Sacramento River from the Pritchard Lake Plant at Mile 16.0L amounted to 590 acre-feet in October.

TABLE 64

FLOW OF AMERICAN RIVER AT FAIR OAKS - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	549	1080	1420	3710	7940	8100	3840	392	226	379	510	630
2	520	1020	1480	4460	7280	10100	3430	388	226	390	622	645
3	5490	967	1480	7180	7120	11200	2950	379	226	390	2040	699
4	4540	949	1350	6390	7420	11100	2520	374	217	400	2670	855
5	9560	1070	1330	7120	8750	9100	2220	361	261	410	1710	836
6	4900	1190	1360	7380	11700	8300	1900	352	236	420	1150	1130
7	4380	1200	1230	5700	14900	10900	1750	344	214	422	875	1220
8	14400	1090	1210	4700	10800	10100	1730	335	210	431	773	1090
9	7990	1250	1500	4720	8500	11100	1630	318	214	457	707	1170
10	5040	1960	1360	9340	7650	10500	1500	323	214	452	691	1040
11	3650	1750	1290	8650	7740	8850	1440	314	220	397	660	965
12	2850	1400	1230	6500	8600	8780	1390	314	187	431	645	895
13	2400	1240	1360	5580	9880	7630	1320	314	187	480	615	1310
14	2050	1200	1920	5170	12500	7780	1160	318	187	503	593	2250
15	1860	1230	2630	6570	11300	7300	1100	302	184	529	600	1720
16	1740	1360	2340	8720	13000	6880	1050	306	187	523	645	1380
17	1600	1730	3080	15700	14600	6520	1020	291	190	492	723	1430
18	1480	1800	2670	17600	11700	6240	912	291	195	457	818	1560
19	1350	1760	3010	12400	9830	5910	841	280	230	486	782	1350
20	1320	1690	2920	11100	9320	5790	774	287	280	497	731	1190
21	1280	1530	2190	11500	8500	5600	728	287	265	480	707	1130
22	1320	1470	2040	13100	7410	5520	652	280	236	474	675	1140
23	1260	2120	2120	11700	7940	5100	614	283	230	480	683	1120
24	1240	2140	7130	9510	10400	5090	584	280	240	366	622	985
25	1230	1810	7060	8870	12500	5150	556	280	272	361	683	965
26	1120	1630	4700	9900	14300	4940	503	280	268	452	699	975
27	1140	1580	3700	9670	14800	4700	480	265	280	463	675	1540
28	1010	1690	3460	11100	11300	4580	452	268	310	469	668	1810
29	1110	1680	3560	10300	9450	4440	384	247	431	469	622	1440
30	1130		3800	8870	8500	4140	417	250	384	474	622	1240
31	1110		3800		9220		397	230		480		1160
Mean	2891	1468	2572	8774	10160	7380	1298	308	240	449	841	1189
Runoff in Ac. Ft.	177800	84470	158100	522100	624500	439200	79820	18910	14290	27600	50020	73130

NOTE: Station is maintained jointly by Division of Water Resources and the Water Resources Branch of the U. S. Geological Survey. It is located on right bank at Mile 19.2R above mouth.

TABLE 65

FLOW OF AMERICAN RIVER AT SACRAMENTO (H ST. BRIDGE) - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	654	1160	1550	3610	8480	8680	3800	438	236	424	551	610
2	494	1100	1550	4260	7480	10600	3380	446	224	394	602	619
3	4550	1040	1550	6940	7280	11700	2880	431	230	386	1630	673
4	4490	1000	1460	6350	7490	11700	2460	408	206	401	2540	760
5	8470	1070	1440	6840	9100	9880	2160	394	256	424	1680	810
6	5340	1220	1460	7170	12300	8600	1880	394	249	438	1100	870
7	4300	1260	1420	5620	15600	11400	1680	386	218	401	870	1140
8	12900	1120	1290	4470	11400	10800	1630	394	182	438	780	980
9	9990	1170	1530	4280	8430	11400	1580	386	200	486	700	1040
10	5390	1790	1490	8270	7440	11300	1460	364	182	446	700	990
11	3560	1760	1430	9440	7720	9640	1410	364	236	478	673	910
12	2860	1420	1410	7400	8880	9230	1350	364	182	446	655	870
13	2430	1290	1490	5840	10600	8220	1300	357	176	470	628	930
14	2090	1280	1800	5580	13000	8170	1180	329	176	534	610	2090
15	1880	1290	2620	6230	12100	7690	1100	336	176	526	602	1660
16	1750	1380	2420	8770	12900	7120	1050	336	176	543	646	1340
17	1640	1740	3000	14500	14300	7000	1020	315	200	534	720	1300
18	1540	1830	2810	19500	12800	6420	960	315	200	486	800	1410
19	1370	1800	2870	13000	10700	6100	910	315	236	502	800	1290
20	1320	1790	3050	11500	10000	5880	840	301	294	526	750	1110
21	1310	1660	2370	11900	9080	5750	810	301	262	526	710	1020
22	1320	1550	2140	13300	7760	5570	750	294	249	526	682	1050
23	1280	2010	2190	12600	8170	5120	691	301	218	526	700	1020
24	1250	2250	5560	10400	10500	5060	646	294	236	462	673	940
25	1230	1870	8250	9250	12700	5080	619	301	256	336	655	940
26	1140	1740	5060	10600	14600	4960	585	301	249	502	710	910
27	1140	1600	3840	10200	15200	4790	551	282	275	486	673	1280
28	1070	1650	3450	12300	12400	4520	518	288	288	510	673	1700
29	1120	1600	3430	11400	10300	4320	470	275	454	518	628	1400
30	1160		3660	9680	9130	4020	462	268	438	518	619	1180
31	1160		3720		9950		462	242		518		1080
Mean	2910	1498	2623	9040	10570	7691	1309	339	239	475	825	1094
Runoff in Ac. Ft.	178900	86160	161300	537900	650200	457600	80520	20870	14200	29180	49110	67280

NOTE: Station is maintained jointly by Division of Water Resources and the Water Resources Branch of the U. S. Geological Survey. Station is located at the "H" Street Bridge and is 6.0 miles above mouth of river. The flows shown may be assumed to be the discharge to the Sacramento River, as American River diversions below this station were negligible in 1948. The American River flows into the Sacramento River at Mile 1.1L.

TABLE 66

FLOW OF CACHE CREEK AT YOLO - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0		0	0	508							
2	0		0	0	357							
3	0		0	0	274							
4	0		0	3.8	235							
5	0		0	339	205							
6	0		0	342	170							
7	0		0	342	119							
8	0		0	281	74							
9	302		0	1090	42							
10	208		0	1030	25							
11	124		0	990	3.7							
12	61	N	0	650	0	N	N	N	N	N	N	N
13	0	O	0	470	0	O	O	O	O	O	O	O
14	0		0	361	0							
15	0		0	1160	0							
16	0		0	1820	0							
17	0	F	0	1020	0	F	F	F	F	F	F	F
18	0	L	0	685	0	L	L	L	L	L	L	L
19	0	O	0	490	0	O	O	O	O	O	O	O
20	0	W	0	386	0	W	W	W	W	W	W	W
21	0		0	305	0							
22	0		0	264	0							
23	0		0	254	0							
24	0		530	232	0							
25	0		810	193	0							
26	0		349	156	0							
27	0		196	132	0							
28	0		137	114	0							
29	0		129	119	0							
30	0		94	339	0							
31	0		1.6		0							
Mean	22.4	0	72.5	452	64.9	0	0	0	0	0	0	0
Runoff in Ac. Ft.	1380	0	4460	26910	3990	0	0	0	0	0	0	0

NOTE: Station maintained and operated by Water Resources Branch of the U. S. Geological Survey. Cache Creek is a west side tributary to Yolo By-Pass opposite Mile 7.0 North of Sacramento By-Pass.

TABLE 67

FLOW OF YOLO BY-PASS NEAR WOODLAND* - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	10	6.3	14	215	2560	877	33	25	24	19	8.7	6.6
2	10	6.2	15	151	4120	1140	35	25	24	25	8.6	6.0
3	15	6.1	17	107	5200	1310	36	26	25	42	8.4	6.6
4	17	5.4	16	78	5400	1350	37	28	24	35	8.2	6.8
5	18	6.1	17	65	4880	1420	37	28	24	27	6.9	5.8
6	17	6.6	19	64	4080	1450	37	29	24	19	6.7	7.4
7	19	6.4	21	140	3430	1520	36	28	23	14	7.4	6.8
8	52	6.1	21	222	3250	1560	34	29	23	12	6.4	7.5
9	63	6.1	22	310	2960	1580	33	29	23	9.7	5.5	7.5
10	67	7.9	22	447	1450	1600	32	30	24	8.4	5.4	7.9
11	74	7.6	22	858	480	1580	31	29	24	8.5	5.4	7.8
12	80	6.8	22	1160	320	1470	29	28	24	8.7	5.4	7.5
13	84	7.0	23	1030	221	1290	29	26	23	8.9	5.5	8.2
14	87	7.3	24	915	157	1080	28	28	23	8.9	5.2	8.5
15	92	7.3	24	782	123	717	26	30	24	9.0	5.7	8.9
16	96	7.9	29	1390	103	458	25	30	24	9.4	5.8	9.4
17	93	7.9	48	2470	95	300	25	28	26	10	6.1	11
18	77	8.0	45	3360	88	214	24	27	26	11	6.3	13
19	57	8.2	36	13600	91	152	24	26	26	12	5.8	14
20	42	8.7	31	14500	149	106	24	25	26	12	6.2	14
21	32	8.5	33	8480	248	78	23	24	25	12	6.6	14
22	24	9.0	29	5450	407	60	22	24	25	12	6.2	14
23	19	12	23	4220	525	46	21	24	25	12	6.4	14
24	16	9.4	22	3990	508	39	21	25	25	12	7.0	13
25	14	9.9	38	4420	385	34	20	25	24	12	7.2	14
26	11	11	134	4190	289	33	21	25	23	11	7.2	16
27	8.6	12	237	2990	272	31	22	24	22	11	6.7	21
28	7.6	13	393	1390	322	30	27	24	21	10	6.4	24
29	7.2	14	504	712	410	31	28	24	20	9.6	6.4	24
30	6.7		434	880	488	32	27	24	20	9.6	6.2	24
31	6.3		293		587		26	24		8.9		24
Mean	39.4	82.3	84.8	2620	1406	720	28.2	26.5	23.8	13.9	6.53	12.0
Runoff in Ac. Ft.	2420	4730	5210	155900	86480	42820	1730	1630	1420	852	389	740

* Also known as Yolo By-Pass at Elkhorn.

NOTE: The flow of this station is referred to the recorder at the end of the Sacramento By-Pass except during periods of high water when it is referred to the recorder at the Woodland-Elkhorn highway crossing. To get total flow through Yolo By-Pass below Sacramento, combine this flow with the flow in Table 61 and the flows of Putah Creek. The flow in this table includes the flows of Cache Creek (Table 66), Knights Landing Ridge Cut (Table 43), and Fremont Weir. Station has been operated cooperatively since 1941 by the Division of Water Resources and the Water Resources Branch of the U. S. Geological Survey.

TABLE 68

FLOW OF COSUMNES RIVER AT MICHIGAN BAR - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	39	67	179	548	1630	840	182	32	6.4	10	14	34
2	45	68	173	612	1420	831	168	29	6.4	10	23	32
3	215	64	163	1480	1310	831	155	27	5.7	9.6	62	39
4	330	54	158	1330	1260	822	145	24	5.7	9.2	101	46
5	260	72	145	2120	1330	777	136	22	5.7	8.8	90	55
6	240	111	143	2750	1490	716	131	24	5.4	8.0	61	67
7	210	140	138	1610	1720	733	124	25	5.4	8.0	45	116
8	310	107	136	1150	1580	724	118	22	4.8	7.6	39	81
9	360	145	166	1040	1370	759	111	19	4.8	7.2	35	92
10	265	301	179	2330	1230	750	96	18	4.2	7.6	33	80
11	219	265	158	1940	1160	682	96	14	3.9	9.2	32	68
12	185	179	148	1480	1140	628	90	8.4	4.2	10	32	61
13	166	145	171	1220	1150	576	86	9.6	3.9	10	31	68
14	145	140	458	1080	1200	541	81	13	3.9	10	31	211
15	133	138	598	1140	1190	494	78	12	3.9	10	32	188
16	122	160	431	1320	1260	455	73	11	4.2	21	38	118
17	116	200	617	1710	1330	419	67	13	3.9	22	43	109
18	107	203	494	1970	1270	390	54	13	4.5	18	47	126
19	97	206	821	1740	1250	365	67	12	3.9	17	51	113
20	92	200	620	1620	1290	345	51	9.2	4.2	17	45	90
21	86	179	419	1630	1200	326	52	9.2	4.8	15	40	83
22	84	173	345	2360	1030	312	48	9.6	5.1	15	39	83
23	83	235	414	2160	984	290	43	10	5.4	13	38	78
24	81	228	3140	1870	1040	276	46	9.6	5.4	11	38	67
25	80	191	1970	1660	1080	265	43	9.2	4.8	10	36	60
26	75	173	1090	1590	1140	252	41	9.6	6.0	10	35	60
27	72	166	813	1560	1180	238	39	10	6.0	11	35	215
28	61	188	690	1650	1070	228	36	12	6.4	11	35	238
29	55	225	605	1860	951	212	34	11	8.4	12	34	163
30	66		590	1900	930	200	29	8.8	10	11	33	124
31	66		562		1010		30	7.6		11		126
Mean	144	163	540	1614	1232	509	82.3	15.0	5.24	11.6	41.6	99.7
Runoff in Ac. Ft.	8860	9370	33190	96060	75760	30300	5060	920	312	714	2480	6130

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

TABLE 69

FLOW OF COSUMNES RIVER AT McCONNELL - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	41	32	196	543	1800	923	147	14			1.8	17
2	37	50	162	555	1540	851	119	12			2.8	19
3	40	52	151	1080	1380	860	61	9.3			5.8	20
4	335	37	143	1420	1300	851	100	8.7			115	24
5	291	38	136	1880	1330	833	115	10			114	36
6	254	54	127	3120	1460	763	97	6.8			87	45
7	209	117	112	2380	1700	767	84	5.6			56	67
8	224	122	109	1400	1720	759	76	6.4			26	100
9	375	104	118	1100	1480	755	68	6.8			36	75
10	318	194	152	1780	1310	807	67	5.2			23	84
11	246	318	149	2520	1200	743	64	1.1			21	68
12	204	224	138	1800	1160	683	62	0	N	N	19	59
13	174	166	140	1360	1160	639	36	0	O	O	19	55
14	154	142	228	1180	1200	587	30	0			17	73
15	138	133	598	1110	1220	555	27	0			20	240
16	127	125	507	1280	1240	518	8.3	0			19	179
17	114	151	475	1510	1320	476	17	0	F	F	33	123
18	109	182	576	2110	1320	440	18	0	L	L	38	109
19	98	182	569	1900	1300	414	17	0	O	O	39	124
20	91	184	874	1700	1320	386	19	0	W	W	41	102
21	85	170	552	1640	1300	355	16	0			33	84
22	80	156	411	2140	1100	326	21	0			29	77
23	73	168	359	2410	1020	304	19	0			26	74
24	71	232	1380	2110	1040	279	10	0			25	68
25	69	198	3230	1790	1090	244	15	0			24	64
26	22	166	1670	1640	1140	236	18	0			23	60
27	42	152	960	1590	1200	229	17	0			19	96
28	55	149	761	1650	1150	193	15	0			19	263
29	67	174	663	1880	1020	186	15	0			20	216
30	54		595	1990	946	163	15	0			19	151
31	61		571		1040		14	0				117
Mean	137	144	542	1686	1274	538	45.4	2.77	0	0	32.3	93.2
Runoff in Ac. Ft.	8450	8280	33350	100300	78360	31980	2790	170	0	0	1920	5730

NOTE: Division of Water Resources, U. S. Geological Survey and U. S. Bureau of Reclamation cooperative station. When flow in main channel reaches 4600 c.f.s. water starts to by-pass station. Figures here given include all overflow.

TABLE 70

FLOW OF DRY CREEK NEAR GALT*- 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1		0	16	147	277	69	1.3	0	0.1			0
2		0	9.9	130	206	53	0.4	0	0.1			0
3		0	5.8	291	162	39	0.1	0.1	0.7			0
4		0	1.6	293	138	34	0	0	0.6			0
5		0	0.4	482	120	32	0	0	1.3			0
6		0	0.1	855	106	29	0	0	1.7			0
7		9.0	0	672	94	26	0	0	1.4			0
8		21	0	402	86	24	0	0	0.8			0
9		15	0	302	86	24	0	0.2	0.1			0
10		73	0	496	72	19	0	0.3	0			0
11		88	3.4	602	64	16	0	0.6	0			0
12	N	55	2.5	426	56	14	0	0.4	0	N	N	0
13	O	39	2.2	298	51	13	0	0	0	O	O	0
14		29	150	245	44	12	0	0	0.2			0
15		22	252	216	40	12	0	0.1	0.7			0
16		23	161	200	33	12	0	0.2	1.2			0
17	F	26	291	195	29	12	0	0.2	1.7	F	F	0
18	L	27	292	202	34	11	0	0	1.6	L	L	0
19	O	23	288	175	68	8.8	0	0	1.0	O	O	0
20	W	21	292	162	102	7.4	0	0	0	W	W	0
21		15	166	153	126	6.4	0	0	0			0
22		10	120	220	104	3.7	0	0	0			0
23		7.2	101	230	76	1.6	0	0.2	0			0
24		7.7	438	192	60	0.9	0	0.5	0			0
25		6.2	1100	166	51	0.7	0	0.7	0			0
26		0.9	574	154	43	0.2	0	0.7	0			0
27		0	366	145	37	0.2	0	0.3	0			0
28		0	246	140	32	1.7	0	0	0			0
29		6.1	196	186	32	1.1	0	0	0			0
30			166	297	39	1.1	0	0.1	0			0.7
31			147		74		0	1.0				0
Mean	0	18.1	174	289	82.0	16.2	0.06	0.18	0.44	0	0	0.02
Runoff in Ac. Ft.	0	1040	10690	17200	5040	962	3.6	11	26	0	0	1.4

* Also known as Dry Creek at Dustin Road.

NOTE: Station is operated jointly by U. S. Geological Survey, U. S. Bureau of Reclamation, and Division of Water Resources. Dry Creek flows into the Mokelumne River above its confluence with the Cosumnes River.

TABLE 71

FLOW OF MOKELUMNE RIVER AT WOODBRIDGE - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	318	52	9.0	137	1400	2220	455	20	39	143	220	368
2	179	43	9.0	192	1240	2220	247	19	25	200	288	192
3	164	145	8.8	246	839	2210	389	19	25	247	300	174
4	145	274	8.5	278	730	2250	304	21	74	160	317	199
5	101	227	8.5	225	633	2400	215	21	77	157	310	174
6	90	116	8.5	346	516	2560	190	21	29	196	310	113
7	117	52	8.2	346	964	2460	165	25	46	198	285	125
8	213	41	8.2	498	1370	2670	169	88	52	198	170	197
9	241	39	8.2	496	1410	3010	162	23	54	178	252	135
10	292	40	9.3	494	1200	3480	141	20	68	150	316	92
11	229	54	10	518	603	3750	49	22	93	74	308	92
12	136	36	11	496	600	3920	32	22	42	206	303	138
13	152	26	12	476	934	3290	26	22	34	249	318	139
14	212	12	12	486	1170	2760	27	22	34	255	314	196
15	202	11	12	488	1240	2640	28	20	49	263	231	288
16	292	13	12	494	1290	2500	27	19	64	285	350	287
17	319	11	12	508	1300	2530	25	20	88	178	389	297
18	201	11	14	514	1300	1940	20	21	95	56	400	180
19	124	11	12	532	1320	1630	15	23	154	134	395	323
20	224	9.6	13	633	1490	1880	14	26	74	207	386	1030
21	359	10	12	873	1560	1990	16	106	60	224	287	618
22	281	10	11	1090	1600	1760	17	61	99	245	213	654
23	248	9.0	9.9	1140	1630	1230	20	22	111	267	347	650
24	199	8.8	9.9	1230	1630	1330	95	21	134	168	413	654
25	145	9.0	176	1330	1340	1150	89	21	153	162	456	662
26	101	9.0	422	1320	1430	986	21	22	122	211	320	674
27	74	8.8	422	1290	1790	1450	21	23	61	248	334	689
28	75	9.0	450	1240	1890	1380	22	24	104	270	387	668
29	98	9.0	448	1350	1750	1170	23	24	210	274	382	662
30	78		377	1400	2180	933	23	23	200	296	357	646
31	66		91		2190		21	36		227		654
Mean	183	45.0	85.0	689	1308	2190	99.0	28.3	82.3	204	322	386
Runoff in Ac. Ft.	11260	2590	5230	40990	80410	130300	6090	1740	4900	12550	19160	23740

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

TABLE 72

FLOW OF CALAVERAS RIVER AT JENNY LIND - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	22	21	48	183	491	136	17				0	11
2	22	21	48	171	366	106	13				0	11
3	23	21	45	803	278	86	8.0				0	12
4	62	21	43	970	230	78	4.8				0	13
5	71	23	42	2510	204	73	5.6				0	15
6	58	37	41	2710	188	67	6.8				0	16
7	49	104	39	2040	177	64	9.2				0	20
8	47	102	39	925	169	62	10				0	27
9	50	80	39	553	159	60	10				0	32
10	58	114	42	817	146	58	11				0	29
11	55	207	44	1130	136	54	11				0	26
12	48	148	43	841	113	50	11	N	N	N	0	24
13	42	102	45	567	110	46	11	0	0	0	0	24
14	39	77	235	439	108	43	9.8				1.7	27
15	36	69	473	361	101	43	8.0				6.4	36
16	33	66	337	309	95	42	7.2				8.6	44
17	32	69	445	386	88	38	6.4	F	F	F	9.2	45
18	31	78	371	262	95	37	6.0	L	L	L	9.2	45
19	29	78	319	237	127	34	4.0	0	0	0	8.6	52
20	27	73	421	214	159	33	1.9	W	W	W	9.8	52
21	27	64	302	201	169	31	.2				10	44
22	26	56	226	248	154	29	0				10	37
23	26	52	177	325	127	27	0				11	32
24	26	50	1650	274	108	26	0				11	30
25	25	52	2850	224	97	24	0				11	29
26	25	48	1710	195	88	23	0				11	29
27	24	45	656	182	82	21	0				11	55
28	23	44	413	175	78	20	0				11	216
29	22	45	305	208	74	20	0				11	146
30	22		248	397	76	19	0				11	86
31	21		207		115		0					61
Mean	35.5	67.8	384	625	152	48.3	5.55	0	0	0	5.38	42.8
Runoff in Ac. Ft.	2180	3900	23610	37200	9340	2880	341	0	0	0	320	2630

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

TABLE 73

FLOW OF STOCKTON DIVERTING CANAL AT STOCKTON* - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	0	6.2	164	429	81						
2	0	0	4.3	142	389	98						
3	0	0	6.6	247	292	78						
4	0	0	5.7	979	238	61						
5	0	0	3.2	1670	205	50						
6	0	0	.9	3190	181	44						
7	20	0	0	2350	167	39						
8	8.8	3.8	0	1300	153	36						
9	3.0	71	.3	684	142	33						
10	3.4	52	0	574	130	30						
11	7.0	91	.3	1060	115	27						
12	7.0	147	2.6	960	104	22	N	N	N	N	N	N
13	1.4	100	6	672	89	17	0	0	0	0	0	0
14	.1	62	12	480	83	7.6						
15	0	42	274	380	79	.1						
16	0	34	380	315	74	0						
17	0	25	303	277	67	2.4	F	F	F	F	F	F
18	0	29	411	256	67	1.1	L	L	L	L	L	L
19	0	35	277	231	87	0	0	0	0	0	0	0
20	0	34	327	208	118	0	W	W	W	W	W	W
21	0	29	323	190	142	0						
22	0	23	231	184	147	0						
23	0	23	343	266	120	0						
24	0	9.1	342	266	98	0						
25	0	7.7	2830	228	72	0						
26	0	8.1	2150	190	60	0						
27	0	5.7	973	169	56	0						
28	0	5.7	495	161	52	0						
29	0	6.6	331	164	46	0						
30	0		245	235	52	0						
31	0		196		58							
Mean	1.64	29.1	338	606	133	20.9	0	0	0	0	0	0
Runoff in Ac. Ft.	101	1670	20780	36080	8160	1240	0	0	0	0	0	0

* Also known as Calaveras River at Stockton.

NOTE: Station maintained and operated by Water Resources Branch of the U. S. Geological Survey with cooperation from the U. S. Bureau of Reclamation and Division of Water Resources. Prior to December 24, 1948, flows of Calaveras River were diverted to the Stockton Canal via Mormon Slough. The flow of the Calaveras River at Bellota as recorded by the Division of Water Resources station at that location amounted to approximately 292 acre-feet in December.

TABLE 74

INFLOW TO FRIANT RESERVOIR (MILLERTON LAKE) - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	110	160	542	1010	2210	3990	3330	400	1300	1120	905	799
2	460	1000	592	1310	1480	4570	3350	1550	1290	1100	855	598
3	415	610	604	1560	2280	4270	2940	1300	1160	332	1010	805
4	310	760	690	1510	2320	5580	2520	1380	1120	1130	956	412
5	710	360	554	1200	3320	4050	2010	1220	965	1120	905	411
6	410	560	653	1550	4660	3330	1740	1200	800	1150	811	814
7	460	500	452	1745	5445	4310	1470	800	1430	1240	249	739
8	760	250	503	1010	4050	4670	1540	750	1325	1040	907	687
9	860	760	490	1180	2990	6100	1550	1320	940	741	859	585
10	510	360	499	5870	2720	5430	1100	1300	1245	891	882	530
11	210	610	642	3100	3400	5490	1140	1240	1100	1070	863	459
12	560	510	586	1970	3850	5490	1640	1190	690	1020	806	358
13	470	460	540	1740	4500	4900	1840	1560	1125	935	611	967
14	470	760	569	1340	5170	5200	1460	770	1080	889	208	621
15	470	300	682	1210	5600	5360	1990	500	1170	964	1070	621
16	550	510	634	1690	6420	5160	1770	1200	1290	748	910	618
17	290	510	684	1820	6990	4670	1890	1210	1150	498	757	691
18	200	610	783	2280	6380	4830	1830	1020	940	894	806	544
19	450	660	711	2200	4220	4240	1820	1260	755	919	884	138
20	750	550	512	2370	3460	3840	1240	1130	1050	745	698	543
21	800	510	260	2630	2880	4180	1760	1190	1050	703	409	591
22	550	400	712	2575	2560	4880	1460	870	1210	715	741	753
23	570	510	554	2150	3070	4490	1500	1360	1140	667	708	451
24	560	670	1310	1850	5230	4430	1260	1020	1180	366	658	500
25	160	720	1390	1900	6000	4430	1000	1080	820	970	205	100
26	760	770	1050	2510	6960	4300	1320	1330	905	1010	807	309
27	810	570	869	2570	7630	3770	1320	1110	1160	959	403	607
28	610	710	716	2850	5960	3960	1400	1080	1230	1010	352	656
29	440	260	967	2790	4740	4220	1350	1020	1120	834	955	705
30	470		1120	2370	4310	3680	1260	1230	1220	955	854	502
31	440		1030		4070		1310	1250		549		450
Mean	503	549	706	2062	4351	4594	1713	1124	1099	880	735	567
Runoff in Ac. Ft.	30930	31580	43440	122690	267530	273360	105340	69110	65380	54120	43720	34840

NOTE: This is the total mean second feet flow inflowing to Friant Reservoir as computed by the U. S. Bureau of Reclamation, taking into account change in storage, release, spill and evaporation; and represents the natural flow passing the dam site if the dam had not been constructed.

TABLE 75

DAILY CONTENT OF FRIANT RESERVOIR (MILLERTON LAKE) IN ACRE-FEET - 1948

Date	Figure given is amount in storage at end of day in thousands of acre-feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	129.1	138.6	139.8	133.0	195.1	342.4	472.9	364.7	238.1	151.5	130.4	148.2
2	129.5	139.6	139.3	133.4	195.9	348.1	472.7	360.8	235.0	149.7	131.1	148.7
3	129.8	139.8	138.8	134.3	198.2	353.2	471.9	356.4	231.1	146.4	132.1	149.5
4	129.9	140.3	138.5	135.1	200.3	361.2	470.3	352.2	227.1	144.7	133.0	149.3
5	130.8	140.0	138.0	135.6	203.8	366.5	467.7	347.7	222.8	143.0	133.8	149.1
6	131.1	140.1	137.7	137.3	209.7	370.4	464.5	343.2	218.2	141.4	134.4	149.7
7	131.5	140.1	137.0	139.4	216.8	376.2	460.4	337.9	214.9	140.0	133.9	150.2
8	132.5	139.6	136.4	140.0	220.5	382.7	456.2	332.5	211.3	138.2	134.7	150.7
9	133.7	140.1	135.8	141.1	222.1	392.0	452.0	328.3	207.0	135.8	135.4	151.0
10	134.2	139.8	135.2	152.2	222.9	399.7	446.9	324.2	203.7	133.7	136.2	151.1
11	134.1	140.0	134.9	158.1	224.7	406.5	441.9	320.1	200.4	132.0	137.0	150.8
12	134.7	140.0	134.5	161.7	227.4	412.8	438.2	315.9	196.3	130.6	137.7	150.3
13	135.1	139.9	134.0	164.9	231.4	417.9	435.2	312.4	193.2	129.8	138.0	151.1
14	135.5	140.4	133.7	166.9	236.7	423.5	431.5	307.3	190.4	129.2	137.5	151.3
15	135.8	140.0	133.7	167.7	243.3	429.1	429.0	301.7	188.0	128.8	138.7	151.5
16	136.1	140.0	133.6	169.2	252.7	434.3	426.1	397.6	185.9	128.0	139.6	151.7
17	135.8	140.0	133.6	170.8	262.8	438.5	423.4	393.6	183.4	126.7	140.2	152.2
18	135.3	140.2	133.8	173.3	270.1	443.0	420.6	289.4	180.5	126.6	140.9	152.6
19	135.3	140.5	133.7	175.3	273.2	446.3	417.9	285.6	177.3	126.8	141.8	152.2
20	135.9	140.6	132.9	176.9	274.9	448.8	414.1	281.6	174.8	126.7	142.4	152.6
21	136.6	140.6	131.6	178.9	275.8	452.2	411.2	277.7	172.5	126.5	142.4	153.1
22	136.8	140.4	131.2	180.8	276.2	457.2	407.5	273.2	170.5	126.3	143.1	154.0
23	137.1	140.4	130.8	181.9	277.6	461.0	403.9	269.8	168.4	126.0	143.8	154.4
24	137.5	140.7	132.1	182.4	283.8	464.1	399.8	265.9	166.3	125.1	144.4	154.9
25	137.1	141.1	133.6	183.0	291.9	467.0	395.2	262.1	163.4	125.7	144.1	154.5
26	137.9	141.4	134.1	184.5	301.9	469.6	391.2	258.8	160.7	126.5	145.0	154.7
27	138.8	141.1	133.8	185.8	313.2	471.1	387.2	255.1	158.6	127.2	145.1	155.4
28	139.3	141.1	133.2	187.5	321.4	472.2	383.4	251.4	156.9	128.0	145.1	156.2
29	139.4	140.2	133.1	189.8	327.6	473.4	379.5	247.6	155.0	128.6	146.3	157.1
30	139.4		133.3	192.6	332.9	473.4	375.3	244.3	153.3	129.5	147.3	157.6
31	139.3		133.2		337.8		370.9	241.1		129.6		158.0
Monthly Change	+9.9	+0.9	-7.0	+59.4	+145.2	+135.6	-102.5	-129.8	-87.8	-23.7	+17.7	+10.7

NOTE: Reservoir water level recorder maintained by U. S. Bureau of Reclamation.

TABLE 76

FLOW OF SAN JOAQUIN RIVER BELOW FRIANT - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	272	516	650	1150	968	1530	3240	3080	2410	1980	490	338
2	272	516	752	1140	1080	1530	3130	3070	2470	1970	490	338
3	272	516	758	1140	1040	1530	2980	3060	2750	1970	490	397
4	272	516	738	1140	1130	1320	2980	3060	2760	1960	490	505
5	272	516	700	956	1450	1130	2970	3050	2750	1950	490	500
6	272	516	700	700	1560	1130	3000	3040	2740	1930	495	505
7	272	516	700	706	1750	1140	3180	3020	2820	1920	495	480
8	272	516	700	712	2050	1150	3300	3020	2920	1920	495	433
9	272	516	700	622	2050	1160	3300	3010	2910	1910	495	428
10	272	516	700	274	2220	1370	3290	2930	2740	1900	470	490
11	275	516	700	119	2360	1870	3290	2900	2580	1900	446	604
12	275	516	700	157	2370	2090	3130	2900	2570	1740	446	604
13	275	516	700	119	2370	2100	2980	2890	2490	1420	446	554
14	275	516	693	454	2400	2180	2940	2890	2330	1170	446	516
15	321	516	693	842	2140	2310	2850	2890	2250	1160	446	516
16	409	516	693	960	1540	2310	2810	2840	2240	1150	446	505
17	454	516	693	1040	1880	2330	2810	2780	2260	1150	446	429
18	454	516	693	1040	2580	2330	2810	2740	2320	990	442	338
19	454	516	790	1220	2590	2330	2760	2690	2310	816	415	338
20	454	516	938	1620	2540	2340	2720	2680	2230	784	388	334
21	454	516	938	1680	2380	2200	2810	2670	2120	804	397	334
22	454	516	938	1680	2310	2100	2900	2660	2110	804	379	292
23	436	516	769	1670	2310	2310	2890	2600	2110	804	346	248
24	364	516	656	1660	2010	2600	2890	2540	2140	804	346	248
25	364	526	656	1660	1820	2680	2880	2550	2180	703	346	248
26	364	560	838	1780	1830	2680	2880	2540	2180	592	342	248
27	364	626	1050	1880	1840	2680	2870	2540	2110	592	342	248
28	364	626	1050	1960	1700	2930	2870	2530	1990	592	338	248
29	388	626	1050	1590	1500	3260	2860	2530	1990	548	338	248
30	495		1050	952	1520	3330	2920	2480	1990	490	338	248
31	516		1120		1530		3070	2430		490		248
Mean	353	529	791	1087	1897	2065	2978	2794	2392	1255	426	387
Runoff in Ac. Ft.	21680	30440	48610	64710	116700	122900	183100	171800	142400	77180	25350	23820

NOTE: This is a permanent station maintained throughout the year under Federal-State cooperation by the Water Resources Branch of the U. S. Geological Survey. It is located at Mile 268.13L. Daily mean release from Friant Reservoir into San Joaquin River obtainable from this table by subtracting flows of Cottonwood Creek (Table 77).

TABLE 77

FLOW OF COTTONWOOD CREEK NEAR FRIANT - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1			0	0	0.2							
2			0	0	0.1							
3			0	0	0							
4			0	0.1	0							
5			0	0.1	0							
6			0	0.2	0							
7			0	0.2	0							
8			0	0.1	0							
9			0	0.7	0							
10			0	3.5	0							
11			0	1.9	0							
12	N	N	0	1.1	0	N	N	N	N	N	N	N
13	0	0	0	0.6	0	0	0	0	0	0	0	0
14			0	0.4	0							
15			0	0.2	0							
16			0	0.2	0							
17	F	F	0	0.1	0	F	F	F	F	F	F	F
18	L	L	0	0.1	0	L	L	L	L	L	L	L
19	0	0	0.2	0	0	0	0	0	0	0	0	0
20	W	W	0	0	0	W	W	W	W	W	W	W
21			0	0	0							
22			0	0	0							
23			0	0	0							
24			0.5	0	0							
25			0.6	0	0							
26			0.1	0	0							
27			0.1	0	0							
28			0	0.1	0							
29			0	0.1	0							
30			0	0.3	0							
31			0		0							
Mean	0	0	0.05	0.33	0.01	0	0	0	0	0	0	0
Runoff in Ac. Ft.	0	0	3.0	20	0.6	0	0	0	0	0	0	0

NOTE: Station maintained and operated by Water Resources Branch of the U. S. Geological Survey. Cottonwood Creek enters the San Joaquin River at Mile 269.53R.

TABLE 78

FLOW OF SAN JOAQUIN RIVER AT WHITEHOUSE - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	289	451	610	1060	1160	1560	3020	2800	2150	1750	480	308
2	293	468	610	1100	1000	1480	2950	2810	2120	1740	476	308
3	285	472	650	1120	1110	1450	2840	2780	2160	1740	468	308
4	285	476	710	1120	1080	1440	2700	2770	2380	1740	472	324
5	285	485	725	1170	1110	1340	2710	2770	2420	1730	468	393
6	281	490	685	1070	1350	1130	2700	2760	2420	1710	468	444
7	277	495	665	817	1500	1090	2710	2730	2400	1700	464	448
8	277	490	655	763	1600	1060	2840	2720	2470	1700	464	448
9	292	490	660	765	1900	1040	2970	2700	2590	1690	456	412
10	312	485	655	786	1940	1030	2980	2670	2610	1680	456	396
11	312	495	660	590	2100	1090	2990	2610	2460	1700	452	392
12	316	490	670	382	2200	1500	2990	2570	2290	1720	424	468
13	316	490	700	260	2200	1800	2840	2570	2260	1620	406	525
14	316	490	720	242	2210	1850	2690	2570	2200	1390	400	530
15	312	485	710	238	2230	1880	2650	2560	2050	1130	396	476
16	316	495	715	679	2080	2020	2540	2560	1970	1080	392	455
17	362	495	740	830	1590	2030	2510	2520	1940	1050	388	452
18	432	490	715	962	1630	2060	2520	2460	1980	1050	392	444
19	468	495	710	986	2440	2070	2510	2420	2020	998	388	376
20	472	495	720	1050	2430	2090	2470	2360	2040	820	384	340
21	476	495	854	1400	2430	2100	2430	2340	1960	750	360	336
22	490	495	914	1540	2290	2020	2510	2340	1840	735	356	332
23	440	500	926	1560	2210	1860	2600	2340	1830	735	352	324
24	440	500	878	1560	2200	2040	2610	2290	1820	730	332	296
25	408	500	740	1570	1990	2290	2610	2220	1840	725	312	276
26	388	500	705	1580	1760	2390	2620	2240	1900	700	312	276
27	376	515	715	1630	1750	2360	2610	2230	1920	595	316	276
28	368	565	974	1780	1740	2430	2600	2220	1890	565	308	266
29	364	600	1020	1880	1680	2600	2600	2210	1760	555	308	256
30	360		1030	1740	1500	2950	2600	2210	1740	546	308	252
31	408		1030		1580		2660	2180		500		248
Mean	355	496	757	1070	1810	1800	2700	2500	2110	1190	399	367
Runoff in Ac. Ft.	21850	28546	46554	63927	111055	107207	165779	153778	125812	73139	23718	22582

NOTE: Station maintained, operated and flow computed by San Joaquin Canal Company. Station is located at Mile 219.83R.

TABLE 79

FLOW OF FRESNO SLOUGH BY-PASS*- 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					0	7.8			0			
2					0	6.7			0			
3					0	2.7			0			
4					0	1.4			0			
5					0	0.9			0			
6					0	0.6			0			
7					0	0.3			0			
8					0	0			0			
9					0	0			0			
10					0	0			0			
11					0	0			0			
12	N	N	N	N	0	0	N	N	0	N	N	N
13	0	0	0	0	0	0	0	0	0	0	0	0
14					0	0			0			
15					0	0			0			
16					0	0			0			
17	F	F	F	F	0	0	F	F	0	F	F	F
18	L	L	L	L	0	0	L	L	0	L	L	L
19	0	0	0	0	114	0	0	0	0	0	0	0
20	W	W	W	W	24	0	W	W	0	W	W	W
21					4.0	0			0			
22					1.5	0			0			
23					.8	0			0			
24					.2	0			0			
25					0	0			0			
26					0	0			0			
27					0	0			0			
28					274	0			0.4			
29					565	0			0.2			
30					285	0			0			
31					24	0						
Mean	0	0	0	0	41.7	0.68	0	0	0.02	0	0	0
Runoff in Ac. Ft.	0	0	0	0	2560	40	0	0	1.2	0	0	0

* Also known as James By-Pass and Fresno Slough Cut-off.

NOTE: U. S. Geological Survey and U. S. Bureau of Reclamation cooperative station located a short distance below the station presently operated by the King's River Water Association. Station is located below Kerman-San Joaquin highway crossing on Fresno Slough By-Pass 5.8 miles above its confluence with Fresno Slough. Fresno Slough By-Pass enters Fresno Slough at Mile 11.8R above mouth of Fresno Slough.

TABLE 80

FLOW OF SAN JOAQUIN RIVER NEAR MENDOTA - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	11	55	77	172	352	205	411	399	393	312	125	57
2	11	60	79	178	75	188	414	399	387	309	110	48
3	12	87	85	158	77	188	414	396	384	306	89	48
4	12	85	85	139	116	185	411	396	378	300	71	46
5	14	93	87	137	132	180	402	408	372	276	26	46
6	16	97	89	114	132	180	402	427	363	250	29	44
7	16	83	83	119	134	175	402	427	354	245	26	44
8	14	81	77	134	151	175	381	430	339	240	37	44
9	14	79	57	114	170	172	372	430	336	238	44	44
10	14	81	49	234	198	165	411	411	333	238	62	44
11	16	79	27	528	212	175	472	408	318	242	64	44
12	16	73	23	539	252	190	497	411	315	242	66	44
13	16	75	24	232	268	192	476	411	315	240	77	44
14	16	81	23	121	270	200	441	414	315	235	79	44
15	16	87	24	66	270	210	441	420	318	208	79	42
16	16	87	23	58	294	242	466	420	318	180	73	37
17	16	87	23	57	318	252	469	427	315	172	73	29
18	16	87	24	60	321	258	469	438	318	200	73	27
19	16	83	29	58	315	258	452	444	315	200	73	27
20	30	79	46	57	300	258	417	441	315	198	75	34
21	75	75	81	70	306	258	411	424	312	165	75	44
22	87	75	83	101	297	265	387	424	306	151	75	41
23	116	79	97	121	265	282	384	420	306	141	75	36
24	99	77	95	134	268	288	393	390	303	137	75	36
25	75	73	105	134	265	306	408	360	306	137	75	36
26	75	73	144	134	265	348	408	357	306	134	77	36
27	70	75	139	146	265	375	408	381	309	132	70	32
28	68	75	108	158	250	372	405	402	312	132	64	27
29	58	75	108	134	240	381	405	399	312	134	64	27
30	57		130	459	240	411	405	396	309	132	64	116
31	55		165		238		402	396		128		279
Mean	36.9	79.2	73.8	162	234	244	421	410	329	205	68.8	49.9
Runoff in Ac. Ft.	2270	4550	4540	9650	14390	14550	25860	25200	19600	2600	4100	3070

NOTE: Station maintained jointly by U. S. Geological Survey and U. S. Bureau of Reclamation. Station is located at Mile 206.2L.

TABLE 81

FLOW OF SAN JOAQUIN RIVER NEAR DOS PALOS - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	20	0.2	0	1.3	349	2.5	6.6	4.6	3.0	2.1	0.6	0.2
2	21	.2	0	1.7	173	2.4	6.6	4.0	3.0	1.8	.6	.2
3	22	.1	0	1.8	19	2.2	6.6	4.0	2.9	1.9	.6	.2
4	22	.1	0	1.4	1.4	2.1	6.6	4.3	2.9	2.1	.5	.2
5	22	.1	0	1.3	1.1	2.1	6.6	4.6	2.9	2.1	.4	.2
6	22	.1	0	1.3	.9	1.9	6.2	4.8	2.9	1.8	.4	.2
7	23	.1	0	1.1	.8	1.9	6.2	5.1	2.9	1.7	.4	.2
8	24	.1	0	.9	.7	1.9	6.2	5.4	2.7	1.7	.3	.2
9	24	0	.2	1.4	.9	1.9	5.4	5.1	2.5	1.7	.2	.2
10	24	0	.1	33	1.2	1.8	5.4	5.1	2.5	1.7	.2	.2
11	23	0	0	240	1.4	1.9	5.9	4.6	2.5	1.9	.2	.2
12	23	0	0	454	1.8	2.1	8.5	4.6	2.5	1.7	.3	.2
13	22	0	.1	394	2.4	11	8.5	4.6	32	1.5	.3	.1
14	22	0	.2	138	2.9	2.2	7.3	3.5	8.0	1.4	.3	.1
15	22	0	.2	52	3.0	2.4	5.9	2.1	2.7	1.3	.4	.1
16	22	0	.4	4.3	3.2	2.4	5.9	2.2	2.4	1.3	.3	.1
17	10	0	.4	1.1	3.8	2.5	6.6	2.4	2.4	1.2	.3	.1
18	.6	0	.4	.8	4.6	2.9	7.0	2.5	2.4	1.2	.3	.1
19	.4	0	.4	.8	3.3	3.2	7.0	2.7	2.4	1.3	.3	.1
20	.3	0	.6	.8	3.2	3.0	6.2	3.0	2.2	1.3	.3	.1
21	.2	0	.6	.8	3.2	3.2	5.7	3.2	2.2	1.2	.3	.1
22	.4	0	.6	.7	3.3	3.2	5.4	3.0	2.2	1.2	.2	.1
23	.6	0	.6	.7	3.3	3.2	5.1	3.0	2.2	.9	.3	.1
24	.6	0	.8	.7	3.3	3.3	4.8	3.0	2.2	.8	.3	.1
25	.6	0	.7	.8	3.3	3.5	5.1	2.7	2.2	.8	.3	.1
26	.6	0	.7	.8	3.2	4.0	4.8	2.7	2.2	.9	.4	.1
27	.5	0	.9	.9	3.2	4.8	4.8	2.5	2.2	.8	.3	.1
28	.4	0	.9	1.3	3.2	5.1	4.8	2.9	2.1	.7	.2	.1
29	.4	0	.9	1.4	2.9	5.1	4.6	3.0	2.2	.7	.2	.1
30	.4		1.1	16	2.9	5.7	4.6	3.0	2.2	.7	.2	1.4
31	.3		1.1		2.9		4.6	3.0		.7		110
Mean	12.1	.03	.38	45.2	19.8	3.18	5.98	3.59	3.65	1.36	.33	3.73
Runoff in Ac. Ft.	742	2.0	24	2690	1210	189	368	221	217	84	20	229

NOTE: Station maintained jointly by Water Resources Branch of the U. S. Geological Survey and U. S. Bureau of Reclamation. Station is located at Mile 186.0L.

TABLE 82

FLOW OF SAN JOAQUIN RIVER NEAR EL NIDO - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3.2			0	71	0.1	0.4	.2	0	1.1		
2	2.7			0	166	.7	1.8	3.5	0	0		
3	3.0			0	32	0	3.7	2.2	0	0		
4	2.8			0	7.2	0	3.4	.1	0	.7		
5	2.8			0	1.2	0	2.8	0	0	2.4		
6	3.0			0	0	0	3.5	0	0	0		
7	3.4			0	0	0	3.2	0	0	0		
8	3.9			0	0	0	2.7	0	0	0		
9	3.9			0	0	0	2.1	0	0	0		
10	3.2			0	0	0	2.1	0	0	0		
11	3.7			31	0	0	1.5	0	0	0		
12	4.0	N	N	212	0	0	.1	0	0	0	N	N
13	4.0	O	O	257	0	1.9	0	0	0	0	O	O
14	4.0			121	0	1.0	.1	0	0	0		
15	3.9			47	0	1.5	.2	0	1.1	0		
16	4.0			17	0	.8	0	0	1.5	0		
17	4.0	F	F	5.3	0	0	0	1.4	1.2	0	F	F
18	2.2	L	L	1.4	0	0	1.2	2.7	0	0	L	L
19	0	O	O	.1	0	0	4.6	1.9	1.0	0	O	O
20	0	W	W	0	0	0	1.7	1.0	2.1	0	W	W
21	0			0	0	.9	.4	.9	1.4	0		
22	0			0	0	0	.4	.1	3.7	0		
23	0			0	0	0	.4	1.7	2.7	0		
24	0			0	0	0	.2	.8	2.5	0		
25	0			0	0	0	0	2.1	1.8	0		
26	0			0	.4	0	.3	2.8	3.0	0		
27	0			0	0	0	1.7	0	1.9	0		
28	0			0	.8	0	.6	0	.2	0		
29	0			0	1.8	.1	0	0	0	0		
30	0			.8	.6	1.4	0	0	1.0	0		
31	0				0		0	0		0		
Mean	1.99	0	0	23.1	9.06	0.28	1.26	0.69	0.84	.14		
Runoff in Ac. Ft.	122	0	0	1370	557	17	78	42	50	8.3	0	0

NOTE: Station is maintained jointly by U. S. Geological Survey and U. S. Bureau of Reclamation. Station is located at Mile 168.0R.

TABLE 83

FLOW OF SAN JOAQUIN RIVER AT DELTA BRIDGE* - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				0	0		0	NR				
2				0	99		0	16				
3				0	88		0	17				
4				0	28		0	17				
5				0	8		0	17				
6				0	1		0	18				
7				0	0		0	18				
8				0	0		0	18				
9				0	0		0	18				
10				0	0		0	18		Station abandoned		
11				0	0		0	17		October 1, 1948		
12	N	N	N	NR	0	N	0	16	N			
13	O	O	O	NR	0	O	0		O			
14				178	0		0					
15				71	0		0					
16				35	0		0	N				
17	F	F	F	12	0	F	0	O	R			
18	L	L	L	4	0	L	0		E			
19	O	O	O	1	0	O	0	R	C			
20	W	W	W	0	0	W	0	E	O			
21				0	0		0	C	R			
22				0	0		0	O	D			
23				0	0		0	R				
24				0	0		0	D				
25				0	0		0					
26				0	0		0					
27				0	0		0					
28				0	0		0					
29				0	0		0					
30				0	0		0					
31					0		NR					
Mean	0	0	0		7	0						
Runoff in Ac. Ft.	0	0	0		444	0						

* Also called Turner Island Bridge and San Joaquin River near Los Banos.

NOTE: Station maintained, operated and flow computed by U. S. Bureau of Reclamation. Station is located at county road bridge eight miles east and six miles north of Los Banos, Mile 158.7 above mouth of San Joaquin River. An undetermined amount of water by-passes this station through Pick Anderson Slough and other channels. Station was abandoned October 1, 1948, because temporary irrigation dams installed in the vicinity caused unratable conditions.

TABLE 84

FLOW OF SAN JOAQUIN RIVER AT FREMONT FORD BRIDGE - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	90	69	47	72	145	404	107	87	301	239	84	63
2	90	67	46	65	138	440	117	89	283	237	86	59
3	84	66	47	68	201	392	101	90	348	233	85	62
4	76	66	47	69	228	365	98	98	344	233	89	60
5	78	68	47	74	192	363	104	91	285	239	85	62
6	139	69	45	80	166	416	112	90	277	222	89	65
7	146	69	43	98	136	413	132	91	256	210	91	67
8	148	68	42	121	112	354	153	94	258	187	90	66
9	182	67	44	136	105	287	121	98	267	159	87	65
10	202	73	43	136	104	291	112	105	242	139	85	64
11	197	72	42	178	100	343	105	111	206	128	83	60
12	197	68	44	533	94	334	101	104	185	126	81	62
13	197	65	46	694	95	256	104	100	174	121	79	62
14	192	67	52	613	95	219	104	103	170	124	78	62
15	177	67	56	493	94	185	104	108	178	126	73	58
16	164	67	59	319	91	156	99	115	192	126	72	53
17	154	66	63	224	86	150	95	107	204	122	73	54
18	146	65	58	174	90	136	95	120	292	121	75	51
19	140	64	59	145	92	127	92	121	315	114	73	50
20	132	64	60	122	100	139	94	110	291	108	74	48
21	124	60	60	112	130	177	92	112	297	107	72	47
22	115	58	58	95	172	208	92	133	322	110	69	47
23	107	60	57	87	204	185	91	136	305	118	67	47
24	101	57	62	80	204	153	90	154	273	124	67	47
25	99	52	63	76	194	128	92	172	260	120	67	49
26	96	50	99	69	195	126	94	390	269	112	72	54
27	92	49	159	67	194	117	90	392	279	108	67	55
28	89	49	128	71	178	118	90	343	277	101	66	57
29	80	49	104	80	192	121	87	328	260	98	64	63
30	78		94	99	204	112	91	326	246	92	64	65
31	75		85		270		90	313		89		65
Mean	129	63.1	63.2	175	148	240	102	156	262	145	76.9	57.7
Runoff in Ac. Ft.	7910	3630	3890	10410	9130	14310	6250	9580	15580	8910	4580	3550

NOTE: Station is on highway bridge on road between Gustine and Stevinson, Mile 129.5 above mouth of San Joaquin River and 5.7 miles above the mouth of the Merced River. Recorder operated by Water Resources Branch of the U. S. Geological Survey in cooperation with Division of Water Resources and Bureau of Reclamation. Additional water during high flow periods passes this station via Mud Slough, see Table 85.

TABLE 85

FLOW OF MUD SLOUGH (BRANCHES COMBINED) AT GUSTINE-STEVINSON HIGHWAY - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13					NO RECORD OF FLOW DURING 1948							
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
31												
Mean												
Runoff in Ac. Ft.												

NOTE: Station is located on highway bridge on road between Gustine and Stevinson. During high flows, San Joaquin River water by-passes the Fremont Ford station via the three branches of Mud Slough.

TABLE 86

FLOW OF SAN JOAQUIN RIVER NEAR NEWMAN - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	245	203	164	248	440	2800	672	266	478	489	244	213
2	245	203	139	233	626	2880	581	286	478	472	240	203
3	242	200	150	230	792	2700	506	273	485	448	240	213
4	230	194	145	233	752	2560	502	260	519	448	240	209
5	230	203	150	239	716	2790	499	242	485	448	237	216
6	266	218	156	248	665	3280	438	245	516	432	233	223
7	305	221	145	279	602	3200	398	248	475	424	237	226
8	318	224	134	328	533	2810	394	266	468	408	237	226
9	348	224	150	342	502	2790	345	286	465	361	230	220
10	381	227	170	338	461	3240	335	279	431	331	226	216
11	381	227	170	371	421	3540	322	270	417	327	226	213
12	381	221	173	740	401	3510	299	270	414	342	223	209
13	384	218	182	936	378	3150	299	276	401	331	220	213
14	384	218	203	860	358	2920	289	263	384	339	220	213
15	371	221	212	764	361	2650	292	279	388	335	220	213
16	361	218	227	588	351	2450	282	315	404	339	209	213
17	348	218	233	472	338	2250	270	308	427	323	220	216
18	338	218	233	404	325	2170	279	299	509	312	213	213
19	325	218	230	358	368	2080	292	295	564	298	213	213
20	312	215	230	322	411	1990	276	276	533	283	216	209
21	299	212	224	289	434	1840	260	279	519	276	213	203
22	286	206	215	270	434	1670	236	312	519	276	213	196
23	270	206	215	251	465	1520	227	338	509	280	209	196
24	251	194	227	248	492	1480	236	345	489	283	206	196
25	245	179	230	233	482	1390	206	335	482	276	209	203
26	242	164	279	212	461	1280	197	468	492	265	216	213
27	233	167	398	197	455	1140	218	540	526	265	209	216
28	218	162	345	200	448	1060	230	499	533	262	209	223
29	212	167	308	266	475	958	233	509	502	247	213	233
30	203		282	325	1550	780	233	519	489	247	213	233
31	200		263		2480		239	489		247		233
Mean	292	206	212	367	580	2296	325	327	477	336	222	214
Runoff in Ac. Ft.	17960	11830	13060	21870	35660	136600	20000	20100	28370	20660	13200	13160

NOTE: This is a permanent station maintained throughout the year under Federal-State cooperation by the Water Resources Branch of the U. S. Geological Survey with cooperation from Division of Water Resources and Bureau of Reclamation. It is located at Hills Ferry Bridge, Mile 123.7 above mouth of San Joaquin River and just below the mouth of the Merced River. Combine flow of Merced River Slough, Table 93, to give total flow passing this point.

TABLE 87

FLOW OF SAN JOAQUIN RIVER AT GRAYSON (LAIRD SLOUGH) - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	335	220	115	265	475	2760	815	330	600	580	390	305
2	340	210	110	250	570	3180	720	360	600	635	400	300
3	335	225	105	245	820	3180	640	380	610	670	395	300
4	335	225	93	240	970	3100	575	375	570	665	390	300
5	330	245	87	235	900	3090	580	340	610	630	390	305
6	335	285	80	230	780	3370	570	315	580	595	390	295
7	355	305	85	240	695	3690	535	310	615	595	345	300
8	390	300	95	270	695	3660	590	360	545	590	345	310
9	400	305	110	300	615	3490	600	335	540	580	335	310
10	425	295	120	320	705	3650	480	340	525	540	335	310
11	460	290	140	315	465	3700	475	350	455	535	335	310
12	465	285	130	350	395	3960	480	320	455	580	345	305
13	465	285	125	585	375	3780	480	320	510	595	330	310
14	475	280	215	790	370	3460	450	350	485	595	315	310
15	470	280	245	755	345	3160	405	355	480	595	335	310
16	460	285	255	665	365	2860	385	390	485	560	345	315
17	440	285	265	515	395	2440	390	430	490	525	335	325
18	430	280	275	420	485	2180	395	445	515	475	325	325
19	415	280	280	360	435	2070	400	500	585	450	315	315
20	400	280	275	305	615	2110	425	460	650	425	315	310
21	375	260	270	275	705	2180	395	385	640	415	320	305
22	340	260	275	245	715	1990	345	430	650	420	330	295
23	295	225	270	215	670	1760	320	490	620	420	330	290
24	280	185	280	250	650	1530	310	505	635	420	325	285
25	250	175	285	250	600	1420	310	485	660	415	330	300
26	235	145	290	215	565	1300	365	475	630	410	315	305
27	210	125	320	210	600	1240	350	570	625	405	310	315
28	205	120	400	195	700	1090	315	655	620	400	305	315
29	215	115	385	275	1160	1010	295	635	600	395	305	325
30	215		330	425	935	970	310	680	570	390	305	335
31	220		295		1910		315	650		390		345
Mean	352	243	213	340	667	2579	452	430	572	513	340	309
Runoff in Ac. Ft.	21620	13993	13101	20251	41018	153481	27808	26430	34026	31527	20202	19012

NOTE: Permanent station maintained by Division of Water Resources, City of San Francisco Public Utilities Commission (Hetch Hetchy Water Supply), Modesto Irrigation District and Turlock Irrigation District. Station is at Laird Slough Bridge, Mile 96.05 above mouth of San Joaquin River. High flows by-passing this station through old channel of San Joaquin River are included in this table.

TABLE 88

FLOW OF SAN JOAQUIN RIVER AT HETCH HETCHY AQUEDUCT CROSSING - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1270	960	205	430	1020	5200	3460	505	820	1480	1200	1210
2	1250	920	200	410	1090	5500	3020	520	805	1580	1170	1220
3	1150	730	200	415	1350	5270	2430	535	825	1700	1340	1250
4	1200	660	190	440	1520	5575	2190	530	810	1690	1310	1210
5	1150	645	180	445	1510	5640	2040	510	845	1540	1290	1170
6	1070	680	190	480	1410	6340	1580	485	865	1470	1300	1150
7	1150	685	205	490	1260	6450	1180	475	885	1490	1310	1120
8	1210	670	215	555	1510	5320	950	520	805	1470	1310	1160
9	1220	660	250	550	1670	4400	830	535	760	1450	1160	1190
10	1200	660	260	560	1520	4180	770	510	790	1360	1230	1230
11	1250	640	235	545	1280	5300	750	490	730	1360	1250	1220
12	1200	635	260	575	1190	6250	755	480	700	1640	1220	1170
13	1150	630	260	770	1150	7550	725	470	740	1750	1220	1140
14	1200	625	410	920	1120	7470	680	495	720	1670	1220	1110
15	1210	610	460	915	1190	7150	640	500	725	1650	1210	1160
16	1200	605	490	850	1530	7030	600	535	760	1870	1160	1180
17	1150	600	535	730	1900	7000	590	570	790	1680	1220	1290
18	1110	595	540	620	2360	6850	600	590	805	1410	1220	1410
19	1040	580	545	540	2830	6350	610	560	850	1300	1220	1320
20	935	575	560	160	2900	5570	625	600	950	1320	1230	1190
21	980	555	545	250	2830	4300	595	580	930	1300	1250	1140
22	965	535	530	435	2580	3920	560	545	910	1310	1220	1190
23	910	540	525	210	2250	3740	540	640	920	1320	1150	1200
24	865	490	535	150	1900	3980	525	680	940	1300	1210	1250
25	885	465	555	375	1750	4320	520	670	1160	1250	1250	1450
26	830	415	610	410	2160	4570	545	675	1460	1160	1300	1420
27	795	380	760	250	2570	4950	535	705	1540	1190	1190	1220
28	885	370	710	240	3150	4600	510	810	1540	1220	1210	1200
29	910	380	635	325	4040	4370	475	840	1490	1250	1220	1420
30	935		560	750	3630	4080	480	850	1470	1290	1140	1610
31	940		475		4310		500	840		1290		1700
Mean	1071	603	414	493	2015	5441	994	589	945	1444	1231	1255
Runoff in Ac. Ft.	65881	34701	25448	29345	123927	323752	61111	36198	56212	88780	73250	77157

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

TABLE 89

FLOW OF SAN JOAQUIN RIVER NEAR VERNALIS - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1830	1290	578	682	3710	9940	4290	642	980	1600	1450	1420
2	1830	1210	453	658	3680	9950	3730	666	990	1640	1430	1430
3	1570	990	388	682	3850	9790	3090	650	975	1730	1510	1450
4	1540	980	380	698	3930	10100	2820	630	970	1700	1480	1430
5	1490	1050	352	730	3900	10300	2580	614	970	1600	1480	1400
6	1360	1090	331	758	3680	10800	2180	582	970	1600	1500	1380
7	1400	1030	328	785	3210	11000	1810	578	960	1700	1500	1350
8	1440	945	324	855	4080	10100	1450	630	950	1650	1500	1380
9	1490	895	388	835	4700	8920	1270	670	950	1600	1400	1440
10	1480	875	372	825	4300	8680	1160	626	965	1550	1430	1490
11	1450	885	345	805	3660	9860	1120	600	915	1490	1430	1470
12	1430	900	360	855	3360	10800	1080	582	860	1450	1440	1420
13	1350	835	390	990	3230	11600	1020	572	915	1600	1480	1400
14	1380	800	511	1140	3290	11600	965	600	885	1580	1520	1360
15	1390	780	575	1210	3640	11000	910	618	880	1550	1540	1390
16	1390	758	614	1210	4300	10800	845	674	955	1650	1540	1430
17	1380	750	662	1020	4890	10700	810	698	970	1700	1530	1470
18	1360	754	682	895	5660	10100	835	722	1000	1550	1540	1660
19	1310	742	690	805	6540	8510	830	726	1050	1480	1570	1640
20	1170	722	714	1270	6920	7350	825	790	1100	1510	1570	1520
21	1190	694	714	2300	6810	5610	775	766	1080	1490	1600	1420
22	1290	670	706	2370	6230	5180	746	758	1060	1500	1580	1440
23	1320	686	710	2030	5330	5170	690	850	1050	1510	1500	1440
24	1290	634	726	1710	4380	5270	678	875	1110	1510	1490	1470
25	1320	610	750	2820	4020	5700	690	850	1300	1480	1510	1650
26	1190	560	920	2680	4970	5970	738	835	1500	1410	1510	1620
27	1060	575	1100	2310	5830	6540	718	870	1580	1400	1450	1450
28	1170	606	1010	2300	6820	6040	674	910	1580	1420	1450	1450
29	1310	654	935	2450	8570	5620	606	940	1570	1440	1460	1650
30	1360		830	3110	8440	5170	606	970	1590	1460	1380	1770
31	1360		726		9090		634	985		1460		1800
Mean	1384	827	599	1393	5001	8606	1328	725	1088	1549	1492	1487
Runoff in Ac. Ft.	85090	47540	36820	82890	307500	512100	81670	44590	64720	95230	88800	91420

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

TABLE 90

FLOW OF MERCED RIVER BELOW SNELLING (YOSEMITE VALLEY RAILROAD CROSSING)* - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	5.6	1.9	1.6	4.8	734	2577	162	20	25	23	2.2	15
2	5.6	1.9	1.9	4.8	552	2317	130	20	26	12	2.2	16
3	6.1	2.5	1.9	5.2	425	2265	120	16	23	9.2	2.2	18
4	5.6	4.3	1.8	4.8	415	2928	120	16	18	8.0	2.2	10
5	5.2	5.2	1.9	7.0	401	3220	118	16	18	7.2	1.9	8.8
6	5.2	5.2	1.9	8.8	352	2815	110	16	20	6.1	2.2	8.8
7	5.2	4.8	1.6	7.0	267	1806	62	18	20	5.7	2.5	9.2
8	5.2	4.3	1.8	8.8	215	2900	61	16	20	5.3	2.5	10
9	5.2	3.4	2.0	11	183	3656	32	18	22	5.3	2.8	10
10	5.2	3.4	1.8	57	148	3740	20	18	20	4.6	3.0	10
11	5.2	3.0	1.8	33	133	3425	18	16	20	5.0	3.3	10
12	5.2	2.5	1.8	20	111	3000	18	16	22	5.3	3.3	10
13	5.2	2.5	3.0	15	108	2764	19	16	23	4.6	3.3	12
14	5.6	2.5	4.3	12	111	2504	20	16	23	4.2	3.6	14
15	4.8	3.0	4.8	11	111	2228	22	16	25	3.9	5.0	14
16	4.3	2.5	4.8	8.8	108	2038	15	16	20	3.9	5.7	12
17	4.3	2.4	4.8	7.9	100	1965	16	15	15	3.6	8.8	14
18	3.8	2.4	4.8	7.0	111	1855	18	15	13	3.3	4.6	14
19	2.5	2.5	5.6	6.6	118	1689	22	15	13	3.3	3.6	14
20	2.4	2.5	4.8	6.6	100	1332	20	16	12	3.0	3.3	10
21	2.2	2.0	4.8	7.0	144	1198	20	16	10	2.8	3.3	8.8
22	2.2	1.9	4.3	7.0	140	1120	20	16	11	2.8	5.7	9.6
23	2.0	1.8	4.8	12	125	1158	20	16	12	2.8	6.9	9.6
24	2.0	1.8	9.7	12	133	1105	21	18	12	2.8	8.0	8.4
25	2.4	1.9	50	8.8	125	955	29	17	16	2.8	9.2	7.6
26	2.4	1.9	12	8.8	125	766	29	20	20	2.5	11	11
27	2.4	1.8	7.9	26	111	740	29	29	20	2.5	11	14
28	2.2	1.9	5.6	29	500	585	20	30	18	2.5	12	12
29	2.0	1.8	5.2	75	2843	375	19	31	21	2.2	14	12
30	2.0		5.2	619	2633	271	21	34	22	2.2	15	10
31	2.0		4.8		2815		20	25		2.2		10
Mean	3.9	2.7	5.6	35.0	468	1977	44.2	18.8	18.7	5.0	5.5	11.4
Runoff in Ac. Ft.	240	158	343	2086	28750	117600	2719	1156	1111	307	326	700

* Formerly listed as Merced River at Yosemite Valley Railroad Crossing. Railroad bridge was removed during 1948.
NOTE: Station maintained and operated by Division of Water Resources. Station is at Mile 42.1 above mouth.

TABLE 91

FLOW OF MERCED RIVER AT CRESSEY BRIDGE - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	106	98	82	98	810	3040	297	62	62	87	48	56
2	106	95	82	98	870	2680	223	58	59	93	49	55
3	106	98	84	108	650	2430	215	55	63	87	49	57
4	106	98	84	106	608	2750	208	49	67	71	49	63
5	106	104	86	116	598	4020	194	44	66	67	47	57
6	106	113	81	170	560	3680	190	45	68	59	47	58
7	108	116	80	186	480	2850	164	46	68	51	47	59
8	108	113	78	145	397	2920	124	50	72	51	46	58
9	108	111	81	127	345	4150	111	49	68	46	46	60
10	108	108	76	204	310	5000	80	46	69	51	48	59
11	108	108	82	460	265	4680	75	50	66	57	48	62
12	104	104	81	280	248	3840	69	54	64	58	50	62
13	106	102	84	210	217	3450	66	51	64	58	50	62
14	106	102	98	164	215	2910	59	49	67	56	48	63
15	104	102	108	138	200	2680	59	52	67	55	47	68
16	106	102	108	122	196	2240	57	55	76	54	47	67
17	106	104	108	108	194	2100	54	51	75	54	48	68
18	106	102	106	98	190	1970	56	47	67	55	52	71
19	104	100	104	91	215	1900	55	48	66	52	49	71
20	102	98	102	84	217	1570	52	51	62	50	49	71
21	102	95	100	82	210	1360	49	52	66	50	51	69
22	100	93	100	84	232	1140	50	54	66	49	52	68
23	98	91	95	81	234	1160	48	48	66	48	54	66
24	98	87	104	78	208	1150	49	50	69	50	55	66
25	100	86	257	81	208	1060	54	57	74	49	55	67
26	102	86	278	75	192	850	60	51	80	48	51	68
27	100	87	174	72	186	795	62	49	87	48	52	81
28	98	86	142	86	174	754	64	56	84	47	54	82
29	98	87	127	132	1660	540	55	59	82	46	54	76
30	98		113	422	3020	413	52	64	86	46	55	75
31	98		106		3120		58	68		47		74
Mean	104	99.2	109	144	556	2336	97.1	52.2	69.9	56.1	49.9	65.8
Runoff in Ac. Ft.	6371	5704	6726	8541	34170	139000	5968	3213	4157	3451	2969	4044

NOTE: Station maintained and operated by Division of Water Resources. Station is at Cressey Bridge - Mile 27.6 above mouth.

TABLE 92

FLOW OF MERCED RIVER NEAR STEVINSON - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	150	122	110	152	404	2780	454	174	157	236	132	140
2	148	126	92	145	650	2690	370	189	164	213	129	138
3	148	124	102	148	690	2460	315	165	147	205	130	143
4	147	119	90	152	568	2380	320	152	146	205	128	144
5	147	130	100	152	556	2910	335	140	184	190	128	151
6	143	139	97	154	528	3470	290	160	213	190	126	152
7	147	140	90	175	468	3140	251	157	176	199	126	152
8	145	141	78	190	412	2640	233	173	174	193	127	151
9	145	140	93	175	380	2960	213	182	154	172	128	148
10	145	136	102	169	340	3810	222	169	144	166	126	147
11	145	136	109	222	308	4200	215	159	164	177	131	145
12	148	136	108	328	288	3940	198	167	177	190	129	146
13	148	134	119	278	267	3430	194	173	175	184	127	146
14	145	134	128	249	246	3170	181	155	168	184	132	147
15	145	135	134	225	247	2810	183	165	175	176	134	148
16	145	136	144	201	247	2540	170	189	184	175	130	150
17	145	135	148	190	240	2300	166	184	206	164	127	154
18	149	138	147	180	232	2180	176	172	233	152	129	154
19	149	136	145	173	270	2050	180	160	240	143	135	155
20	148	135	141	164	310	1920	164	158	223	138	131	153
21	145	132	144	157	293	1670	156	165	197	136	135	148
22	143	132	139	156	263	1430	147	182	190	136	137	146
23	135	131	140	152	273	1270	140	193	188	132	136	146
24	130	124	144	158	290	1270	157	181	199	131	134	145
25	128	114	148	144	277	1190	175	156	216	129	137	147
26	128	109	201	135	256	1080	169	155	219	134	136	151
27	121	108	232	127	247	920	144	153	263	133	135	153
28	119	112	196	131	252	870	137	153	251	134	138	158
29	114	117	179	211	333	695	145	176	224	133	143	159
30	108		166	252	1970	545	146	176	234	133	141	157
31	110		156		2640		156	154		132		155
Mean	139	129	133	182	476	2291	210	167	193	165	132	149
Runoff in Ac. Ft.	8550	7440	8180	10800	29250	136300	12900	10290	11470	10150	7850	9180

NOTE: U. S. Geological Survey, U. S. Bureau of Reclamation and Division of Water Resources cooperative station located at Mile 4.6R above mouth. The recording gage operated by the Division of Water Resources at a point 1.1 miles above mouth was discontinued in 1944. Station also known as "Merced River below Stevinson Drain (near Mouth)."

TABLE 93

FLOW OF MERCED RIVER SLOUGH NEAR NEWMAN - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					0	319	0.3					
2					0	305	0.1					
3					0	253	0					
4					0	232	0					
5					0	343	0					
6					0	473	0					
7					0	405	0					
8					0	298	0					
9					0	354	0					
10					0	534	0					
11					0	620	0					
12	N	N	N	N	0	570	0	N	N	N	N	N
13	0	0	0	0	0	466	0	0	0	0	0	0
14					0	416	0					
15					0	336	0					
16					0	270	0					
17	F	F	F	F	0	209	0	F	F	F	F	F
18	L	L	L	L	0	184	0	L	L	L	L	L
19	0	0	0	0	0	157	0	0	0	0	0	0
20	W	W	W	W	0	131	0	W	W	W	W	W
21					0	85	0					
22					0	53	0					
23					0	37	0					
24					0	37	0					
25					0	30	0					
26					0	23	0					
27					0	13	0					
28					0	9.8	0					
29					0	4.3	0					
30					128	.8	0					
31					283		0					
Mean	0	0	0	0	13.3	239	0.01	0	0	0	0	0
Runoff in Ac. Ft.	0	0	0	0	815	14220	0.8	0	0	0	0	0

NOTE: This station records the flow which at high stages in the Merced River by-passes the Hills Ferry Road Bridge and reaches the San Joaquin River below the U.S.G.S. station "near Newman", at Mile 122.2 above mouth. This is a U. S. Geological Survey, U. S. Bureau of Reclamation and Division of Water Resources cooperative station. Station also known as "Merced River Slough near Hills Ferry Road Bridge."

TABLE 94

FLOW OF TUOLUMNE RIVER AT LA GRANGE BRIDGE - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	479	65	e11	3.2	e672	1320	1480	9.1	9.1	458	e580	625
2	529	30	e7.7	4.1	e580	1250	1050	9.1	12.0	458	625	576
3	563	31	e5.4	5.4	499	1930	977	8.4	9.1	387	558	554
4	380	29	e3.5	4.7	508	2120	454	8.4	8.0	369	563	541
5	537	e29	e1.7	7.7	512	2790	73	8.4	8.0	430	580	492
6	533	e28	e0.8	6.9	520	2260	17	8.4	9.7	387	602	529
7	546	e28	e0.7	4.7	524	1200	15	8.4	8.4	365	483	571
8	516	e26	e0.5	3.8	524	702	14	8.4	8.4	376	546	571
9	491	e25	e0.3	4.1	533	1320	14	8.4	8.4	372	571	616
10	466	e17	e0.2	5.4	533	2360	14	8.0	8.4	265	e558	571
11	365	e11	0.0	2.9	541	2870	14	8.0	8.4	e391	e558	571
12	434	e6.9	0.0	2.0	563	3600	14	8.0	7.3	336	554	470
13	426	e4.1	0.0	1.2	414	3660	14	8.0	6.2	329	580	558
14	446	e1.7	0.3	0.3	479	3680	13	8.0	8.4	347	495	580
15	450	e0.3	1.0	0.0	957	3870	12	8.0	15	e495	550	594
16	450	e0.0	1.2	0.0	1320	4230	12	8.0	9.1	e516	584	667
17	442	e0.2	1.5	0.0	2060	4390	12	8.4	9.7	e537	594	634
18	252	e1.7	1.4	0.0	2080	4320	11	8.0	9.1	e558	602	612
19	410	e4.4	2.0	256	1180	2300	12	8.0	8.4	580	602	524
20	450	e7.7	1.7	537	707	1140	12	8.0	6.9	580	594	630
21	454	e12	1.7	46	639	1240	10	8.0	8.0	580	487	658
22	442	e15	1.7	15	503	1430	9.7	8.4	7.3	576	541	648
23	450	e15	0.2	14	426	2480	9.1	8.4	170	558	580	977
24	403	e14	4.1	14	677	2670	8.4	8.4	470	507	571	858
25	249	e14	4.4	14	1560	3470	8.4	9.1	495	513	630	546
26	462	e13	3.8	15	1910	3560	8.4	9.1	454	550	576	537
27	438	e12	2.3	16	3090	3200	8.4	9.1	434	554	594	802
28	458	e12	2.0	e529	3130	3170	8.4	9.1	462	533	503	957
29	462	e11	2.3	e903	1420	2660	8.4	9.7	454	537	598	1010
30	462		3.8	e778	1520	2140	9.1	8.4	479	537	607	1080
31	438		3.8		1810		9.1	10.0		e495		936
Mean	448	16.0	2.3	106	1045	2578	140	8.5	120	467	569	661
Runoff in Ac. Ft.	27540	920	141	6334	64250	153400	8591	522	7163	28710	33850	40650

NOTE: Station maintained jointly by Division of Water Resources and Turlock Irrigation District. Station is at Mile 50.5 above mouth.
e Estimated.

TABLE 95

FLOW OF TUOLUMNE RIVER AT ROBERTS FERRY BRIDGE - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	563	289	53	45	143	1470	1620	43	40	546	546	671
2	520	101	53	49	568	910	1032	43	42	541	633	671
3	603	77	53	53	585	1700	962	42	40	510	615	627
4	485	73	53	53	585	1840	766	43	45	460	597	603
5	505	75	52	61	591	2638	210	42	43	536	609	563
6	563	73	50	93	591	2280	115	42	43	510	609	585
7	585	71	50	73	591	1290	73	40	42	475	603	609
8	558	65	47	59	585	773	63	43	42	480	541	639
9	515	69	50	52	585	850	57	43	39	500	633	671
10	525	63	47	77	585	2104	55	42	38	430	633	633
11	435	65	47	84	585	2475	59	39	39	440	585	627
12	430	65	45	67	591	3413	57	39	39	460	609	546
13	470	65	52	55	520	3482	53	39	38	450	609	580
14	490	67	55	53	510	3566	50	39	36	450	568	627
15	485	67	e55	47	801	3818	46	40	35	546	574	621
16	485	67	e55	45	1112	4225	46	39	40	520	627	671
17	485	67	e53	45	1710	4514	45	32	39	505	627	678
18	337	67	e53	42	2060	4498	45	36	38	541	627	645
19	394	65	e53	93	1390	3116	43	38	35	591	627	568
20	465	65	e53	546	815	1144	45	39	38	603	627	615
21	465	65	53	321	684	1196	45	38	35	615	563	664
22	465	65	53	93	580	1214	45	39	34	609	558	645
23	465	63	49	67	495	2049	43	40	73	597	621	745
24	450	61	57	57	574	2638	45	42	510	563	621	895
25	313	59	59	57	1290	3089	45	39	536	558	627	671
26	398	57	61	53	1640	3846	45	40	515	597	627	546
27	455	57	53	53	2364	3156	45	42	510	615	615	664
28	475	53	53	71	3650	3116	45	39	530	609	603	815
29	485	53	50	115	1350	2750	43	40	530	609	597	940
30	485		49	73	1400	2016	42	40	563	615	658	978
31	470		46		1680		40	42		546		888
Mean	478	74.1	52.0	88.4	1007	2506	191	40.1	154	536	606	674
Runoff in Ac. Ft.	29400	4262	3197	5260	61900	149100	11750	2467	9178	32980	36080	41460

NOTE: Station maintained jointly by Division of Water Resources and Modesto Irrigation District. Station is at Mile 39.9 above mouth.
e Estimated.

TABLE 96

FLOW OF TUOLUMNE RIVER AT HICKMAN-WATERFORD BRIDGE - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	646	478	104	133	142	2104	2170	133	135	652	674	776
2	561	206	104	133	625	1314	1412	135	135	641	840	801
3	685	165	104	138	685	2112	1336	133	133	605	776	733
4	590	152	102	138	685	2212	1159	133	133	542	751	697
5	547	162	102	138	691	2907	386	130	135	625	776	680
6	652	162	104	162	697	2822	238	128	135	605	770	652
7	674	152	104	154	691	1814	168	133	138	571	776	691
8	658	141	110	138	697	1045	152	133	138	575	636	733
9	615	138	117	133	703	975	141	133	135	556	764	764
10	620	130	117	138	727	2364	133	135	135	510	776	733
11	533	125	117	160	727	2639	138	135	133	515	739	721
12	487	120	120	149	721	3560	138	135	133	538	757	641
13	575	115	130	138	658	3615	138	133	135	547	745	641
14	590	112	135	138	641	3681	141	125	133	524	733	703
15	580	110	130	135	872	3895	141	128	135	770	658	703
16	585	110	141	135	1449	4264	168	130	138	610	757	727
17	571	107	138	133	1957	4552	135	128	141	610	776	788
18	461	107	135	133	2474	4540	135	125	133	620	776	727
19	474	107	138	130	1924	3615	135	125	133	715	776	663
20	580	107	133	590	1159	1524	133	128	133	715	745	658
21	580	107	133	478	989	1539	138	128	133	739	685	770
22	580	107	130	191	820	1592	135	130	133	739	641	757
23	580	104	133	152	674	2271	130	133	138	727	745	807
24	561	102	138	143	658	2964	133	133	571	668	745	1031
25	414	100	138	141	814	3110	135	135	652	641	757	866
26	465	100	138	138	1892	3976	135	130	630	715	733	620
27	580	97	138	138	2398	3334	138	130	620	733	776	709
28	580	102	135	143	3964	3292	135	128	641	739	745	954
29	580	104	135	304	1721	3080	135	128	636	751	680	1116
30	580		135	188	1790	2406	133	128	663	757	770	1196
31	580		133		2145		133	133		674		1181
Mean	573	135	125	175	1187	2771	328	131	250	643	743	782
Runoff in Ac. Ft.	35230	7793	7678	10440	72970	164900	20190	8041	14910	39530	44190	48080

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

TABLE 97

FLOW OF TUOLUMNE RIVER AT MODESTO - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	833	643	220	236	424	3080	2460	322	268	844	751	886
2	730	408	220	234	563	2440	1660	312	264	826	875	900
3	787	314	216	251	872	2580	1460	300	264	802	875	861
4	787	288	214	244	861	2920	1410	305	264	754	864	816
5	649	282	212	298	844	3220	950	302	277	757	878	796
6	760	282	208	314	830	3410	589	307	268	993	886	742
7	778	266	206	430	819	2640	457	317	268	775	918	775
8	778	266	212	362	861	1540	379	352	268	742	799	796
9	742	257	212	312	836	1190	356	344	262	733	872	812
10	733	255	208	282	850	2010	324	334	262	727	914	844
11	703	247	208	275	840	2590	319	324	259	688	896	799
12	607	244	208	457	844	3480	324	319	262	868	868	787
13	685	240	242	354	844	3730	288	322	262	796	886	724
14	694	232	242	305	772	3850	293	302	266	739	896	784
15	703	228	247	270	878	3850	298	295	264	822	805	796
16	703	226	255	249	1330	4150	279	298	270	1020	864	805
17	721	228	257	234	1700	4450	277	284	262	775	889	896
18	679	226	257	222	2510	4540	277	286	262	700	896	868
19	543	228	284	216	2400	4400	282	286	288	766	910	826
20	658	228	284	379	1780	2210	266	284	273	790	910	745
21	700	226	259	718	1450	1740	273	268	266	793	872	822
22	703	226	266	503	1340	1720	270	270	259	799	772	864
23	703	226	253	324	1160	2080	259	288	255	784	847	854
24	691	230	262	273	1010	2980	259	279	411	772	889	1050
25	625	228	288	264	1280	3040	262	268	742	712	903	1030
26	506	224	667	251	1960	3880	253	268	799	736	861	858
27	613	224	457	234	2360	3610	275	262	787	790	854	793
28	658	232	329	251	3810	3460	273	266	778	808	882	1010
29	667	224	284	509	2820	3440	279	264	808	822	784	1170
30	664		259	506	2160	2750	291	270	822	833	858	1240
31	658		247		2840		302	273		812		1280
Mean	692	263	264	325	1414	3033	514	296	375	793	866	878
Runoff in Ac. Ft.	42570	15130	16230	19350	86970	180500	31620	18190	22330	48750	51520	54010

NOTE: Station maintained jointly by Division of Water Resources, U. S. Geological Survey, and Modesto Irrigation District. Prior to July 11, 1947 station was located at old U. S. 99 Highway Bridge at Mile 15.75 above mouth. Subsequent to July 11, 1947 station was located at the Tidewater Southern R.R. Bridge at Mile 15.92.

TABLE 98

FLOW OF TUOLUMNE RIVER AT TUOLUMNE CITY - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	845	680	260	280	480	2890	2410	365	350	790	795	855
2	825	535	250	270	460	2670	1910	375	340	785	800	875
3	730	380	250	295	770	2240	1520	355	335	765	825	875
4	845	340	250	285	840	2680	1460	340	330	735	810	835
5	705	335	250	300	830	2790	1230	345	345	690	810	800
6	710	325	240	345	810	3260	790	340	340	750	815	760
7	765	315	245	390	795	2740	635	340	330	720	815	760
8	780	305	245	395	830	1810	525	360	325	700	810	790
9	765	305	255	355	830	1150	500	350	320	690	765	810
10	720	295	250	335	830	1430	450	340	315	685	825	840
11	720	295	245	315	820	2430	425	335	315	670	825	815
12	640	290	245	395	820	3050	450	340	315	840	800	785
13	640	285	255	405	820	3650	410	345	310	825	800	725
14	635	285	280	350	755	3800	395	330	320	750	805	750
15	625	280	275	320	790	3740	375	330	315	780	760	780
16	615	280	290	295	1150	3890	370	345	330	1032	755	780
17	610	275	295	285	1508	4120	350	340	315	830	790	850
18	600	275	295	275	1890	4270	350	340	330	750	800	860
19	590	275	305	265	2100	4210	360	335	345	800	805	825
20	615	270	325	280	1720	2880	345	345	330	835	815	740
21	635	270	305	590	1420	1790	335	345	325	845	805	770
22	655	270	295	560	1340	1720	335	360	325	865	720	855
23	675	270	290	410	1260	1800	335	370	325	850	740	820
24	685	270	290	325	1170	2610	325	370	350	835	795	965
25	670	260	315	315	1190	2870	320	370	630	770	820	1030
26	550	255	475	395	1570	3620	315	365	720	780	805	840
27	570	250	525	280	1850	3860	315	360	735	795	795	750
28	655	260	385	280	2850	3510	315	355	720	800	830	875
29	670	265	335	400	3170	3460	310	365	735	800	790	1055
30	680		310	530	1890	2870	350	340	760	795	800	1125
31	685		295		2420		350	350		795		1210
Mean	681	310	294	351	1290	2927	609	350	406	786	798	852
Runoff in Ac. Ft.	41871	17841	18099	20866	79295	174169	37418	21511	24159	48301	47455	52374

NOTE: Station maintained jointly by Division of Water Resources, City of San Francisco Public Utilities Commission (Hetch Hetchy Water Supply), and Turlock Irrigation District. Station is 3.35 miles above the mouth.

TABLE 99

FLOW OF DRY CREEK NEAR MODESTO (CLAUSS ROAD BRIDGE) - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	24	21	19	13	148	504	36	44	72	61	31	28
2	24	19	20	25	119	466	31	41	55	56	35	28
3	24	18	19	23	118	441	31	35	52	57	35	28
4	24	19	17	22	57	393	68	31	64	65	34	30
5	25	20	17	116	43	319	96	31	64	65	30	28
6	24	20	17	e114	38	155	122	40	62	62	28	26
7	23	21	16	e100	42	115	48	48	57	63	27	24
8	23	20	17	e87	41	60	36	45	59	62	29	24
9	22	20	17	e74	42	42	35	46	54	58	29	26
10	22	20	17	62	54	41	29	41	56	62	29	26
11	22	19	18	92	48	e41	31	46	60	74	30	25
12	22	19	17	248	36	51	30	50	59	153	31	24
13	22	18	19	135	39	e50	29	46	62	110	31	25
14	22	18	31	91	46	e50	28	56	62	96	33	25
15	22	18	44	60	56	e49	27	53	57	75	32	25
16	21	18	40	44	64	e49	25	58	60	154	30	24
17	21	18	44	34	68	e49	25	57	65	73	29	27
18	21	18	61	29	70	e48	30	54	79	47	30	26
19	21	18	106	25	141	e48	31	56	89	34	36	26
20	21	18	83	23	220	e47	30	65	83	31	38	26
21	21	18	67	21	252	e47	28	69	77	28	35	28
22	20	18	77	104	263	46	31	71	61	27	33	25
23	20	18	52	46	252	35	30	71	56	27	30	24
24	20	18	44	29	238	35	27	72	57	28	26	22
25	20	18	135	26	198	39	27	68	67	28	25	20
26	20	e18	535	25	180	42	29	62	68	29	25	21
27	20	e18	201	25	183	36	33	61	67	30	25	22
28	20	e18	106	22	182	37	36	62	64	30	26	29
29	20	18	65	72	156	37	35	62	65	29	28	30
30	20		46	171	209	39	33	75	60	28	28	33
31	20		38		531		41	86		27		31
Mean	21.6	18.7	64.7	65.3	133	114	37.7	54.9	63.8	57.1	30.3	26.0
Runoff in Ac. Ft.	1330	1080	3980	3880	8200	6770	2317	3380	3790	3510	1800	1600

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

TABLE 100

FLOW OF STANISLAUS RIVER AT ORANGE BLOSSOM BRIDGE - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	246	24	18	19	3030	3900	789	24	24	19	57	52
2	54	42	16	19	2680	3950	630	24	21	18	62	70
3	140	341	15	84	2520	4510	382	24	20	18	96	70
4	36	304	27	62	2520	4480	228	22	22	18	93	79
5	21	242	25	156	2370	4450	192	22	21	18	99	73
6	17	38	20	146	1400	4070	70	22	22	18	87	62
7	25	24	17	82	4830	4020	47	23	22	18	84	109
8	153	22	16	38	4180	4220	40	24	21	17	49	182
9	25	21	15	29	2770	4410	36	24	22	17	60	90
10	20	257	16	138	2680	4760	34	23	21	18	82	90
11	19	36	18	161	2230	4740	34	23	22	133	141	87
12	18	22	17	151	2300	4170	34	24	22	117	175	90
13	17	20	19	125	2510	3540	33	24	22	57	182	67
14	22	19	23	99	3300	3640	27	27	21	47	272	141
15	109	18	24	70	4220	3600	24	31	20	42	115	90
16	125	17	24	57	4420	3520	24	24	20	47	165	330
17	130	16	52	52	5570	2220	20	25	22	54	175	315
18	29	18	40	49	5840	311	22	25	25	79	175	148
19	20	18	31	3090	5100	208	24	24	36	76	175	90
20	198	20	34	2550	4200	211	22	24	36	87	182	57
21	359	19	23	1820	3500	870	22	24	27	87	195	70
22	341	17	20	1550	2560	1250	22	24	22	87	44	109
23	359	16	19	1460	1580	1070	23	23	19	82	65	125
24	494	17	130	3720	2640	1180	24	23	19	79	76	90
25	34	146	294	2340	3950	1320	24	24	20	54	76	87
26	44	198	57	2030	5200	1450	23	24	20	57	67	90
27	378	195	25	2180	6700	1480	24	24	19	96	47	151
28	315	156	20	2160	6720	1320	24	24	19	87	54	135
29	308	22	19	2670	5320	1190	24	24	19	73	38	109
30	272		17	3330	4470	892	24	24	19	93	36	99
31	99		18		3480		24	23		90		93
Mean	143	79.5	35.8	1130	3703	2698	95.8	24.0	22.2	58.2	107	111
Runoff in Ac. Ft.	8781	4572	2200	67230	227700	160600	5891	1476	1319	3576	6395	6843

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

TABLE 101

FLOW OF STANISLAUS RIVER AT RIVERBANK (BURNEYVILLE BRIDGE) - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	680	96	34	14	3020	3330	1030	100	82	62	156	102
2	232	54	30	13	2700	3990	950	98	84	68	106	128
3	224	391	29	46	2540	4240	805	98	64	68	124	134
4	174	493	e74	150	2520	4300	667	98	76	68	170	132
5	90	473	e82	120	2320	4500	566	88	100	e66	166	126
6	82	170	e34	279	1890	4200	443	90	102	e68	164	124
7	54	68	e22	214	e3280	3860	214	92	100	e68	162	106
8	252	54	e18	78	4110	4070	172	94	92	e68	158	315
9	98	50	e14	43	3340	4180	154	100	72	e64	104	180
10	60	290	e14	60	2490	4500	150	98	54	58	130	156
11	30	110	e21	351	2350	4730	138	94	45	120	224	148
12	29	e26	e21	246	2270	4140	154	102	e56	216	334	146
13	27	e13	e29	174	2350	3840	220	98	60	176	355	140
14	26	e12	54	130	2860	3260	232	100	60	108	353	180
15	134	e10	37	108	3740	3600	232	104	64	98	431	178
16	196	e8	45	90	3900	3490	206	104	60	94	294	156
17	218	e6	58	70	4830	3010	114	106	66	100	363	634
18	100	e13	72	64	5640	e922	106	104	66	112	370	366
19	45	e19	50	1190	5320	e680	106	114	62	130	370	186
20	78	e52	41	2680	4350	637	106	122	56	130	374	140
21	468	e24	60	2020	3600	805	102	106	58	152	374	104
22	489	e19	70	1680	2720	1390	104	114	60	154	226	124
23	493	e16	80	1180	2300	1280	104	114	58	156	126	238
24	515	e13	122	3330	1940	1270	120	106	60	154	158	154
25	146	90	464	2770	3330	1380	122	106	70	146	170	138
26	62	260	178	2160	4320	1530	130	100	80	76	170	138
27	397	579	66	2230	5840	1550	122	98	72	162	160	200
28	517	374	34	2100	6930	1450	120	96	64	154	138	265
29	482	104	24	2510	5760	1330	110	66	60	124	130	184
30	460		16	3230	4630	1140	114	76	60	146	104	164
31	256		14		4000		102	80		162		146
Mean	229	134	61.5	978	3587	2753	258	98.9	68.8	114	222	182
Runoff in Ac. Ft.	14110	7710	3782	58180	220500	163800	15900	6081	4092	6998	13220	11170

NOTE: Station is maintained jointly by Division of Water Resources, Oakdale and South San Joaquin Irrigation Districts. Station is at Mile 32.0 above mouth.

e Estimated.

TABLE 102

FLOW OF STANISLAUS RIVER AT RIPON - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	632	263	200	142	3020	4240	1130	212	177	163	209	177
2	450	195	164	144	2760	4080	1020	180	169	156	193	179
3	279	209	169	146	2530	4250	903	172	166	157	174	188
4	287	387	162	184	2420	4510	750	172	176	154	187	190
5	229	418	140	195	2350	4600	641	174	179	152	200	193
6	195	366	150	226	2190	4630	544	169	176	148	201	190
7	177	224	150	255	2180	4330	406	172	179	148	203	187
8	177	185	150	214	3660	4140	330	184	166	156	200	190
9	265	171	130	179	3620	4240	287	185	157	158	184	294
10	193	174	130	162	2760	4370	278	177	176	168	166	228
11	168	274	130	209	2500	4640	250	169	158	190	184	206
12	160	187	133	272	2280	4790	233	166	152	253	234	203
13	157	160	150	246	2300	4410	231	176	156	301	297	200
14	152	151	157	217	2590	3840	211	171	142	267	321	190
15	154	150	166	198	3140	3750	217	182	152	248	357	228
16	212	140	164	187	3630	3710	208	184	156	226	324	214
17	241	130	179	179	3880	3560	204	179	157	196	306	323
18	248	140	180	169	4440	2330	204	164	163	185	333	468
19	188	150	179	308	5090	1240	209	164	164	198	344	346
20	164	150	163	2020	5060	1050	201	200	168	200	350	260
21	234	160	156	1970	4470	987	208	168	160	212	351	219
22	416	150	148	1600	3620	1440	195	180	171	217	350	201
23	435	150	145	1330	2840	1520	190	190	162	219	241	211
24	452	150	146	2040	2140	1360	195	177	160	219	211	253
25	385	150	248	2800	2920	1410	201	171	157	219	217	216
26	231	203	384	2160	3570	1530	195	180	164	201	219	206
27	224	279	240	2030	4360	1640	204	172	166	187	216	206
28	402	317	188	2030	5520	1590	182	169	169	212	206	253
29	440	303	169	2220	6390	1440	184	169	154	212	200	262
30	425		158	2730	5940	1290	193	177	168	195	192	226
31	374		146		5170		187	190		204		209
Mean	282	210	170	892	3524	3031	342	177	164	197	246	230
Runoff in Ac. Ft.	17350	12070	10460	53080	216700	180300	21010	10900	9760	12140	14620	14110

NOTE: Station maintained jointly by Division of Water Resources, Water Resources Branch of the U. S. Geological Survey, U. S. Bureau of Reclamation, and Modesto Irrigation District. Station is at Highway 99 and is 16 miles above mouth of river.

TABLE 103

FLOW OF STANISLAUS RIVER NEAR MOUTH - 1948

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	569	309	209	166	2950	4510	1250	177	134	150	163	156
2	533	243	167	163	2850	4100	1140	198	124	126	170	159
3	348	202	146	168	2650	4150	1040	174	e107	143	157	161
4	303	294	147	168	2460	4260	930	154	e117	114	159	163
5	280	391	115	204	2430	4350	813	163	e133	110	174	163
6	243	395	116	200	2310	4450	700	157	e140	115	182	157
7	222	294	120	234	1920	4350	599	170	e135	123	183	157
8	207	239	114	241	3160	4100	485	183	e128	124	183	155
9	253	212	143	210	3480	4030	439	167	e122	123	167	196
10	243	195	124	194	2990	4070	381	151	119	141	141	e196
11	212	250	122	183	2580	4240	364	139	113	141	139	e160
12	198	236	117	246	2350	4460	318	137	105	182	164	e189
13	189	182	130	255	2320	4500	296	137	108	236	209	e212
14	178	159	155	239	2430	4240	284	142	97	248	251	e244
15	178	156	164	220	2870	3920	284	154	99	226	258	e270
16	198	141	174	210	3340	3910	258	152	107	209	280	e305
17	236	141	178	201	3520	3860	253	139	110	194	248	e334
18	248	146	174	194	3760	3290	251	130	113	176	263	e374
19	231	145	178	173	4060	1940	238	131	137	163	273	e315
20	190	141	177	835	4310	1470	214	141	142	170	277	e253
21	180	126	170	1920	4260	1130	198	136	126	157	278	e204
22	316	134	167	1680	3800	1350	200	128	112	176	277	177
23	379	140	163	1420	3130	1740	176	156	112	167	243	170
24	398	125	161	1300	2490	1560	184	142	113	178	e189	189
25	419	125	171	2720	2610	1600	212	121	116	171	e183	189
26	298	117	316	2360	3220	1700	201	119	137	152	e178	177
27	217	176	273	2040	3670	1870	206	134	117	139	e174	171
28	280	231	218	2100	4130	1840	186	121	120	150	e170	180
29	393	267	195	2160	4660	1660	168	132	123	163	e164	212
30	413		182	2510	4990	1510	178	139	130	154	e160	200
31	400		173		4820		173	148		159		183
Mean	288.8	203.9	166.4	830.5	3242	3139	407.1	147.5	119.9	160.6	201.9	205.5
Runoff in Ac. Ft.	17760	11730	10230	49420	199400	186800	25030	9070	7130	9880	12010	12640

NOTE: Station maintained jointly by Division of Water Resources, U. S. Bureau of Reclamation, City of San Francisco and Modesto Irrigation District. Station is located 4.3 miles above mouth and 1.6 miles below the now abandoned station at Bret Harte Pump. Also called "Stanislaus River at Mile 4.3."

e Estimated.

TABLE 104

SUMMARY OF WATER UTILIZATION OF SACRAMENTO-SAN JOAQUIN VALLEYS

	Year	Acreage			Diversion Acre-Feet	Irrigation Draft Average c.f.s. July	Gross Duty of Water (1)		Runoff in % of Normal Sacto. R. at Red Bluff
		General	Rice	Total			Ac. Ft. per Acre	Acres per Sec. Ft.	
Sacramento River Redding to Sacramento	1939	158800	63900	222700	1301000	3746	5.74	85	50
	1940	119700	64400	184100	1063000	4050	5.65	86	120
	1941	118600	85200	203800	1150000	4314	5.53	88	164
	1942	111200	107700	218900	1279000	4662	5.74	85	129
	1943	107400	115600	223000	1417000	4699	6.24	78	97
	1944	111900	122200	234100	1678000	5502	7.06	69	53
	1945	106500	115100	221600	1676000	5766	7.44	65	76
	1946	117400	124100	241500	1778000	5560	7.24	67	92
	1947	121600	124000	245600	1707000	5600	6.82	71	58
	Av. 1939 to 1947	119200	102500	221700	1450000	4878	6.38	77	93
	1948	149700	128300	278000	1593000	5947	5.70	85	87
									Sacto. R. at Red Bluff
Back Borrow Pit Knights Landing Outfall Gates to Highway 20 Bridge	1939	1710	5770	7480	42600	139	5.70	85	50
	1940	3130	3260	6390	20600	89	3.22	151	120
	1941	3890	1970	5860	19500	103	3.33	146	164
	1942	2760	5650	8410	37800	179	4.49	108	129
	1943	2810	11680	14490	74600	279	5.15	94	97
	1944	960	9020	9980	65800	240	6.59	74	53
	1945	1580	5180	6760	38500	161	5.69	86	76
	1946	2060	7880	9940	70900	256	7.13	68	92
	1947	2300	9040	11340	73900	254	6.52	75	58
	Av. 1939 to 1947	2360	6610	8960	49400	189	5.31	99	93
	1948	2460	7080	9540	82500	332	8.65	56	87
									Sacto. R. at Red Bluff
Colusa Trough above Highway 20 Bridge	1939		1060	1060	32200	109	30.38	16	50
	1940	200	700	900	39400	136	43.78	11	120
	1941	240	1280	1520	30300	106	19.93	24	164
	1942	240	1520	1760	28300	104	16.08	30	129
	1943	600	2770	3370	40700	160	12.08	40	97
	1944	1540	4490	6030	53700	198	8.91	55	53
	1945	200	3880	4080	48500	171	11.89	41	76
	1946	3030	3690	6720	71200	256	10.60	46	92
	1947	1740	6470	8210	79200	276	9.65	50	58
	Av. 1939 to 1947	870	2870	3740	47100	168	18.14	35	93
	1948	3250	4740	7990	67500	275	8.45	57	87
									Sacto. R. at Red Bluff
Yolo By-Pass and Knights Landing Ridge Cut	1939	2540	2630	5170	33100	116	6.40	76	50
	1940	2500		2500	3840	32	1.54	316	120
	1941	1840	890	2730	9860	44	3.61	135	164
	1942	1730	880	2610	12370	52	4.74	103	129
	1943	1860	1410	3270	18790	84	5.72	85	97
	1944	1540	4230	5770	33360	126	5.78	84	53
	1945	1820	3820	5640	35800	141	6.35	77	76
	1946	1790	3000	4790	30260	112	6.32	77	92
	1947	3220	2980	6200	27200	110	4.39	111	58
	Av. 1939 to 1947	2090	2200	4290	22720	91	4.98	118	93
	1948	1710	2260	3970	27800	93	7.00	70	87
									Feather R. near Oroville
Lower Butte Creek and Butte Slough	1939	12300	600	12900	36300	91	2.81	173	39
	1940	9600	400	10000	28100	74	2.81	173	116
	1941	9600		9600	27000	40	2.81	173	133
	1942	8700	1000	9700	31900	65	3.29	148	136
	1943	8700	2000	10700	35900	77	3.36	145	115
	1944	7800	1800	9600	33700	60	3.51	138	57
	1945	7800	2100	9900	39600	88	4.00	121	77
	1946	8200	1800	10000	45600	123	4.56	106	85
	1947	4500	1100	5600	19800	58	3.54	137	52
	Av. 1939 to 1947	8580	1200	9780	33100	75	3.41	146	90
	1948	4650	660	5310	27600	106	5.20	93	80

(1) Excluding Municipal diversions on Sacramento River, the City of Sacramento and the City of Redding.

TABLE 104 (CONT'D)

SUMMARY OF WATER UTILIZATION OF SACRAMENTO-SAN JOAQUIN VALLEYS

	Year	Acreage			Diversion Acre-Feet	Irrigation Draft Average c.f.s. July	Gross Duty of Water (1)		Runoff in % of Normal Feather R. near Oroville
		General	Rice	Total			Ac. Ft. per Acre	Acres per Sec. Ft.	
East and West Borrow Pits of Sutter By-Pass and Sacramento Slough	1939	7660	1640	9300	32600	108	3.51	139	39
	1940	8090	650	8740	24300	118	2.78	175	116
	1941	7830	2440	10270	31300	141	3.05	159	133
	1942	5550	1790	7340	22700	88	3.09	157	136
	1943	5380	3040	8420	33100	133	3.93	124	115
	1944	5890	4300	10190	51100	195	5.01	97	57
	1945	4710	7000	11710	54700	199	4.67	104	77
	1946	9380	4920	14300	59200	217	4.14	117	85
	1947	8840	3210	12050	48400	180	4.02	121	52
	Av. 1939 to 1947	7040	3220	10260	39700	153	3.80	133	90
	1948	7920	2640	10550	36200	149	3.43	142	80
									Feather R. near Oroville
Feather River Mouth to Oroville Bridge	1939	29200	26300	55500	501400	1497	9.03	54	39
	1940	30100	23500	53600	474000	1713	8.84	55	116
	1941	27700	26600	54300	475200	1684	8.75	56	133
	1942	38500	25200	63700	539700	2042	8.47	57	136
	1943	24100	46600	70700	623600	2134	8.82	55	115
	1944	25200	49800	75000	712900	2312	9.51	51	57
	1945	25100	47900	73000	698400	2313	9.57	51	77
	1946	27200	51100	78300	744800	2362	9.51	51	85
	1947	28300	49700	78000	674400	2245	8.65	56	52
	Av. 1939 to 1947	28400	38500	66900	604900	2034	9.02	54	90
	1948	29500	43300	72800	586300	2292	8.05	60	80
									Yuba R. at Smartville
Yuba River	1939	6640	1900	8540	73100	210	8.56	57	36
	1940	7220	1270	8490	70000	247	8.24	59	115
	1941	7470	1350	8820	73500	221	8.33	58	129
	1942	6660	1120	7780	74700	243	9.60	51	137
	1943	6280	2310	8590	93800	280	10.92	45	126
	1944	7010	2400	9410	93300	273	9.91	49	56
	1945	8810	1090	9900	84200	229	8.51	57	88
	1946	8870	1960	10830	98700	278	9.11	53	96
	1947	8280	3630	11910	100100	282	8.40	58	55
	Av. 1939 to 1947	7470	1890	9360	84600	251	9.06	54	93
	1948	8720	3110	11830	92800	281	7.84	62	81
									American R. at Fairoaks
American River Mouth to Fairoaks	1939	3060		3060	6650	28	2.17	223	36
	1940	3060		3060	6050	29	1.98	246	118
	1941	3050		3050	5310	25	1.74	279	109
	1942	3130		3130	4170	23	1.33	365	136
	1943	3110		3110	4580	25	1.47	330	135
	1944	3200		3200	4820	25	1.51	323	51
	1945	2940		2940	3860	16	1.31	370	88
	1946	2890		2890	4120	18	1.43	341	100
	1947	3670		3670	5910	19	1.61	302	49
	Av. 1939 to 1947	3120		3120	5050	23	1.62	309	91
	1948	3630		3630	5880	28	1.62	302	78
Combined Sacramento River System									Sacto R. at Red Bluff
Sacramento River and Tributaries	1939	215300	103800	319100	2059000	6045	6.45	75	50
	1940	176500	94200	270700	1729300	6488	6.39	76	120
	1941	172400	119800	292200	1822100	6678	6.24	78	164
	1942	158500	158100	316600	2030600	7458	6.41	76	129
	1943	153200	185400	338600	2342700	7872	6.92	70	97
	1944	157500	189300	346800	2661300	8931	7.67	63	53
	1945	157300	186000	343300	2680000	9082	7.81	62	76
	1946	180900	198100	379000	2898800	9360	7.65	64	92
	1947	182400	200200	382600	2736100	9023	7.15	68	58
	Av. 1939 to 1947	172700	159400	332100	2328900	7880	6.97	70	93
	1948	211500	192100	403600	2519600	9503	6.17	79	87

(1) Excluding Municipal diversions on Sacramento River, the City of Sacramento and the City of Redding.

TABLE 104(CONT'D)

SUMMARY OF WATER UTILIZATION OF SACRAMENTO-SAN JOAQUIN VALLEYS

	Year	Acreage			Diversion Acre-Feet	Irrigation Draft Average c.f.s. July	Gross Duty of Water		Runoff in % of Normal San Joaquin R. near Vernalis
		General	Rice	Total			Ac. Ft. per Acre	Acres per Sec.Ft.	
Old San Jo. River and Tom Paine Slough	1939	38900		38900	81500	242	2.10	232	46
	1940	33000		33000	64600	264	1.96	248	105
	1941	32800		32800	60400	248	1.84	264	127
	1942	33100		33100	61900	254	1.87	260	118
	1943	45700	150	45850	76100	267	1.66	293	117
	1944	47000	240	47240	105700	325	2.24	217	62
	1945	37300	220	37520	106400	369	2.84	171	106
	1946	40000	320	40320	126100	374	3.13	155	92
	1947	43100	550	43650	136800	423	3.13	155	55
	Av. 1939 to 1947	39000	300	39300	91100	307	2.31	221	92
	1948	45400	500	45900	135600	427	2.95	164	68
									San Joaquin R. near Vernalis
San Joaquin River Stockton to Vernalis	1939	18700		18700	51200	191	2.74	177	46
	1940	18500		18500	44600	208	2.41	202	105
	1941	19300		19300	40100	195	2.08	234	127
	1942	17900		17900	42200	198	2.36	206	118
	1943	19500		19500	51700	189	2.65	183	117
	1944	20700		20700	59300	185	2.86	170	62
	1945	19900		19900	62300	213	3.13	155	106
	1946	24500		24500	77200	250	3.15	154	92
	1947	25100		25100	84400	251	3.36	145	55
	Av. 1939 to 1947	20500		20500	57000	209	2.75	180	92
	1948	25600		25600	66600	226	2.60	187	68
									San Joaquin R. near Vernalis
San Joaquin River Vernalis to Fremont Ford	1939	42400	400	42800	120000	409	2.80	173	46
	1940	39400	500	39900	97800	429	2.45	198	105
	1941	39900	500	40400	93400	431	2.31	210	127
	1942	41900	600	42500	104400	461	2.46	198	118
	1943	41100	300	41400	121700	486	2.94	166	117
	1944	42200	1500	43700	138300	440	3.16	153	62
	1945	41600	800	42400	131400	495	3.10	157	106
	1946	43100	1400	44500	160000	520	3.60	135	92
	1947	43100	1400	44500	181400	554	4.08	119	55
	Av. 1939 to 1947	41600	800	42400	127600	469	2.99	167	92
	1948	46400	500	46900	144800	471	3.09	158	68
									Merced R. at Exchequer
Merced River Mouth to Yosemite Valley Railroad Crossing	1939	3480		3480	10300	41	2.96	164	45
	1940	3120		3120	9110	36	2.92	166	103
	1941	3570		3570	7590	32	2.13	228	136
	1942	3300		3300	8400	44	2.55	191	120
	1943	3680		3680	11700	50	3.18	153	121
	1944	4510		4510	13500	42	2.99	162	64
	1945	4400		4400	11800	50	2.68	181	103
	1946	4480		4480	14400	59	3.21	151	88
	1947	5880		5880	21100	70	3.59	135	53
	Av. 1939 to 1947	4050		4050	37100	47	2.91	170	93
	1948	6490		6490	17800	80	2.74	176	64
									Tuolumne R. near La Grange
Tuolumne River Mouth Roberts Ferry Bridge	1939	864		864	2534	7	2.93	166	46
	1940	1072		1072	2578	10	2.40	202	112
	1941	1295		1295	3147	10	2.43	199	126
	1942	1619		1619	2770	10	1.71	284	120
	1943	1826		1826	2616	9	1.43	339	120
	1944	3161		3161	4101	13	1.30	375	66
	1945	3259		3259	3555	12	1.09	445	106
	1946	3564		3564	4922	15	1.38	352	95
	1947	3761		3761	7466	20	1.99	245	55
	Av. 1939 to 1947	2269		2269	3743	12	1.85	289	94
	1948	3745		3745	6234	21	1.66	288	71

TABLE 104 (CONT'D)

SUMMARY OF WATER UTILIZATION OF SACRAMENTO-SAN JOAQUIN VALLEYS

	Year	Acreage			Diversion Acre-Feet	Irrigation Draft Average c.f.s. July	Gross Duty of Water (1)		Runoff in % of Normal Stanislaus R. below Melones
		General	Rice	Total			Ac. Ft. per Acre	Acres per Sec. Ft.	
Stanislaus River Mouth to Orange Blossom Bridge	1939	6330		6330	16200	52	2.56	190	41
	1940	6900		6900	15700	63	2.28	214	110
	1941	6940	110	7050	16700	56	2.37	205	105
	1942	7100	130	7230	20000	75	2.77	176	117
	1943	7360		7360	22100	73	3.00	162	123
	1944	7920		7920	21800	69	2.75	176	53
	1945	6870		6870	21700	72	3.16	154	100
	1946	6340		6340	26800	82	4.23	115	93
	1947	6600		6600	30100	88	4.56	106	51
	Av. 1939 to 1947	6930	30	6960	21200	70	3.08	166	88
	1948	7920		7920	29700	99	3.75	80	70
Combined San Joaquin River System									San Joaquin at Vernalis
San Joaquin River and Tributaries Including Old San Jo. and Tom Paine Slough	1939	110600	420	111020	281800	942	2.54	191	46
	1940	101900	470	102370	234600	1010	2.29	212	105
	1941	103800	590	104390	221300	972	2.12	229	127
	1942	105000	710	105710	239700	1042	2.27	214	118
	1943	119300	490	119790	285900	995	2.39	204	117
	1944	116200	1695	117895	342700	1074	2.91	167	62
	1945	113400	1000	114400	337500	1211	2.95	165	106
	1946	122000	1717	123717	409400	1300	3.31	147	92
	1947	127600	1900	129500	461300	1406	3.56	136	55
	Av. 1939 to 1947	113300	999	114310	312700	1106	2.70	185	92
	1948	135600	1000	136600	400700	1322	2.93	166	68
Combined above Delta									
Sacramento River and Tributaries and San Joaquin River and Tributaries Including Old San Jo. and Tom Paine Slough	1939	325900	104220	430120	2340800	6987	5.44	89	
	1940	278400	94670	373070	1963900	7498	5.26	92	
	1941	276200	120390	396590	2043400	7650	5.15	94	
	1942	263500	158810	422310	2270300	8500	5.38	90	
	1943	272500	185890	458390	2628600	8867	5.73	85	
	1944	273700	190995	464695	3004000	10005	6.46	75	
	1945	270700	187000	457700	3017500	10293	6.59	74	
	1946	302900	199817	502717	3308200	10660	6.58	74	
	1947	310000	202100	512100	3197400	10429	6.24	78	
	Av. 1939 to 1947	286000	160400	446400	2641600	8988	5.87	83	
	1948	347100	193100	540200	2920300	10825	5.41	90	

(1) Excluding municipal diversions on Sacramento River, the City of Sacramento and the City of Redding.

TABLE 105

DIVERSIONS AND ACREAGES IRRIGATED - SACRAMENTO RIVER - 1948

Water User	Mile and Bank above Sacramento	Number and Size of Pump	Monthly Diversions in Acre-Feet								Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.		General	Rice
--"M" STREET BRIDGE - SACRAMENTO - MILE 0.0--													
--GAGING STATION AT SACRAMENTO - MILE 0.4--													
City of Sacramento	0.8L	1-18" 3-20"	2206	2144	2888	3792	4794	4446	3740	2718	(a)26728	Municipal	
--AMERICAN RIVER - MILE 1.1L--													
--BACK BORROW PIT RECLAMATION DISTRICT 1000 - MILE 1.3L--													
E. Fourness	1.45R	1-8"				72	75	91	22		260	168	
--RECLAMATION DISTRICT 1000 DRAIN - MILE 2.1L--													
Elmer F. Christophel	2.15L	1-8"	10		4	7	21	10	3		(b) 55	38	
H. M. Swalley	2.30L	1-5"	26	4	5	17	25	12	5		94	38	
D. D. Parr	3.15L	1-6"	26			32	14	6	1	1	80	26	
Rose Orchard	3.55R	1-16"	328			130	556		12		(c) 1026	171	
W. E. M. Beardsley Estate	3.75R	1-5"				NO DIVERSION							
M.C.C. Van Loben Sells	4.0R	1-10"				122	96	90	101		409	150	
--SACRAMENTO WEIR - MILE 4.2--													
Reese and Greer	4.65R	1-7"	17				80				97	(d) 58	
A. M. Harbinson	5.05R	1-14"	25			32	218	27			302	61	
R. S. Seydel	5.25R	1-8"	9		1	14	62	67	17		(e) 170	102	
A. R. Merkley	5.3R	1-6"	22			40	14	10			86	59	
Lucy Casselman	5.5R	1-6"	2			2	20				24	35	
A. A. Casselman	5.55R	1-6"				5	29				34	40	
J. E. Bandy	6.0R	1-6"	16				89	31	1	5	142	48	
Riverside Mut. W. Co. (Natomas)	6.1L	2-18"	261	277	1126	454	2427	1793	929	171	(f) 7438	1511	156
O. A. and F. L. White	6.6R	1-6"				NO DIVERSION							
--RECLAMATION DISTRICT 1000 DRAIN #3 - MILE 6.85L--													
Fred C. Jones	7.5L	1-8"					49	27	17	14	107	100	
M. R. Williamson	7.8L	1-10"						41			41	93	
A. Marty	7.9R	1-8"						56	1		57	(g) 235	
E. D. Willey	7.9L	1-10"				94	89	69	51		303	143	
M. Marty	8.3R	1-8"					1	236	99		336	(h)	
Blauth Estate	8.5R	1-7"	11	2	2	16	91	33			(i)155	83	
H. Waldeck	8.7R	1-6"				NO DIVERSION							
Mullin & Plato	8.95R	1-6"				NO DIVERSION							
Fong Sik, Fong Shee, Wm. Fong	9.3L	1-10"	63	2	3	34	149	80	124		(j) 455	253	
Henry Amen (k)	9.35R	1-14"	21			85	309	172	15	61	(l) 663	375	
Fred C. Jones	9.8L	1-14"					30	63			93	34	
Carl Casselman	9.9R	1-12"	1			142	123	55	72		393	123	
Lloyd M. Robbins	10.25L	1-14"	36				149	181	11		377	484	
Ray Hughes	10.65R	1-12"							77		(m) 77	85	
John Schachtili (n)	10.75L	1-12"					88	31	31		150	100	
W. A. Ten Eyck (o)	11.1R	1-12"	40			9	97	68	50		(p) 264	126	
Federal Farm Mortgage Co.	11.6L	1-10"				NO DIVERSION					(q)		
--ELKHORN FERRY - MILE 11.9--													
Conaway Ranch	12.0R	4-36"	1492		10963	8492	12161	9577	4414		(r) 47099	(s) 7533	(t)4923
Thomas O'Connor Estate	12.5R	1-12"	42				66	45			(u) 153	91	
Gertrude Brown	12.7R	1-6"				NO DIVERSION							
Frank F. Newman	13.1R	1-12"			13	88	146	108	25		380	130	
J. Corey	13.2R	1-8"				NO DIVERSION							
J. DeNigris	13.25R	1-8"	2			7	131	87	43	21	291	75	
Elkhorn Mutual Water Co. (Natomas)	14.1L	1-20" 1-24"	758		157	1161	2784	2231	1469		(v) 8560	2325	316

(a) Additional acre-feet diverted: January 2132, February 2095, November 2151 and December 2012.
(b) Additional acre-feet diverted: February 8.
(c) Additional acre-feet diverted: February 4.
(d) Also receives water from wells.
(e) Additional acre-feet diverted: February 1.
(f) Additional acre-feet diverted: February 140 and November 192.
(g) This is combined acreage, this plant and one at Mile 8.3R.
(h) See plant at Mile 7.9R.
(i) Additional acre-feet diverted: February 93.
(j) Additional acre-feet diverted: February 42.
(k) Formerly listed as Capital Company.
(l) Additional acre-feet diverted: February 32.
(m) Additional acre-feet diverted: February 56.
(n) Formerly listed as Fiddymint and John Sing, Jr.
(o) Formerly listed as Joseph Mello.
(p) Additional acre-feet diverted: February 14.
(q) Served from wells.
(r) Additional acre-feet diverted: February 1135, November 704 and December 896.
(s) Includes 400 acres outside district.
(t) Includes 2220 acres outside district. An indeterminate amount of acreage re-used for gun club during November and December.
(u) Additional acre-feet diverted: February 14.
(v) Additional acre-feet diverted: February 476.

TABLE 105 (CONT'D)
DIVERSIONS AND ACREAGES IRRIGATED - SACRAMENTO RIVER - 1948

Water User	Mile and Bank above Sacramento	Number and Size of Pump	Monthly Diversions in Acre-Feet								Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.		General	Rice
Joseph Veress	14.25R	1-14"	48			20	261	41	110		(a) 480	240	
M. E. Dole	14.4R	1-6"				NO DIVERSION							
Capital Company	15.1R	1-10"				NO DIVERSION							
Central Mutual Water Co. (Natomas)	16.0L	1-24" (b)2-32" 2-38"	674		8278	5075	8487	9089	6335	19	(c)37957	(d)1548	(d)9750
Henry Rich (Hershey Plant)	16.27R	1-20"	25				58	18			(e) 101	18	
H. T. Silvius	16.4R	1-6"				NO DIVERSION							
Henry Rich	16.62R	1-14"					66	24			90	85	
Henry Rich (f)	17.0R	1-14"				15	30	30			75	30	
Frank and Ruth Lang	17.4R	1-16"	130				4		182		316	80	
Calif. W. States Life Ins. Co.	17.75R	1-16"				NO DIVERSION							
Jose Alves and Sons (g)	18.0R	1-20"					76	536			612	800	
H. C. Lauppe	18.2L	2-10"					90	161			251	230	
M. & J. Scheiber	18.45L	1-12"				1	162	114	108		385	121	
J. R. Brannely (h)	18.7L	1-8"					22	84	20		(i) 126	72	
SACRAMENTO TO VERONA													
Totals			6291	2429	23440	19958	34239	29840	18085	3010	137292	18117	15145
Average cubic feet per second			102	41	381	335	557	485	304	51	283		
Monthly use in per cent of seasonal			4.6	1.8	17.1	14.5	24.9	21.7	13.2	2.2			
--VERONA GAGING STATION - MILE 19.6L--													
--CROSS CANAL RECLAMATION DISTRICTS 1000 AND 1001 - MILE 19.6L													
Arthur Drown	*(0.5S)	1-20"					45	133	24		202	(j)90	
Natomas Central Mut. W. Co. (Bennett Subd. Plant)	*(1.0S)	(k)1-24"			1624	1366	1836	1801	1367		7994		
Natomas Northern Mut. W. Co. (Central)	*(2.0S)	1-20" 2-24"		214	4363	3585	5259	5259	3967		22647	(l)	
Natomas Co. (Ben May Plant)	*(3.35N)	(m)1-12" 1-16"		33	274	531	946	1097	1143		4024		520
--FEATHER RIVER - MILE 20.9L--													
--SACRAMENTO SLOUGH - MILE 21.2L--													
West Coast Life Ins. Co.	21.7R	1-15"				15	581	241			837	163	
Henry Rich (Keller Plant)	22.5R	1-22"	533			444	360				(n)1337	1150	
A. F. Johnston	26.8L	1-16"						64			64	165	
Anthony Furlan	26.8L	1-16"				NO DIVERSION							
--FREMONT WEIR GAGING STATION (WEST END WEIR) - MILE 28.0--													
Gustaf Inglin	28.2R	1-6"	8			16	23	25	12	8	(o)92	30	
Russell Bros.	29.2R	1-12"				43	91	46	33	5	(p)218	118	
M. R. Richardson (Mrs.)	29.7R	1-8"				NO DIVERSION							
Kate Russell & P. L. Traganza	29.75R	1-8"				NO DIVERSION							
Sebastine Yturralde	29.9L	1-12"				12	54	78	10		154	112	
Leo Giovanetti (q)	30.2L	1-5"				7	10	10	3		30	18	
Wm. Duffy, Jr. (f)	30.5L	1-14"				248	398	418	343		1407	20	90
Kate Russell & P. L. Traganza(r)	30.6R	1-12"				PLANT REMOVED							
Kate Russell & P. L. Traganza(r)	30.6R	1-12"				NO DIVERSION							
M. R. Richardson (Mrs.) (f)	30.7R	1-10"				NO DIVERSION							
Albert Nusz (s)	30.75R	1-6"					5	7			12	15	
A. C. Huston	31.5R	1-12"					97	66	64		227	150	
M. R. Richardson (Mrs.) (t)	31.75R	1-10"			57	2	142	147	128		476	(u)72	
M. Alonso	31.8L	1-6"						10			10	4	
Sutter Mutual Water Co. (Portuguese)	32.0L	2-24"	965		1822	1960	2558	2532	1519		(v)11356	1530	518

* Cross Canal - the main drain between R. D. 1000 and 1001 joins the Sacramento River at Mile 19.6L. Distance from Sacramento River and the bank is shown in ().

(a) Additional acre-feet diverted: February 7.
(b) The 2-32" units replace 36" unit listed at this location in 1947.
(c) Additional acre-feet from controlled drainage: April 541, June 238, July 984 and September 952.
(d) This is combined acreage of this plant and those at Miles 19.6L (1.0S) and 19.6L (2.0S).
(e) Additional acre-feet diverted: February 13.
(f) New installation 1948.
(g) Formerly listed as Harms Bros.
(h) Formerly listed as G. H. Lyall.
(i) Additional acre-feet diverted: November 7.
(j) Also served from wells.
(k) Replaces 10" and 20" formerly listed at this location.
(l) See plant at Mile 16.0L.
(m) New 12" unit installed in 1948.
(n) Additional acre-feet diverted: February 492.
(o) Additional acre-feet diverted: February 21 and November 1.
(p) Additional acre-feet diverted: November 2.
(q) Reinstallation at old point of diversion.
(r) Formerly listed as M. R. Richardson (Mrs.)
(s) Previously listed at 30.7R under name of Floyd Anderson.
(t) Formerly listed as Mary Anna Richardson.
(u) Cooperatively irrigates with plant on Knights Landing Ridge Cut at Mile 0.82L.
(v) Additional acre-feet diverted: February 277.

TABLE 105 (CONT'D)

DIVERSIONS AND ACREAGES IRRIGATED - SACRAMENTO RIVER - 1948

Water User	Mile and Bank above Sacramento	Number and Size of Pump	Monthly Diversions in Acre-Feet								Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.		General	Rice
Collier Bros.	32.5R	1-10"	2			5	59	9	6		81	68	
Walter H. Zeigler	33.2L	(a)2-10"			328	639	476	700	771	17	2931	170	200
J. G. Knox	33.35L	1-8"				NO DIVERSION							
Orrick and Tadlock (b)	33.5R	1-12"	32								32	40	
Fred Leiser (Mrs.)	33.75L	(c)1-8" 1-14"			392	358	473	524	433		2180		240
Neil Wilson (d)	33.85R	1-6"					20		11		31	32	
VERONA TO KNIGHTS LANDING													
Totals			1540	247	8860	9231	13433	13167	9834	30	56342	3947	1568
Average cubic feet per second			25	4	144	155	218	214	165	0	116		
Monthly use in per cent of seasonal			2.7	0.4	15.7	16.4	23.8	23.4	17.5	0.1			
--KNIGHTS LANDING GAGING STATION - MILE 34.0--													
--COLUSA BASIN DRAIN - MILE 34.15--													
Commercial Investment Co.	34.85L	(e)1-8" 1-12"					216	25	38		279	94	
Walter Raymond	35.2L	1-7" 1-12"				NO DIVERSION							
Susie M. Donnely	35.8L	1-10"	26								26	70	
J. Goffitzer	35.85L	1-6"	14			23	25	26	22		110	17	
Kilgore and Rossi	36.2L	(c)1-12" 1-14"			172	147	186	160	100		765	50	165
R. H. Bailey	36.45L	1-8"	2				45	26	17		90	56	
Amedio Moroni	36.7L	1-5"				NO DIVERSION							
Robert Bottimore	37.2L	1-14"				NO DIVERSION							
Maybelle J. Bundock	37.75L	1-8"					14				14	60	
Addie Reel	38.4L	1-10"				44	43				87	110	
C. L. Reel	38.8L	1-10"				NO DIVERSION							
F. O. Eastman	39.4L	1-12"					44				44	80	
Commercial Inv. Co. (f) (C. L. Reel)	39.8L	1-10"					16	46			62	80	
William Duffy, Jr.	39.9L	1-6"				1	17	14			32	25	
Sutter Mutual Water Company (State Ranch)	40.6L	2-24" 1-36"	488		2600	3636	4139	4016	2599	169	(g)17647	(h)4471	1243
River Farms Co. (i)	41.0R	1-14" 1-16"			620	937	861	1516	1154		5088	24	514
El Dorado Ranch	42.0R	1-14" 1-16"	54			65	525	10		43	(j) 697	588	
Matteoli and Fracchia	42.3L	1-8"					70		45		115	50	
Kramer Ranch	43.1L	1-12"			481	596	673	653	346		2749	110	150
--RECLAMATION DISTRICT #108 DRAINAGE PLANT - MILE 44.0R--													
Reclamation District #2047	43.1R	2-50"		411	12709	10042	14317	14904	6455		58838	(k)304	(l)7073
El Dorado Ranch	43.1R	1-18"				NO DIVERSION							
John Clauss	44.2L	1-18"	4		758	698	960	970	910		4300	(m)590	140
John Clauss (Fuchlin)	45.6L	1-14"					189	160			349	(n)	(n)
P. J. Hiatt	48.7L	2-20"	115	186	1505	1151	1432	1230	855		(o)6474	225	320
G. J. Hiatt	49.7L	1-14"				55	67	46			168	125	
Reclamation District #108	51.1R	2-24" (p)1-36"	1651	200	2437	2302	2850	3143	1365		13948	635	1180
Holmes & Westover Co.	51.2L	2-16"	528	322	650	675	1164	1184	545		(q)5068	(r)858	250
B. M. Chaplin	52.0L	1-16"	45				326	20	14		405	180	
River Farms Co.	52.35L	(i)1-10" 1-12"	103			16	603	254	374		1350	608	
George Van Ruiten	52.9L	1-10"					65	38			103	(s)160	
George Van Ruiten	53.9L	1-12"					87	81			168	(t)	

(a) Listed as 2-20" units in 1947.
(b) Formerly listed as J. DuBois.
(c) New unit installed in 1948.
(d) Formerly listed as Sidney Epperson.
(e) New unit installed in 1948. Not used during 1948.
(f) Formerly listed as Commercial Inv. Co. (C. L. Reel).
(g) Additional acre-feet diverted: February 141.
(h) An additional 420 acres of double crop.
(i) New installation 1948.
(j) Additional acre-feet diverted: November 64. Also received water from controlled drainage.
(k) An additional 530 acres irrigated from controlled drainage.
(l) Lands irrigated as follows: R.D. #108, 4712 acres and River Farms Company, 2361 acres.
(m) Combined acreage this plant and one at Mile 45.6L.
(n) See plant at Mile 44.2L.
(o) Additional acre-feet diverted: February 495.
(p) No operation of 36" unit in 1948.
(q) Additional acre-feet diverted: February 10.
(r) Includes 25 acres of beans on J. F. White Ranch.
(s) Combined acreage this plant and one at Mile 53.9L.
(t) See plant at Mile 52.9L.

TABLE 105 (CONT'D)

DIVERSIONS AND ACREAGES IRRIGATED - SACRAMENTO RIVER - 1948

Water User	Mile and Bank above Sacramento	Number and Size of Pump	Monthly Diversions in Acre-Feet								Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.		General	Rice
Broomieside Farm	55.1L	1-20"	109				423	166	33		731	466	
C. L. Enright (a)	56.3L	1-10"					89	14	49		152	130	
Reclamation District #108	56.4R	1-18" (b)1-30"	638								638	300	
C. M. Miller	56.42R	1-6"				NO DIVERSION							
Jacob Miller (c)	56.65R	1-12"				167	177	9			353	130	
Broomieside Farm (S. C. Crawford)	56.95L	1-20"	394		1349	382	1496	1320	980		5921	(d)939	(d)1090
L. M. Miller	57.0R	1-10"	32				66	73	40		(e)211	89	
Lamb Bros.	57.5L	1-16"				NO DIVERSION							
James A. Neilsen (Mrs.) (f)	58.2L	1-15"				202	28	58			288	(g)164	
Alex Grant	58.9L	1-16"				NO DIVERSION							
I. G. Zumwalt	59.1R	1-12"					124	95	15		(h) 234	226	
Lamb Bros.	59.8L	1-12" 1-14"	73		661	783	1102	1112	334		4065	(i)	
Reclamation District #108	59.85R	1-16"				NO DIVERSION							
F. L. Burrell	60.4L	1-10"					87		73		160	125	
A. Earl Lane	60.5L	1-12"					98	177			275	120	
Robert Lane	61.35L	1-12"				NO DIVERSION							
I. G. Zumwalt	61.5R	1-12"				NO DIVERSION							
Samuel Hines	62.3R	1-10"				6	11	8	7		32	30	
Jake Brayles (j)	62.3L	(k)1-10"				1	219	93	130		443	270	
Jake Locovitch	62.6R	1-8"					67	8			75	30	
R. L. Young	62.8L	1-12"	2			1	61	63	20		147	96	
KNIGHTS LANDING TO WILKINS SLOUGH													
Totals			4278	1119	23942	21930	32982	31718	16520	212	132701	12685	12125
Average cubic feet per second			70	19	389	369	536	516	278	4	273		
Monthly use in per cent of seasonal			3.2	0.8	18.0	16.5	24.9	23.9	12.4	0.3			
--WILKINS SLOUGH GAGING STATION - MILE 62.9--													
Reclamation District #108 (Wilkins Slough)	63.2R	1-36" 5-42"	580	5129	23707	18896	27100	22932	6826		(l)105170	1298	(m)11519
Lueltha Meister (n)	63.65L	1-8"					33	7	9	2	51	44	
Sutter Mutual Water Co. (Tisdale Pls. #1 and 2)	63.75L	6-42" 2-48"	3887	392	31100	35220	40336	40807	27682	1653	(o)181077	(p)18509	14105
--TISDALE WEIR - MILE 64.2L--													
Edward Seaman	63.9L	2-14"			386	925	577	883	336		3107	288	276
Ornbaum, Nobles Land & Livestock Co.	64.3R	1-12"					22	36			58	35	
Tisdale Irrig. & Dr. Co.	64.4L	1-12"				202	490	461	400		1553	415	
Van Horn Ranch	64.9R	1-14"				NO DIVERSION							
Juan Valsyves (q)	65.1R	1-4"					21	9	5		35	37	
Walter Ettyl	65.7L	1-8"					129	93			222	137	
Fred Schohr (r)	65.8R	1-16"				NO DIVERSION							
J. L. Browning	66.4R	1-18"				NO DIVERSION							
Tisdale Irr. & Dr. Co.	67.1L	1-12" 1-20"			340	813	1457	1240	514		4364	1140	(s)
Desmond A. Winship	67.2L	1-10"				NO DIVERSION						(t)	(t)
--RECLAMATION DISTRICT #70 DRAIN PLANT - MILE 68.8L--													
Newhall Land and Farming Co.	67.5L	1-12" (u)2-24"	80		3301	4628	2214	3619	2614	149	16605	3050	687
J. L. Browning	69.0R	1-24"				NO DIVERSION							
Faxon, Morton and P. Andreotti	69.2R	1-18"					398	186	63	7	654	391	
--EDDY'S FERRY SITE (GRIMES) - MILE 69.45--													

(a) New installation 1948
(b) No operation of 30" unit in 1948
(c) Formerly listed as C. M. Miller (Asa Morris).
(d) Combined acreage this plant and one at Mile 59.8L. This is all Sutter Basin District Lands.
(e) Additional acre-feet diverted: February 5.
(f) Formerly listed as J. A. Neilsen and W. H. Saylor.
(g) Additional water received from wells.
(h) Additional acre-feet diverted: February 48.
(i) See plant at Mile 56.95L.
(j) Formerly listed as Blanche Coulter Brown.
(k) Replaces 8" unit formerly listed at this location.
(l) Additional acre-feet diverted: February 1134.
(m) An additional 450 acres irrigated from plant at Mile 70.4R
(n) Formerly listed as B. W. Meister.
(o) Additional acre-feet diverted: February 315 and December 1120.
(p) An additional 850 acres double cropped.
(q) Formerly listed as Juan Valasyuez.
(r) Formerly listed as M. P. Schohr.
(s) Includes 140 acres of Winship land.
(t) See plant at Mile 67.1L.
(u) One 24" unit installed in 1948.

TABLE 105 (CONT'D)

DIVERSIONS AND ACREAGES IRRIGATED - SACRAMENTO RIVER - 1948

Water User	Mile and Bank above Sacramento	Number and Size of Pump	Monthly Diversions in Acre-Feet								Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.		General	Rice
J. E. Hollenbeck	69.8R	1-4"					1	2			3	7	
H. F. Daly	70.4L	1-10"					80	41	16		137	(a)96	
Hoffman, Beckley, Ritchie Poundstone and Denny	70.4R	(b)1-6" 1-20" 1-24"	72	596	960	982	940	1006	290		4846	130	(c) 450
Meridian Farms Water Co. #4	71.1L	1-24"			531	1184	1524	1180	740	3	5162	1177	367
A. B. Armstrong	71.9R	1-12"	124			72	227	135		9	567	200	
Antone Steidlmayer	71.9R	1-12"				NO DIVERSION							
H. and A. Andreotti (d)	72.1L	2-14"			316	493	325	858	395		2387	100	400
H. and A. Andreotti	72.3L	1-7"				NO DIVERSION							
E. B. Vann (Froh)	73.6R	1-10"	50				74	97	19		(e)240	100	
Meridian Farms Water Co. #3	74.8L	(f)1-10" 1-18"	75	493	1279	1092	1202	1309	631		(g)6081	392	313
L. B. Westfall	75.3R	1-10"	174					37	4		(h) 215	(i)202	
J. H. Yates Estate	76.1L	1-10"					100	60	9		169	(j)125	
Robert Chesney (d)	76.15L	1-10"					72	15	11		98	105	
M. S. Davis and C. K. Anderson	76.2L	1-8"				4	11	13			28	(k) 69	
Steidlmayer Bros.	76.5R	1-16"										(l)190	
E. V. Jacobs	77.9L	(m)1-12"	44			149	346	76			615	235	
Sebia Davis Estate	78.2R	1-16"					173	73	47		(n) 293	140	
Sebia Davis Estate (d)	78.75R	2-12" 1-16"	126		121	920	1204	955	584		(o)3910	115	330
Sebia Davis Estate	78.8R	(p)1-14" 1-24"			1743	2016	1842	1842	300		7743	(q)540	(q)1173
C. E. Reische	79.0L	1-10"	60			10	95	69			(r) 234	166	
Steidlmayer Bros.	79.0R	1-12"			86		50	115			251	70	
Henry Schmidt	79.3R	1-10"				66	60	58			184	78	
E. V. Jacobs	79.5L	1-8"	17				18				35	40	
Steve M. Burtis and G. Wood	79.7L	1-10"	13				34	28			75	(s)115	
--MERIDIAN BRIDGE - MILE 79.85--													
Meridian Farms Water Co. #1 and #2	80.0L	1-20" 1-24"	408	1800	5000	4348	4330	4723	2788		23397	(t)3031	(u)1656
Roger C. Wilbur	80.3R	1-8"	105			29	45	79		68	326	65	
Wayne Hall and L. Burrows	81.5L	1-16"		182	430	547	429	540	223		2351	(v)144	(v)327
Wayne Hall	81.8L	1-16"		309	401	618	728	825	457		3338	(w)	(w)
Steidlmayer Bros.	81.9R	1-20"	709	509			430	207	147		(x) 2002	628	
F. T. Reische and L. F. Wood	82.5L	1-12"	10								10	30	
J. E. Clark	83.3L	1-14"				NO DIVERSION							
J. E. Clark	83.5L	1-10"	6			10	93	28	27		164	116	
--BUTTE SLOUGH OUTFALL GATES - MILE 84.0L--													
Steidlmayer Bros.	85.6R	1-12"				246	49				295	120	
Clifford Reichel	85.8L	1-8"	25				44	95			164	27	
W. H. Halsey	86.1R	1-12"	14			68	75	44			(y)201	170	
Lydell Peck	86.1L	1-8"	46				99	110	12	5	(z)272	95	
Howell Davis	86.2R	1-18"				79	94	91			(aa)264	210	
Lloyd Scoggins	86.8L	1-8"	96				54				(bb)150	45	
Roger Wilbur	86.9R	1-10"	60	7	13	84	160	139	5	44	(cc)512	(dd)205	
Roger Wilbur	87.4R	1-10"	87				51	28	55	22	(ee)243	(ff)	
Jacobsen and O'Rourke	87.6L	1-8"	1				12	19			32	40	

(a) Includes 44 acres of Rohleter lands.
(b) No operation of 6" unit in 1948.
(c) This is all Reclamation District #108 lands.
(d) New installation in 1948.
(e) Additional acre-feet diverted: February 68.
(f) One 10" unit removed.
(g) Additional acre-feet diverted: November 4 and December 88.
(h) Additional acre-feet diverted: February 40.
(i) Includes 170 acres of Steidlmayer lands.
(j) Includes 40 acres of Coffman lands.
(k) Includes 170 acres of Albertson lands.
(l) Diverted 160 acre-feet in February to irrigate barley.
(m) Replaces 16" unit formerly listed.
(n) Additional acre-feet diverted: February 45.
(o) Also furnished some water to plant at Mile 78.8R. Additional acre-feet diverted: February 4.
(p) 14" unit removed in 1948.
(q) Received some water from plant at Mile 78.75R.
(r) Additional acre-feet diverted: February 60.
(s) Includes 63 acres of Burtis lands and 52 acres of Woods lands.
(t) An additional 161 acres irrigated from controlled drainage.
(u) An additional 1315 acres irrigated from controlled drainage.
(v) Combined acreage for plants at Miles 81.5L and 81.8L.
(w) See plant at Mile 81.5L.
(x) Additional acre-feet diverted: February 160 and November 128
(y) Additional acre-feet diverted: February 51.
(z) Additional acre-feet diverted: February 51 and November 81.
(aa) Additional acre-feet diverted: February 40.
(bb) Additional acre-feet diverted: February 25.
(cc) Additional acre-feet diverted: February 70 and November 80.
(dd) Combined acreage this plant and one at Mile 87.4R.
(ee) Additional acre-feet diverted: February 28.
(ff) See plant at Mile 86.9R.

TABLE 105 (CONT'D)

DIVERSIONS AND ACREAGES IRRIGATED - SACRAMENTO RIVER - 1948

Water User	Mile and Bank above Sacramento	Number and Size of Pump	Monthly Diversions in Acre-Feet								Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.		General	Rice
Swinford Tract Irrigation Co.	87.7R	1-12"	41			19	147	93	11		(a)311	137	
Edward K. Lange	88.0R	1-6"		4		8	6				18	20	
Nagel and Locovitch	88.2L	1-10"	24				70	10			(b)104	20	
Mayfair Packing Co.	88.7L	1-14"	101				189	113			(c)403	114	
Colusa Irrigation Co.	89.2R	1-20"	313				582	231	97		(d)1223	357	
Phil B. Arnold	89.25L	1-8"	114				209				323	65	
Butte Creek Farms (e)	89.25L	1-12" 1-18"			390	1310	1051	1357	912		5020	(f)300	(f)1900
G. A. Berkey	89.26L	1-12"	94		2		102				198	85	
WILKINS SLOUGH TO COLUSA Totals Average cubic feet per second Monthly use in per cent of seasonal			7556 123 1.9	9421 158 2.4	70106 1140 18.1	75038 1261 19.4	90204 1467 23.3	86974 1414 22.5	46229 777 11.9	1962 32 0.5	387490 797	35760	33503
--COLUSA BRIDGE AND GAGING STATION - MILE 89.4--													
Lillian and Hattie Boggs	89.7L	1-8"					65	1			66	40	
Roberts Ditch Company	90.7R	2-20"	194			207	639	441	296	97	(g)1874	668	
Paul R. Westfall	91.1L	1-8"				20					(h)20	(h) 30	
I. G. Zumwalt	91.6R	1-12"				18	85				(i)103	125	
--COLUSA WEIR - MILE 92.4--													
George P. Ahlf	92.5L	1-6" 1-10"			224	267	314	336	263		1404		160
Paul R. Westfall	93.0L	1-8"				20					(h) 20	(h)12	
W. Halsey and M. Yerxa (j)	93.0R	1-12"	14			8	12	16			50	25	
Paul R. Westfall	93.4L	1-10"	9	33		3	84	53			182	117	
Tuttle Land Co.	94.3R	(k)1-15" 1-20"	77	44			201	119	254	94	789	173	
I. G. Zumwalt	94.8R	1-12"				PLANT REMOVED							
Roger Wilbur	95.25L	1-18"			5		157	129	163		454	(l)295	
George W. Lewis	95.6L	1-20"			293	840	859	1088	600		3680	75	310
Bridget Graham Ranch	95.8L	(m)1-18"			1068	1142	1123	1243	632		5208	(n)758	(n)64
I. G. Zumwalt	96.8R	1-15"	26		157		367	39	210		(o)799	374	
H. Heitman	97.7R	1-12"				28	154	149	63	16	(p)410	95	
Frank N. Beckley	98.0L	1-10"	23				53				76	(q) 83	
J. L. Erisey	98.3R	1-10"					6	35			41	51	
Otterson and Boggs	98.6L	1-15"			195	117	739	766	308		2125	(r)	(r)
D. Boggs	98.8L	1-18"	30	35	527	4	74				(s) 670	75	
B. H. Mitchell Estate	99.0R	1-14"				NO DIVERSION						(t)	
J. P. Boggs (u)	99.1L	1-10"	17	4			78	49	63	17	228	150	
Terrill and Sartain	99.2L	1-20"		18	1201	559	1241	612	497		4128	20	(v)640
L. W. Seavers	(w)99.3R	1-10" (z)1-12"	125	66		192	314	152	66	24	(x)939	(y)309	
Dave George (aa)	99.8L	1-16"				2	228	187	21		438	202	
St. Patrick's Home Ranch	101.1R	1-20"	118				145	51			314	145	
Nettie, George and Ella Packer	102.8R	1-20"					114	282	142	222	(bb)760	(cc)139	
Charles W. Welch	103.7R	1-16"		274	885	787	778	804	283		3811	260	(dd)700
Charles W. Welch (e)	103.8R	1-14"			499	643	765	788	156		2851	(ee)	
C. W. Tuttle	103.9R	1-12" (ff)1-18"	97	58	1117	927	1123	1283	282		(gg)4887	262	590
I. G. Zumwalt	104.8L	1-12"	30				81				(hh)111	(ii)95	

(a) Additional acre-feet diverted: February 78.
(b) Additional acre-feet diverted: February 9.
(c) Additional acre-feet diverted: November 20.
(d) Additional acre-feet diverted: February 47.
(e) New installation 1948.
(f) Combined acreage this plant and one on Butte Creek, Mile 3.9R.
(g) Additional acre-feet diverted: February 132 and November 36.
(h) Estimated from previous use.
(i) Additional acre-feet diverted: November 79.
(j) Formerly listed as Brown Ranch
(k) No operation of 15" unit during 1948.
(l) Additional acre-feet diverted: February 65 and November 111.
(m) Replaces 16" unit formerly listed at this location.
(n) Combined acreage this plant and one at Mile 98.6L.
(o) Additional acre-feet diverted: February 183.
(p) Additional acre-feet diverted: February 23 and November 36.
(q) 35 acres are O'Sullivan lands.
(r) See plant at Mile 95.8L.
(s) Additional acre-feet diverted: November 6. Furnished approximately 450 acre-feet to lands at Mile 98.6L.
(t) 80 acres served from plant at Mile 99.3R.
(u) Formerly listed as J. P. Boggs.
(v) Also receives some water from pump at Mile 99.1L.
(w) Listed as Mile 99.3L in 1948.
(x) Additional acre-feet diverted: November 58.
(y) Includes 80 acres of Mitchell lands and 20 acres of Middlecamp lands.
(z) Formerly listed as a 14" pump.
(aa) Formerly listed as Helen Forry.
(bb) Additional acre-feet diverted: November 4 and December 53.
(cc) Includes 75 acres of gun club. Also served from wells.
(dd) Combined acreage this plant and one at Sacramento River Mile 103.8R and Colusa Trough Mile 11.7L.
(ee) See plant at Mile 103.7R.
(ff) Replaces 16" and 20" units formerly listed at this location.
(gg) Additional acre-feet diverted: November 12.
(hh) Additional acre-feet diverted: February 5 and November 60.
(ii) Also served by wells.

TABLE 105 (CONT'D)

DIVERSIONS AND ACREAGES IRRIGATED - SACRAMENTO RIVER - 1948

Water User	Mile and Bank above Sacramento	Number and Size of Pump	Monthly Diversions in Acre-Feet								Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.		General	Rice
Lawrence Boyd	105.5L	1-10"	9				5				14	24	
Thousand Acre Ranch(H.W.Keller)	106.0R	1-14"	84	36			86	26	3		235	145	
Howell Davis	106.5R	1-16"			150		53	92			(a)295	125	
Princeton Ranch Co. (b)	110.0R	1-12"	37				77	84			198	178	
I. G. Zumwalt	110.7L	1-16"				NO DIVERSION							
Princeton Ranch Co. (b)	111.2R	1-6"					23				23	48	
--PRINCETON FERRY - MILE 112.0--													
I. G. Zumwalt	112.05L	1-10"	25				18				43	60	
Reclamation District #1004	112.1L	2-30" 1-50"		506	6212	4849	10044	9828	5733		(c)37172	(d) 2450	(d) 5835
Princeton-Codora Glenn I.D.	112.4R	3-24"	1312	144	3787	2311	4264	4429	1761		18008	(e)	(e)
I. G. Zumwalt	112.6L	1-10"	6				101	54	14		(f) 175	220	
Edward L. Steele Estate	115.5L	1-12"	5	29		15	11				60	32	
COLUSA TO BUTTE CITY Totals Average cubic feet per second Monthly use in per cent of seasonal			2238 36 2.4	1247 21 1.4	16320 265 17.6	12959 218 14.0	24481 398 26.4	23136 376 25.0	11810 198 12.7	470 8 0.5	92661 191	7860	8299
--BUTTE CITY GAGING STATION - MILE 115.8--													
R. H. Gebicke	115.85L	1-14"	135		2	38	152	136	22		(g) 485	250	
W. F. Wright, Jr.	116.7R	1-10"				8	53	37			98	130	
R. H. Gebicke	116.9L	1-12"				NO DIVERSION							
Robert T. Miller	122.3R	1-10"					77	42			119	52	
C. T. White (Clarence Reed)(h)	123.7R	1-6"	6			13	14	16	13		(i) 62	35	
Howard Leach	123.8R	1-4"					1	1			2	2	
Princeton-Codora-Glenn I.D.	123.9R	3-24"	1541		1182	1067	4026	610			(j)8426	(k)	(k)
Provident Irrigation District	124.2R	1-36" 4-42"			2099	2268	7500	3171			(l)15038	(k)	(k)
F. S. Reager	130.75R	(m)1-8"				19	92	15	1		127	60	
-- ORD FERRY - MILE 130.8--													
-- STONY CREEK - MILE 136.3R--													
Ed. Cramer	131.22L	1-6"				NO DIVERSION							
M. & T. Inc. and Parrott Investment Co.	141.5L	(n)1-20" 5-24"	71			40	2637	3596	2737		(o) 9081	(o)5865	(o) 2704
--OLD CHICO LANDING RAILROAD BRIDGE SITE - MILE 142.1--													
Alameda Putney	143.8L	1-6"				8	42	52	41		143	43	
Holly Sugar Corp. (p)	148.9R	1-10"						88	6		94	70	
--GIANELLA BRIDGE - U.S. BUREAU OF RECLAMATION GAGING STATION AT HAMILTON CITY - 149.5--													
Capital Company	150.0L	1-10"				92	2				94	(q)122	
V. G. Strain	150.8R	1-12" 1-16"	93	20	61	32	334	230	176		(r) 946	613	
A. Holecek	152.2R	1-6"					3	7	1		11	38	
R. E. Jessie (s)	154.6R	1-5"				1	1				2	12	
Maas Brothers	154.7R	1-4"				NO DIVERSION							
Glenn-Colusa Irr. Dist.	(t)154.8R	2-30" 1-42" 2-50" 2-66" 4-72" 1-100"	30030	750	65833	81096	111854	110444	68552	28254	(u)(v)496813	(w)27562	(x)38296
Jacinto Irrigation District	(t)154.8R	(y)			2475	3661	6736	6109	4621	3352	(z) 26954	(aa)9950	
Compton-Delevan Irr. Dist.	(t)154.8R	(y)			3600	3450	2940	2860	1850		(bb)14700		2160
Provident Irr. Dist.	(t)154.8R	(y)			2988	3898	101	2381	3905	2466	(cc)15739	(dd)(ee)4842	(dd)5399
Princeton-Codora Glenn I.D.	(t)154.8R	(y)		573	8293	8338	3866	8025	7202	1398	(ff)37695	(gg)2269	(gg)4397
Maxwell Irrigation District	(t)154.8R	(y)			1120	1200	1050	1060	520		(hh)4950		521

(a) Additional acre-feet diverted: February 21.
(b) Formerly listed as Capital Company.
(c) Additional water received from controlled drainage. 50" unit was down during June, otherwise diversion for month would have been approximately 10,000 acre-feet.
(d) Combined acreage for this plant and plants on Butte Creek at Miles 9.3R and 13.2R.
(e) See plant at Mile 154.8R.
(f) Additional acre-feet diverted: November 71.
(g) Additional acre-feet diverted: February 35.
(h) Formerly listed as G. T. White.
(i) Additional acre-feet diverted: November 18.
(j) Additional acre-feet diverted: December 1041.
(k) See plant at Mile 154.8R.
(l) Includes following water in acre-feet delivered to Princeton-Codora-Glenn Irr. Dist.: May 525, June 919 and July 1794.
(m) Replaces 6" unit listed in 1947.
(n) New unit installed in 1948.
(o) 1948 season was such that a larger portion of water used was received by gravity from Butte Creek.
(p) Formerly listed as C. C. Dunning.
(q) Also served by wells.
(r) Additional acre-feet diverted: February 91 and November 57.
(s) Formerly listed as Maas Brothers.
(t) This is a common point of diversion for Glenn-Colusa, Compton-Delevan, Provident, Princeton-Codora-Glenn and Maxwell Irrigation Districts.
(u) Additional acre-feet diverted: November 28,915.
(v) Includes acre-feet diverted from river by gravity: March 3780, April 1323 and May 9205. Also additional acre-feet by gravity from Stony Creek: April 1000, May 7870, June 3050.
(w) Includes 2341 acres of duck club.
(x) Includes 3321 acres outside district.
(y) Diversion through Glenn-Colusa I.D. plant at Mile 154.8R.
(z) Additional acre-feet diverted: November 2380.
(aa) Prior to 1948 only net acreage was listed--this figure is gross.
(bb) Partially estimated from previous years.
(cc) Additional acre-feet diverted: November 2380 and December 376.
(dd) Combined acreage for this plant and ones at Sacramento River Mile 124.2R and Colusa Trough at miles 20.5R, 24.2R and 27.2R.
(ee) Includes 4000 acres duck clubs.
(ff) Additional acre-feet diverted: November 1194.
(gg) Combined acreage this plant and ones at Miles 112.4R and 123.9R.
(hh) Partially estimated from previous years. This water is mainly derived from controlled drainage.

TABLE 105 (CONT'D)

DIVERSIONS AND ACREAGES IRRIGATED - SACRAMENTO RIVER - 1948

Water User	Mile and Bank above Sacramento	Number and Size of Pump	Monthly Diversions in Acre-Feet								Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.		General	Rice
Jonathan Garst	161.7L	1-12"				12	135	148	6		301	200	
--CORNING-VINA BRIDGE - MILE 166.5--													
E. L. Dietz	166.7R	1-3"				1	3	3	4	1	12	8	
G. C. Kelber (a)	166.8R	1-2"					2	1	2	1	6	7	
--TEHAMA BRIDGE -MILE 177.5--													
E. B. Noble	184.5R	1-14"				NO DIVERSION							
Coneland Water Company	187.6L	1-12"					92	160	8	1	261	(b)753	
Henry Tieden	188.6L	1-8"				1	6	5			12	14	
--RED BLUFF BRIDGE - MILE 193.45--													
G. E. Sutton	196.2R	1-3"				NO DIVERSION							
Dave Singletary	196.5L	1- 2½"			1	1					2	15	
S. & E. Erickson	196.6L	1-5"	10			9	18	13	6	1	(c) 57	32	
A. M. Alemeida	197.0L	1-8"				PLANT REMOVED							
BUTTE CITY TO RED BLUFF													
Totals			31886	1343	87654	105253	141737	139210	89673	35474	632230	52944	53477
Average cubic feet per second			519	23	1426	1769	2305	2264	1507	577	1301		
Monthly use in per cent of seasonal			5.0	0.2	13.9	16.7	22.4	22.0	14.2	5.6			
--RED BLUFF GAGING STATION (IRON CANYON) - MILE 198.6--													
C. C. Budd (J. E. Breeden)	(d)207.75L	1-10"					4	4			8	40	
--BEND FERRY BRIDGE - MILE 207.0--													
Emil E. Johnson	209.0L	1-2½"						2	2		4	10	
J. F. Nunes	213.0R	1-7"				NO DIVERSION							
F. L. Jelly	213.5L	1-2½"				NO DIVERSION							
J. F. Nunes	216.0R	1-3"				4	20	20	20	13	77	12	
W. A. Hunaeus	216.4L	1-3"					3		5		8	10	
Haakonson Bros.	217.5L	1-3½"					22	20			42	50	
J. L. Haskins	218.0L	1-5"					17	32	25		74	50	
Rio Alto Rancho	221.0R	1-10"				66	81	154	90	109	500	200	
--BATTLE CREEK NEAR COTTONWOOD - MILE 221.5L--													
--COTTONWOOD CREEK NEAR COTTONWOOD - MILE 222.2R--													
--BALLS FERRY BRIDGE - MILE 224.5--													
--ANDERSON BRIDGE - MILE 232.9--													
L. C. Smith	233.0L	1-6"				NO DIVERSION							
Menzel Estate	240.2L	1-12"				35	81	229	36		381	128	
Anderson-Cottonwood Irr. Dist.	240.5L	3-16"		20	523	1335	3183	2660	2701	1508	(e)11930	(f) 17895	
--U.S. BUREAU OF RECLAMATION GAGING STATION - NEAR REDDING - MILE 240.7--													
Jack Graf	241.5L	1-8"				NO AGRICULTURAL USE							
--REDDING-ALTURAS FREE BRIDGE - MILE 242.0--													
--REDDING-YREKA BRIDGE - MILE 245.9--													
Anderson-Cottonwood Irr. Dist.	246.0R	Gravity		494	20440	25573	24701	24046	22112	22054	(g)139420	(h)	
--SOUTHERN PACIFIC RAILROAD CROSSING - MILE 246.25--													
Isabel and Maybell Diestelhorst	246.3R	1-8"			1	30	28	21			80	26	
--OLD REDDING-YREKA BRIDGE - MILE 246.4--													
City of Redding	246.7R	3-8"	146	131	192	325	485	433	322	200	(i) 2234	Municipal	
--GAGING STATION AT KESWICK - MILE 250.5--													
RED BLUFF TO REDDING													
Totals			146	645	21156	27368	28625	27621	25313	23884	154758	18421	0
Average cubic feet per second			2	11	344	460	466	449	425	401	318		
Monthly use in per cent of seasonal			0.1	0.4	13.7	17.7	18.5	17.8	16.4	15.4			
SACRAMENTO TO REDDING													
Totals			53935	16451	251478	271737	365701	351666	217464	65042	1593474	149734	128314
Average cubic feet per second			877	276	4090	4567	5947	5719	3655	1093	3279		
Monthly use in per cent of seasonal			3.4	1.0	15.8	17.1	22.9	22.1	13.6	4.1			

(a) Formerly listed as Mrs. Guy Whitnack.
(b) Also served by wells.
(c) Additional acre-feet diverted: February 4.
(d) Listed at Mile 206.75L in 1947.
(e) Additional acre-feet diverted: February 53 and November 330.
(f) This is combined acreage this plant and one at Mile 246.0R.
(g) Additional acre-feet diverted: November 8825 and December 1224.
(h) See plant at Mile 240.5L.
(i) Additional acre-feet diverted: January 144, February 162, November 169 and December 150.

TABLE 106

DIVERSIONS AND ACREAGES IRRIGATED - COLUSA TROUGH*- 1948

Water User	Mile and Bank**	Number and Size of Pump	Monthly Diversions in Acre-Feet								Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.		General	Rice
--COLUSA-WILLIAMS HIGHWAY - GAGING STATION - MILE 0.0--													
I. G. Zumwalt	2.2L	4-20"			616	722	1849	76	1074		4337	2840	780
F. Buffum and L. W. Seavers	3.0L	2-16"	252	5	204	413	676	449	465	414	2878	299	
L. W. Seavers and F. J. Byington	4.5L	3-16"			371	842	1132	1452	137		3934		700
S. Ash	8.0L	1-20"			647	8	646	542	289		2132		220
Charles Welch	8.0R	1-15"			270	348	716	672	285		2291		(a)1700
El Dorado Sportsmans Club	9.5R	1-15"	114	38	598	594	825	744		22	2935	(b)60	(b) 340
I. G. Zumwalt	9.75L	1-24"				NO DIVERSION							
Lloyd Kahn	10.5L	1-20"			246	169	335	407	215		1372		110
Charles Welch	11.7R	1-14" 2-16" 1-20"		180	1990	2340	1979	1841	636		8966		(c)
Charles Welch	11.7L	1-12"					17	44	65		(d)126	(c)	
Del Valley Farms Co.	12.1R	1-10"			215	390	322	281	182		1390		180
E. Butler, E. Meyer and J. Jones	12.7L	1-14"		1				7	37	71	116	50	
--LATERAL HIGHWAY - BUTTE CITY TO WEST SIDE - MILE 20.5--													
Provident Irrigation Dist. (Willow Creek Plant)	Opp. 20.5R	1-24" 1-36"			548	123	34				705	(e)	(e)
Walter McGowan	Opp. 21.4R	2-16"			279	677	678	624	431		2689		350
Henry Jameson Estate	22.0R	1-18"			638	692	825	949	322		3426		365
Provident Irrigation Dist. (Drain 55)	Opp. 24.2R	Gravity			2085	4621	5359	5780	5653		23498	(e)	(e)
Provident Irrigation Dist. (Drain 13)	Opp. 27.2R	1-20" (f)1-24"			730	1269	1520	1852	1305		6676	(e)	(e)
Totals			366	224	9437	13208	16913	15720	11096	507	67471	3249	4745
Average cubic feet per second			6	4	153	222	275	256	186	9	139		
Monthly use in per cent of seasonal			0.6	0.3	13.9	19.6	25.1	23.3	16.5	0.7			

* Main Drain of Reclamation District #2047
** Mileage along Colusa Trough above Colusa-Williams Highway.
(a) Combined acreage this plant and ones at Miles 11.7L and 11.8R.
(b) Estimated acreage.
(c) See plant at Mile 8.0R.
(d) Additional acre-feet received from plant on Sacramento River, Mile 103.7R.
(e) See plant, Sacramento River, Mile 154.8R.
(f) New unit installed, 1948.

TABLE 107

DIVERSIONS AND ACREAGES IRRIGATED - BACK BORROW PIT*- 1948

Water User	**Mile and Bank	Number and Size of Pump	Monthly Diversions in Acre-Feet								Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.		General	Rice
River Farms Company	0.3L	1-10" 1-20"	4404	845	8846	1789	5106	1593	3431		26014	885	82
--KNIGHTS LANDING RIDGE CUT JUNCTION - MILE 0.4R--													
John J. Anderson	1.45R	2-16"				4	13				17	285	
Earl L. Wallace and Cecil Hulse	3.4R	1-16"				NO DIVERSION							
John C. Cooling	3.8R	(a)1-16"				NO DIVERSION							
W. Crawford	4.35R	1-20"			1	1	156	113	456		727		110
Cornelia Walker (Heidrick Bros.)	7.2R	(b)1-8" (b)2-16"			651	441	406	599	341		2438		400
George C. Youngmark	8.8R	1-14" (c)1-16"			722	617	1256	99	272		2966		400
Hershey Estate	11.15R	1-14" (d)1-16"			689	852	974	828	483		3826		320
Hershey Estate	13.75R	1-16"			880	606	1106	961	169		3722		400
C. M. Mumma	14.75R	1-10"			141	75	111	106	19		452	60	80
--COUNTY LINE BRIDGE - MILE 15.25--													
M. T. Emmert	15.75R	1-12"				NO DIVERSION							
Katie West (H. B. West and Son)	18.1R	(e)1-15" 1-20"			389	395	661	577	588		2610		200
William West	20.0R	1-15"			261	259	423	394	99		1436		250
--RECLAMATION DISTRICT 108 - GRAVITY DRAIN - MILE 20.2L--													
Gregory Estate	21.35R	1-15"			656	509	827	766	196		2954		400
Bean and Brandenburg	22.15R	1-12" 1-14"				NO DIVERSION							
Aileen B. Armstrong (Louis Kaelin)	22.65L	1-16" 1-20"				NO DIVERSION							
--GAGING STATION NEAR COLLEGE CITY - MILE 22.7--													
--SOUTHERN PACIFIC RAILROAD CROSSING - MILE 23.0--													
H. H. Balsdon	24.6L	(f)2-16" 1-20"		64	1143	776	1639	1397	134	28	5181	500	900
Yates, Traynham, Balsdon (g)	24.61R	2-16"			350	519	493	601	371		2334		450
A. M. Dobrosky and Henry Olin	24.7L	1-12"					17	25			42	70	
Gertrude M. Sherer (Mrs.)	25.3L	1-16"				22	53	40			115	100	
Gertrude M. Sherer (Mrs.) (g)	25.5R	1-10"				8	11	1			20	40	
--GRIMES-COLLEGE CITY CAUSEWAY (South Line of R.D. 2047) - MILE 25.5--													
Fred Schutz	25.9L	1-16" 1-20"	133	520	896	1053	1831	1694	152		6279	70	1000
C. W. and M. F. Struckmeyer	27.25L	1-16" 1-20"		378	1050	567	1359	1007	56		4417	135	482
William P. Wallace Ranch (h)	28.0R	1-12" 1-14" (i)1-16"		3	805	850	1320	2281	801		6060		560
--WALLACE CROSSING - (OLD MERIDIAN-WILLIAMS BRIDGE) - MILE 29.2--													
Sebia Davis Estate (g)	29.8R	1-14"				567	185	183	327		1262		170
A. Davis Estate (j)	31.5L	1-24"				NO DIVERSION							
Sebia Davis Estate	32.5L	1-24"				PLANT REMOVED							
Wallace Lynn (g)	32.6R	1-16"						70	25	95	(k) 190	(l)70	
J. G. Olvey (g)	32.7L	1-14"			92	65	44	148			349	140	
A. Davis Estate	33.0R	1-14"				PLANT REMOVED							
Davis Estate	33.5R	1-12"				PLANT REMOVED							
Mike O'Hair (g)	33.5L	1-16"				1165	943	603	578		(m) 3289		235
Davis Estate	33.7L	1-20"				PLANT REMOVED							
Mike O'Hair	34.2R	1-18" 1-20"				PLANT REMOVED							
Ord Leachman	34.25L	1-12"				NO DIVERSION							
Federal Fish & Wild Life Service	36.65R	1-15" 1-20"			87	1055	1189	1004	1935	87	5357		640
Federal Fish & Wild Life Service	37.0L	1-15"					269	171			440		(1)100
--COLUSA-WILLIAMS HIGHWAY - GAGING STATION - MILE 37.0--													
Totals Average cubic feet per second Monthly use in per cent of seasonal			4537 74 5.5	1810 30 2.2	17659 287 21.4	12195 205 14.8	20392 332 24.8	15261 248 18.5	10433 175 12.6	210 4 0.2	82497 170	2455	7079

* Carries return water from Colusa Basin along west border of Reclamation Districts 108 and 787 and thence to discharge to Sacramento River at Knights Landing or partial diversion via Knights Landing Ridge Cut.
** Mileage along Borrow Pit from Outfall Gates just above junction of Borrow Pit with Sacramento River at Knights Landing.
(a) Listed as 2-16" units in 1947.
(b) New units installed in 1948, replacing old 12" and 16" listed in 1947.
(c) New unit installed, 1948.
(d) No operation of 16" unit in 1948.
(e) No operation of 15" unit in 1948.
(f) One 16" unit installed in 1948.
(g) New installation, 1948.
(h) Listed as William S. Wallace in 1947.
(i) New 16" unit installed in 1948.
(j) Installed prior to 1948, not previously listed.
(k) Additional acre-feet diverted: December 77.
(l) All duck clubs.
(m) Additional acre-feet diverted: November 89.

TABLE 108

DIVERSIONS AND ACREAGES IRRIGATED - KNIGHTS LANDING RIDGE CUT - 1948

Water User	*Mile and Bank	Number and Size of Pump	Monthly Diversions in Acre-Feet								Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.		General	Rice
E. L. Wallace	0.8R	1-16" 1-20"		2686	3780	3248	2904	2146	1209		15973	575	900
M. R. Richardson	0.82L	1-14"		108	497	643	882	903	315		3348		365
Ralph W. Pollock	3.5L	1-12"	1								(a) 1	(b) 40	
--RECLAMATION DISTRICT 730 DRAIN PLANT #2 - MILE 3.8--													
Kenneth Lowe	4.5R	1-20"				NO DIVERSION							
Ralph W. Pollock	4.55L	1-12"	61								(c)61	(d)	
Hershey Estate	4.7L	1-15"				NO DIVERSION							
John Sieber	4.7R	1-6"					8	14			22	20	
Layton D. Knaggs	(e)5.25R	1-14"				NO DIVERSION							
Henry Rich	5.9L	1-10" 1-12"					32	33			65	(f) 50	
--WEST LEVEE YOLO BY-PASS - MILE 6.3--													
Henry Rich	6.3R	Gravity				NO DIVERSION							
E. L. Wallace	6.3R	Gravity				NO DIVERSION							
Totals			62	2794	4277	3891	3826	3096	1524		19470	685	1265
Average cubic feet per second			1	47	70	65	62	50	26		40		
Monthly use in per cent of seasonal			0.3	14.4	22.0	20.0	19.6	15.9	7.8	0			

*Mileage downstream from head on Back Borrow Pit near Knights Landing. Flow is principally Colusa Basin drainage diverted to the Ridge Cut by checking at the Knights Landing Outfall Gates on the Back Borrow Pit of Reclamation District 787. See Table 44.

(a) Additional acre-feet diverted: February 23.
(b) Combined acreage, this plant and one at Mile 4.55L.
(c) Additional acre-feet diverted: February 60.
(d) See plant at Mile 3.5L.
(e) Listed as Mile 5.75R in 1947.
(f) Estimated.

TABLE 109

DIVERSIONS AND ACREAGES IRRIGATED - YOLO BY-PASS (EAST BORROW PIT OR TULE CANAL) - 1948

Water User	**Mile and Bank	Number and Size of Pump	Monthly Diversions in Acre-Feet								Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.		General	Rice
T. S. Glide	2.0S	1-20"				NO DIVERSION							
Robert Swanston	1.8S	1-16"			448	640	569	896	985	142	(a)3680		1000
Robert Swanston	1.1S	1-12"				NO DIVERSION							
Robert Swanston	0.7S	1-16"				NO DIVERSION							
Robert Swanston	0.1S	(b)1-16"					419	692	302		1413	450	
--NORTH LEVEE SACRAMENTO BY-PASS - RECORDING GAGE - MILE 0.0--													
Robert Swanston	*1.8N	2-20"				NO DIVERSION							
Ensher, Alexander and Barsoom	2.4N	1-20"			106	290	816	805	863	190	3070	403	
Ensher, Alexander and Barsoom	3.4N	1-8"				NO DIVERSION							
Ralph Aitken	5.9N	1-12"				NO DIVERSION							
--SACRAMENTO-WOODLAND HIGHWAY - MILE 6.1S--													
--SACRAMENTO-WOODLAND RAILROAD CROSSING - MILE 6.2--													
--CACHE CREEK - MILE 7.0N--													
Frank Newman	*7.0N	1-16"				NO DIVERSION							
--RECLAMATION DISTRICT 1600 DRAINAGE PLANT - MILE 10.0--													
--KNIGHTS LANDING RIDGE CUT - MILE 10.1R--													
Fisher and Rich (c)	10.0N	1-14" 1-16"					100	70			(d)170	170	
Henry Rich	10.3N	2-12"				NO DIVERSION							
Totals			0	0	554	930	1904	2463	2150	332	8333	1023	1000
Average cubic feet per second			0	0	9	16	31	40	36	5	17		
Monthly use in per cent of seasonal			0	0	6.6	11.2	22.8	29.6	25.8	4.0			

* Asterisk indicates that land irrigated is in By-Pass area.
** Mileage is given northerly or southerly from North Levee of Sacramento By-Pass. Diversions from East Borrow Pit of Yolo By-Pass are primarily from water diverted through Knights Landing Ridge Cut. See Table 43.

(a) Additional water received from controlled drainage.
(b) One 16" unit removed.
(c) New installation in 1948.
(d) Partially estimated.

TABLE 110

DIVERSIONS AND ACREAGES IRRIGATED - DELTA UPLANDS FROM CACHE SLOUGH - 1948

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	June	July	Aug.	Sept.	Oct.		General	Rice
Reclamation District #2068	SW¼ NE¼ Sec.34 T6N, R1E.	1-36" 2-30"	409	2274	3933	6698	6495	6191	2766	843	(a) 29609	7400	960

(a) Additional acre-feet diverted: February 2378

TABLE 111

DIVERSIONS AND ACREAGES IRRIGATED - LOWER BUTTE CREEK AND BUTTE SLOUGH - 1948

Water User	*Mile and Bank	Number and Size of Pump	Monthly Diversions in Acre-Feet								Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.		General	Rice
						Lower Butte Creek							
--SACRAMENTO RIVER JUNCTION - MILE 0.0--													
--BUTTE SLOUGH - MILE 0.1--													
Reclamation District #833	1.5L	1-8"				PLANT REMOVED							
Reclamation District #833	2.9L	1-36"box		194	429	605	1160	14	1		2403	600	
West Butte Farms Co.	3.85L	1-20"					104	214	13		331	525	
Reclamation District #1004	3.9R	1-20" (a)1-24"				3655	2205	2108	65		8033	(b)	(b)
Butte Lodge Outing Club	4.0R	1-22"				NO DIVERSION							
El Anzar Duck Club	5.35L	1-12"					31				31	60	
Reclamation District #1004	9.3R	1-48" Gravity	300	300	750	800	800	800	600	250	(d)4600	(c)	(c)
Butte Basin Gun Club	10.0L	Gravity							1500	1500	(d)(e)3000	(d)(f)1500	
White Mallard Duck Club	10.2R	1-36" Gravity				NO DIVERSION							
White Mallard Duck Club	13.2R	1-16" (g)1-24"				218	88	140			446	350	
Murdock Land Company	14.4L	1-12"				NO DIVERSION							
--GRIDLEY ROAD - MILE 15.4--													
Murdock Land Company	19.3R	1-14"				144	115	139	85	23	506	(h)180	
--BIGGS-AFTON ROAD - MILE 19.4--													
Glenn Rice Farms	20.4R	1-18"				97	162	389	29	117	794	(h)235	
H. W. McGowan	20.9R	1-16"				PLANT REMOVED							
H. W. McGowan	21.0R	1-16"		302	229	664	863		524		2582		220
A. H. Hulen (i)	21.4R	1-16"								210	210	(f)180	
--RICHVALE-BUTTE CITY ROAD - MILE 22.5--													
McGowan Ranch	23.0R	(j)2-16"			968	463	470	627	492		3020		440
						Butte Slough							
Butte Slough Irrigation Co.	0.3W	Gravity									(k)	(l)	(l)
M. Marty	0.3W	1-12"	11			80	98	197	37		(m) 423	175	
G.S. and D.C. Smith Estate	1.4E	1-8"					94	158			252	(n) 140	
--MAWSON BRIDGE - MILE 2.1--													
C. W. Rowley	2.5W	1-12"	29			47	95	53	28		252	110	
J. E. Smith	3.0W	1-10"					45	14	3		62	44	
I. E. Nall Estate	3.5W	1-10"	8				51	32	35		126	95	
P. A. Reische	3.7W	1-10"	6			22	14	14			56	46	
Granniman and Feiths	4.08W	1-6"					7				7	6	
P. A. Reische	4.1W	1-10"				30	48	42	10		(o) 130	136	
E. V. Jacobs Estate	4.8W	1-10"	40			43	19	35	8		145	180	
P. B. Henson and Hankins (p)	5.1W	1-12"				68	51	73	15		207	115	
T. J. Hageman	6.8W	3-8"				NO DIVERSION							
--OLD LONG BRIDGE - MILE 7.5 WEST--													
Totals (Lower Butte Creek and Butte Slough)			394	796	2376	6936	6520	5049	3445	2100	27616	4647	660
Average cubic feet per second			6	13	39	117	106	82	58	34	57		
Monthly use in per cent of seasonal			1.4	2.9	8.6	25.1	23.6	18.3	12.5	7.6			

* Approximate mileage from junction with Sacramento River.
(a) 24" unit not listed in 1947.
(b) See Butte Creek Farms plant at Mile 89.25L, Sacramento River.
(c) See plant at Mile 112.1L, Sacramento River.
(d) Partially estimated.
(e) Additional acre-feet diverted: November 1300, December 1000.
(f) All gun club lands.
(g) The 24" unit did not operate in 1948.
(h) A portion of this acreage re-used for gun club.
(i) Formerly listed as Glenn Harris.
(j) Replaces 20" unit formerly listed at this location.
(k) Flow in Butte Slough, derived from Butte Creek, is controlled by Outfall Gates at its junction with Sacramento River and is thereby retained in Butte Slough to discharge into East and West Borrow Pits of Sutter By-Pass near "Long Bridge." The Outfall Gates are maintained by the Division of Water Resources and are cooperatively operated with the Butte Slough Irr. Co. See Sutter By-Pass Diversions, Table 112
(l) See acreages under rediversion--West Borrow Pit Sutter By-Pass. A considerable additional but indeterminate acreage was served by sub-irrigation and direct diversions from flow diverted to East Borrow Pit of Sutter By-Pass which is joined by Feather River return flow entering via Wadsworth Canal, Table 48. See East Borrow Pit Sutter By-Pass Diversions, Table 112.
(m) Additional acre-feet diverted: February 14.
(n) Also served by wells.
(o) Additional acre-feet diverted: February 10.
(p) Formerly listed as Hensen and Jacobs.

TABLE 112

DIVERSIONS AND ACREAGES IRRIGATED - SUTTER BY-PASS AND SACRAMENTO SLOUGH - 1948

Water User	Mile and Bank above Mouth	Number and Size of Pump	Monthly Diversions in Acre-Feet								Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.		General	Rice
(a)				West Borrow Pit of Sutter By-Pass									
--SOUTHERN PACIFIC RAILROAD CROSSING - MILE 2.5--													
Reclamation District 1500	8.5R	1-18"			100	300	200	150			750		75
--KNIGHTS LANDING-MARYSVILLE CAUSEWAY - MILE 12.7--													
--SOUTH LEVEE TISDALE BY-PASS - MILE 18.9--													
--RECLAMATION DISTRICT 1660 GRAVITY RETURN - MILE 19.3--													
G. Guisti	23.7R	1-16"			860	833	860	860	833		4246		600
Butte Slough Irr. Co. Ltd.	25.0R	1-30" Gravity					59	61	62		182	(b)5159	
Butte Slough Irr. Co. Ltd.	28.4R	1-48" Gravity	1064		219	634	1453	1756	711		(c)5837	(d)	
Fred Tarke	28.6R	1-12"				NO DIVERSION							
Frye Brothers	29.0R	1-7"						13	12		25	23	
--NEW COLUSA-MARYSVILLE HIGHWAY - MILE 29.1--													
--NORTHERN ELECTRIC RAILROAD CROSSING - MILE 29.15--													
(e)				East Borrow Pit of Sutter By-Pass									
R. E. Hughes	*0.95S	1-16"					207	849			1056	300	
R. E. Hughes	*0.5N	1-14" (f)1-16"				79	42	30			151	140	
Cliff P. Childers	(g) 1.4N (0.3)	1-16"		148	835	1270	927	1884	30		(h)5094		300
Cliff P. Childers	(g) 1.4N (1.3)	1-16"				NO DIVERSION							
E. H. Christensen & Sons	(g) 1.4N (1.3)	1-16"				NO DIVERSION							
E. H. Christensen & Sons	(g) 1.4N (1.75N)	1-15"			436	476	365	396	4		1677		400
E. H. Christensen & Sons	(g) 1.4N (3.3N)	1-15"			184	791	1146	776	313		3210	80	220
E. H. Christensen	(g) 1.4N (4.0E)	1-18"				NO DIVERSION							
R. E. Hughes #6	*1.5N	1-14"				NO DIVERSION							
R. E. Hughes #5	*2.9N	1-14"				1	284	217			502	120	
R. E. Hughes #4	*4.0N	1-14"				325	590	441			1356	160	110
R. E. Hughes #3	*4.5N	1-14"					409	16			425	200	
Ira Mulligan	*5.7N	1-16"				NO DIVERSION							
R. E. Hughes #2	*5.9N	(i)1-10" 1-14"				823	182				(h)1005	200	
O. O. Orrick	7.1N	1-6" (j)1-16"				205	574	539	36		1354	65	150
Ira Mulligan	7.1N	1-16"				NO DIVERSION							

* Asterisk indicates area irrigated is within By-Pass area.
(a) Mileage is given northerly from drainage plant of Reclamation District 1500. Mile 9.15 West Borrow Pit is opposite Chandler.
(b) Combined acreage for plants at this mile and Mile 28.4R.
(c) Additional acre-feet diverted: February 365.
(d) See plant at Mile 25.0R.
(e) Mileage is given northerly or southerly from Chandler.
(f) No operation of 16" unit.
(g) Plant is on drain canal which enters By-Pass at this point. Figure in () indicates distance along drain from By-Pass.
(h) An indeterminate amount of water spilled back to stream.
(i) No operation of 10" unit in 1948.
(j) 16" unit not listed in 1947.

TABLE 112 (CONT'D)

DIVERSIONS AND ACREAGES IRRIGATED - SUTTER BY-PASS AND SACRAMENTO SLOUGH - 1948

Water User	Mile and Bank above Mouth	Number and Size of Pump	Monthly Diversions in Acre-Feet								Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.		General	Rice
(a)			East Borrow Pit of Sutter By-Pass (Continued)										
Crepps and Middleton	8.4N	1-12" (b)1-16"				NO DIVERSION							
--RECLAMATION BOARD DRAINAGE PLANT #2 - MILE 10.0N--													
Crepps and Middleton	Opp. 10.0N(8.6N)	1-18"				NO DIVERSION							
Martin Gun Club	*10.0N	1-12"						206	221	80	(c)507	(d)200	
Sutter Home Investment Co.	*12.0N	1-12"		100	400	400	400	200	113		1613		215
Federal Fish and Wildlife Service	*16.3N	1-20" Gravity							200	150	(e) 350	310	
--EAST LEVEE OF WADSWORTH CANAL - MILE 16.5N--													
--RECLAMATION BOARD DRAINAGE PLANT #3 - MILE 16.5N--													
Fred S. Betty	(f) *16.5N(1.0R)	1-10"							1		1	3	
C. C. Epperson	(f) *16.5N(1.1L)	1-10"				NO DIVERSION							
F. H. Ziegenmeyer	(f) *16.5N(1.35R)	1-12"		186	250	500	250	186			1372		140
A. H. Muns	(f) *16.5N(1.36R)	1-12"		186	250	260	260	250	186		1392		160
Youill Joaquin	(f) *16.5N(3.0L)	1-10"				NO DIVERSION							
Gilbert Williamson	(f) *16.5N(3.6R)	1-10"		33	100	100	100	100	185	180	798	190	
Fred S. Betty	16.5N	(g)1-10" 1-16"			100	200	250	150	100		800		100
Mrs. H. C. and C. H. Epperson	16.5N	1-16" (h)1-20"			300	500	500	350	250		1900	25	165
Meyer, Platter, Moorehead, DeWitt Bros, Epperson and Middleton	19.1N	1-14"					97	361	58		516	443	
--NEW COLUSA-MARYSVILLE HIGHWAY - MILE 19.98N--													
--NORTHERN ELECTRIC RAILROAD CROSSING - MILE 20.0N--													
			Sacramento Slough (i)										
C. F. Holmes	0.5R	1-12"				NO DIVERSION							
C. F. Holmes	1.4R	1-12"						119			119	300	
Totals			1064	653	4034	7697	9155	9910	3315	410	36238	7918	2635
Average cubic feet per second			17	11	66	129	149	161	56	7	75		
Monthly use in per cent of seasonal			2.9	1.8	11.1	21.3	25.3	27.4	9.1	1.1			

*Asterisk indicates area irrigated is within By-Pass area.
(a) Mileage is given northerly or southerly from Chandler.
(b) 16" unit not listed in 1947.
(c) Additional acre-feet diverted: November 111.
(d) All gun club lands.
(e) Additional acre-feet diverted: November 100, December 100; record estimated.
(f) Plant is on Wadsworth Canal which enters By-Pass at this point. Figure in () indicates distance up canal from By-Pass.
(g) Listed separately in 1947, no operation of 10" unit.
(h) No operation of 20" unit in 1948.
(i) Mileage is given easterly from drainage plant of Reclamation District 1500 which is at head of slough.

TABLE 113

DIVERSIONS AND ACREAGES IRRIGATED - FEATHER RIVER - 1948

Water User	Mile and Bank above Mouth	Number and Size of Pump	Monthly Diversions in Acre-Feet								Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.		General	Rice
Walter Raymond	0.6R	(a)1-20"							21		21	50	
Walter Raymond	2.6R	(b)1-20"						35	258		293	150	
Johnston Bros.	3.0L	1-10"				NO DIVERSION							
Ralph Taylor	5.6L	1-10"				NO DIVERSION							
A. L. Haymore	6.44L	1-10"			56	99	103	44	72	29	403	141	
M. Scheiber	7.7L	1-10"				32	187	164	164	36	583	215	
--NICOLAUS GAGING STATION - MILE 9.3--													
--NICOLAUS BRIDGE - MILE 9.4--													
T. H. Richards (c)	9.75R	1-20"	284			182	238	357	222	61	1344	250	
--MOUTH OF BEAR RIVER - MILE 12.0L--													
Garden Highway Mut. W. Co.	13.1R	1-20" 1-24"	283		1418	1661	2162	2154	1304		8982	1220	855
Feather River Water Co.	16.35R	1-14"				PLANT REMOVED							
Farm Lands Co.	17.5L	1-15" 1-20"			566	1095	1599	1245	1367		5872	1493	340
Oswald Water District	21.4R	1-16"	401			380	795	723	606	345	(d)3250	608	
--SHANGHAI BEND GAGING STATION - MILE 23.0--													
Hamilton, Broberg and Stuart	25.2R	1-10"				15	99	27	10		151	115	
--MOUTH OF YUBA RIVER - MILE 27.3L--													
--FIFTH STREET HIGHWAY BRIDGE - MILE 28.0--													
--TENTH STREET HIGHWAY BRIDGE - MILE 28.2--													
A. C. Rackerby	32.3R	(e)1-4" 1-10"					27	53	1		81	80	
G. D. Prindiville	33.3R	1-10"	3			8	105	175	53	32	(f)376	144	
J. L. Sullivan, Jr.	33.9R	1-10"				67	172	106	15	10	(g)370	195	
Sutter Butte Canal Co. (Sunset Plant)	38.1R	1-26" 2-42"			17	2002	2198	1740	1486		7443	(h)	(h)
Matthews, Sullivan and Prindiville	(i) 43.7L(0.4L)	1-18"	179		3	113	309	222	30		(j)856	256	
Mat. Thomes	(i) 43.7L(1.2L)	1-8"	6	17		13	26	21	8		(k)91	63	
Ray Washburn	(i) 43.7L(1.25L)	1-8"					25	49	18	9	101	57	
W. Earl Willey (l)	44.5R	1-7"					3	11	6		20	27	
Arnold Christensen (l)	46.3L	1-24"			59	174	1469	787			2489	1000	
A. P. Barba	47.4L	1-7"				NO DIVERSION							
A. P. Barba	47.9L	1-12"				3	263	294	140	73	773	305	
Robert S. Biggs	48.3L	1-10"			30	202	150	15			397	205	
Edward Dunning	49.0L	1-8"				18	58	34			110	76	
--GRIDLEY BRIDGE - GAGING STATION NEAR GRIDLEY - MILE 49.7--													
Frank R. Norton (m)	51.0R	1-6"	1				14	6			21	15	
M. A. Pedroza and Sons	51.1L	1-6"				56	70	93	44	13	276	62	
Steadman Orchards	51.4R	1-10"					103				103	82	
Capital Company (n)	51.6R	1-6"				NO DIVERSION							
J. F. Fratus	52.1L	1-10"	4		8	28	34	29	12		115	110	
Arthur Starr (o)	52.5L	1-10"				1	13	13			27	65	
F. L. Morris	52.7L	1-9"					24	23			47	42	
Ruby Chambers (Mrs.)	53.1R	1-6"				1	27	15	4		47	37	
Hearst Estate	55.1L	1-14"			16	46	261	213	181	14	731	207	
Henry Hazelbusch	57.9R	1-9"					70	10			(p) 80	48	

(a) Replaces 18" unit formerly listed at this location.
(b) Replaces 20" and 26" units formerly listed at this location.
(c) Formerly listed as Bercut Richards.
(d) Additional water received from wells.
(e) New 4" unit installed in 1948.
(f) Additional acre-feet diverted: February 19.
(g) Additional acre-feet diverted: February 17.
(h) See plant at Mile 58.1R.
(i) Plant diverts Feather River water backed into Honcut Slough, Mouth of Slough at Mile 43.7L. Distance from Feather River up Slough shown in ( ).
(j) Additional acre-feet diverted: February 76.
(k) Additional acre-feet diverted: February 6.
(l) Installed prior to 1948, Not previously listed.
(m) Formerly listed as Clyne Ranch.
(n) New installation at old point of diversion.
(o) Formerly listed as W. F. Shannon.
(p) Additional acre-feet received from Sutter-Butte Canal Co., Mile 58.1R.

TABLE 113 (CONT'D)

DIVERSIONS AND ACREAGES IRRIGATED - FEATHER RIVER - 1948

Water User	Mile and Bank above Mouth	Number and Size of Pump	Monthly Diversions in Acre-Feet								Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.		General	Rice
Sutter Butte Canal Co.	(a) 58.1R	(b)Gravity	916	2585	26076	44262	46983	39182	28344	13696	(c)202044	(d)16083	(d)7882
Richvale Irr. Dist.	(a) 58.1R	Gravity	538	1519	15324	26010	27609	23026	16656	8048	(e)118730	1230	11292
Biggs-West Gridley Water Dist.	(a) 58.1R	Gravity	566	1596	16100	27328	29008	24192	17500	8456	(f)124746	4140	5944
Western Canal Company	59.7R	Gravity			6700	23800	26700	25600	16600	5900	105300	763	16945
--OROVILLE BRIDGE - MILE 65.0--													
--U.S.G.S. GAGING STATION - MILE 71.0--													
Totals			3181	5717	66373	127596	140904	120658	85122	36722	586273	29534	43258
Average cubic feet per second			52	96	1079	2144	2292	1962	1384	597	1206		
Monthly use in per cent of seasonal			0.5	1	11.3	21.7	24.1	20.6	14.5	6.3			

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

(b) Listed as 1-26" and 2-42" units in 1947.
(c) Additional acre-feet diverted: November 6258.
(d) Combined acreage this plant and one at Mile 38.1R.
(e) Additional acre-feet diverted: November 3678.
(f) Additional acre-feet diverted: November 3864.

TABLE 114

DIVERSIONS AND ACREAGES IRRIGATED - YUBA RIVER - 1948

Water User	Mile and Bank	Number and Size of Pump	Monthly Diversions in Acre-Feet								Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.		General	Rice
--HIGHWAY 99E (D STREET BRIDGE) - MILE 0.0--													
--YUBA RIVER AT MARYSVILLE - GAGING STATION AT SEVENTH STREET BRIDGE - MILE 0.9--													
Ben Williams (a)	1.4R	1-4"					1				1	5	
M. Lively (b)	1.6L	(c)1-10"					28	21			49	10	
W. B. Harrington	1.8R	1-6"				36	70	54	35		195	60	
W. B. Harrington	2.6L	1-5"							7	5	12	18	
Bill Wolfe	3.0L	1-10"					70	117	35		222	100	
E. O. Rubke	4.1L	1-14"				51	109	136	24	31	351	(d) 300	
E. O. Rubke	4.3L	1-10"				30	95	94	48		267	(e)	
DiGiorgio Fruit Corp.	4.75L	(f)1-6"	33	23		8					64	72	
DiGiorgio Fruit Corp.	5.3L	(g)1-6"				PLANT REMOVED							
Scott Hendricks	6.2L	1-10"				34	162	122	25		343	165	
Cordua Irrigation District	11.0R	Gravity			4280	4770	5140	5230	5660	5720	(h)30800	(i)3471	1265
Hallwood Irrigation District	11.0R	Gravity			8070	8920	11630	12180	11160	8500	(j)60460	4515	1850
Yuba Consolidated Gold Field Co.	14.5L	Gravity				NO AGRICULTURAL USE							
Totals			33	23	12350	13849	17305	17954	16994	14256	92764	8716	3115
Average cubic feet per second			1	1	201	233	281	292	285	232	191		
Monthly use in per cent of seasonal			0.1	0.1	13.3	14.9	18.6	19.3	18.3	15.4			

(a) Not previously listed.
(b) Formerly listed as Iona Davis Ray.
(c) Replaces 3" unit previously listed at this location.
(d) Combined acreage this plant and one at Mile 4.3L.
(e) See plant at Mile 4.1L.

(f) Replaces 10" pump at this location.
(g) Listed as 8" unit in 1947.
(h) Additional acre-feet diverted: November 700, December 3660.
(i) Includes 1073 acres gun clubs.
(j) Additional acre-feet diverted: November 2530.

TABLE 115

DIVERSIONS AND ACREAGES IRRIGATED - AMERICAN RIVER - 1948

Water User	Mile and Bank above Mouth	Number and Size of Pump	Monthly Diversions in Acre-Feet								Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.		General	Rice
--GARDEN HIGHWAY BRIDGE - MILE 0.2--													
--AUBURN BOULEVARD BRIDGE - 16TH STREET - MILE 1.9--													
--SACRAMENTO NORTHERN RAILROAD BRIDGE - MILE 2.0--													
--WESTERN PACIFIC RAILROAD BRIDGE - MILE 2.1--													
Sacramento Stucco Company	2.4L	1-5"	1			6	6	5	4	1	23	(a)10	
North Sacramento Lands Company	2.4R	1-6"				PLANT REMOVED							
North Sacramento Lands Co.	2.55R	(b)1-6"				5					5	15	
North Sacramento Lands Co.	2.65R	1-7"					9				9	40	
North Sacramento Lands Co.	2.75R	1-5"				NO DIVERSION							
--SOUTHERN PACIFIC RAILROAD BRIDGE - MILE 3.5--													
C. Swanston and Sons	4.2R	1-10"				NO DIVERSION							
C. Swanston and Sons	5.3R	1-10"				NO DIVERSION							
C. Swanston and Sons	5.5R	1-6"				PLANT REMOVED							
--GAGING STATION - AMERICAN RIVER AT SACRAMENTO - MILE 6.1--													
E. Clemens Horst Co.	6.5R	1-6"	3			19	44	11			(c)77	(d)100	
E. Clemens Horst Co.	7.5R	1-8"				53	78	18			(e)149	(d) 50	
John I. Haas, Inc.	7.8R	1-4"			9	35	9	1			54	50	
Hagginbottom Land Co.	8.05R	1-10"				NO DIVERSION							
J. H. Kerby	9.0L	1-6"			17	41	52	23			133	40	
Hagginbottom Land Co.	9.2R	1-12"				NO DIVERSION							
J. G. and F. F. Dauenhauer	9.2L	1-8"			13	22	18	7			60	60	
Ruth Coleman (Mrs.)	9.35L	1-5"				NO DIVERSION							
Ruth Coleman (Mrs.)	9.5L	1-5"				NO DIVERSION							
Ruth Coleman (Mrs.)	9.55L	1-5"				NO DIVERSION							
Sweem Bros.	10.2R	(f)1-8"			47	34	73	34	49	31	268	70	
Andrew C. Feige, et al.	10.3L	1-10"				PLANT REMOVED							
Gold Nugget Orchard Co.	10.4R	1-5"	3		7	3	3	3			19	17	
Mucke Sand and Gravel Co.	11.2L	1-6"	5	1	5	11	18	26	18	7	(g)91	35	
J. T. Gore	11.5L	1-4"				NO DIVERSION							
William A. Meyer	11.7L	1-4"		5	19	12	23		27		86	27	
H. T. Danielson	13.1R	1-5"				NO DIVERSION					(h)		
Knapp Corporation	13.3R	1-4"				31	29	17	17		94	57	
C. W. Deterding and Mrs. May McDonnell	13.9R	1-6"					21	29			50	27	
J. R. Deterding	15.1R	1-4"				34	28	18	5		85	30	
Carmichael Irrigation District	16.0R	1-6" 2-12"	80	28	92	560	1326	1228	910	456	(i)4680	(j)3000	
A. I. Goddard	17.1R	1-6"				NO DIVERSION							
--GAGING STATION - "AMERICAN RIVER AT FAIROAKS" - FAIROAKS BRIDGE - MILE 19.2--													
Totals			92	34	209	866	1737	1420	1030	495	5883	3628	
Average cubic feet per second			2	1	3	15	28	23	17	8	12		
Monthly use in per cent of seasonal			1.5	0.6	3.7	14.7	29.5	24.1	17.5	8.4			

(a) Acreage estimated.
(b) Formerly listed as 5" unit.
(c) Additional acre-feet diverted: February 23.
(d) Also served by wells.
(e) Additional acre-feet diverted: February 47.
(f) Formerly listed as 6".
(g) Additional acre-feet diverted: February 2.
(h) Domestic use only.
(i) Additional acre-feet diverted: February 4, November 230.
(j) Estimated irrigated suburban lands. No segregation of irrigated acreage available.

TABLE 116

DIVERSIONS AND ACREAGES IRRIGATED - OLD SAN JOAQUIN RIVER - 1948

Water User	*Mile and Bank	Number and Size of Pump	Monthly Diversions in Acre-Feet								Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.		General	Rice
Contra Costa Canal	30.5L	(a)	2529	1666	2001	1664	2577	2669	2432	1698	(b)17236	(c)	
Leo Fallman	36.4L	1-16"	51	61	91	99	125	116	131	23	(d) 697	(e)165	
East Contra Costa I.D.	36.5L	2-18" 2-24" 2-30"	3524	315	6090	4716	6943	5380	3021	713	(f)30702	16936	
Augustus Serge	36.5L	2-6"	4	4	12	15	25	9	13	4	86	77	
Byron-Bethany Irr. Dist.	40.9L	1-24" 1-30"	2502	1327	3314	3880	4908	5718	3975	2102	(g)27726	7600	
M. R. Furtado	44.8L	1-14"	44	29	165	126	231	174	229	101	1099	430	
George Ray	45.3L	1-12"				NO DIVERSION							
H. Lindeman & Son	47.2L	1-12"	56	115	230	121	241	237	147	112	(h)1259	(i) 400	
G. Lindeman	47.2L	1-10"				NO DIVERSION							
West Side Irrigation District	47.65L	7-15"	2741	868	5004	3650	5015	5450	3290	1534	(j)27552	10842	
Vance Brown	48.7L	1-12"		1	30	28	4	37	28	14	(k) 142	60	
Naglee-Burke Irr. Dist.	50.4L	1-16" 1-18"	209	253	1044	966	1477	1398	1099	662	(l)7108	(m) 2875	
Freemont Irr. Assn.	50.9L	1-16"	119	92	221	138	320	313	181	66	(n)1450	(o) 711	
Joe M. Freitas	51.0L	1-8"			6	6	7	5	6		30	35	
Attilio Casserini	51.2L	1-8"				NO DIVERSION							
Excelsior Ranch #2	52.4L	1-10"	27	16	30	14	51	30	22		190	111	
A. L. Galli	53.0L	1-8"	2	18	21	37	19	11			(p)108	59	
--MOUTH OF TOM PAINE SLOUGH - MILE 54.3--													
Totals Average cubic feet per second Monthly use in per cent of seasonal			11808 192 10.2	4765 80 4.1	18259 297 15.8	15460 260 13.4	21943 357 19.1	21547 350 18.7	14574 245 12.6	7029 114 6.1	115385 237	40301	

* Distance from mouth of San Joaquin River 4½ miles below Antioch (mileage as established by War Department Survey of 1913-15).
(a) Size of units not available.
(b) Additional acre-feet diverted: January 1943, February 2529, November 2055 and December 2189.
(c) Water was used for industrial, municipal and small agricultural diversions. No segregations made.
(d) Additional acre-feet diverted: February 22 and November 52.
(e) Acreage estimated.
(f) Additional acre-feet diverted: February 5738.
(g) Additional acre-feet diverted: February 1789 and November 10.
(h) Additional acre-feet diverted: February 21 and November 23.
(i) Includes 60 acres on Gus Lindeman's land.
(j) Additional acre-feet diverted: February 2223 and November 422.
(k) Additional acre-feet diverted: February 7.
(l) Additional acre-feet diverted: February 127 and November 28.
(m) Furnished water for an additional 7 acres on Freemont Irrigation Association lands.
(n) Additional acre-feet diverted: February 24.
(o) Includes 7 acres served by plant at Mile 50.4L.
(p) Additional acre-feet diverted: February 14.

TABLE 117

DIVERSIONS AND ACREAGES IRRIGATED - TOM PAINE SLOUGH DELTA UPLANDS - 1948

Water User	*Mile and Bank	Number and Size of Pump	Monthly Diversions in Acre-Feet								Total Diversions March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.		General	Rice
Independent Mutual W. Corp. and Company	0.7S	2-18"	243	254	421	363	635	638	549	13	(a) 3116	(b)1390	
Independent Mutual W. Corp. and Company	1.5S	1-18"	15		53	34	76	51	66	1	(c)296	(d)	
George J. Lake	(e)1.8S	1-10"				47	155	75	52		329	178	
Holly Sugar Corporation	(e)2.0S	1-14"	45		32	24	270	7	10		(f)388	(g)776	
Holly Sugar Corporation	2.1S	(h)1-12"					69	430	417	431	1347	(i)	
Tracy-Clover Irr. District	2.1S	1-16"				NO DIVERSION							
Pescadero R.D. #2058 (Plant #1)	2.9S	1-12"	18	11	83	122	160	153	96	46	(j)689	(k)2733	(k)468
Pescadero R.D. #2058 (Plant #3)	6.3S	1-12" 1-20" 1-24"	154	674	1889	1959	2518	2386	1955	454	(l)11989	(m)	(m)
Pescadero R.D. #2058 (Plant #5)	8.3S	1-12"	108	22	153	244	288	293	188	7	(n)1303	(m)	(m)
Pescadero R.D. #2058 (Plant #5A)	9.0S	1-12"	46	37	164	73	156	189	89	1	(o) 755	(m)	(m)
Totals Average cubic feet per second Monthly use in per cent of seasonal			629 10 3.1	998 17 5.0	2795 45 13.8	2866 48 14.2	4327 70 21.4	4222 69 20.9	3422 57 16.9	953 15 4.7	20212 42	5077	468

* 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.)
(a) Additional acre-feet diverted: February 5.
(b) Combined acreage this plant and one at Mile 1.5S.
(c) Additional acre-feet diverted: February 19.
(d) See plant at Mile 0.7S.
(e) Previously listed as Mile 2.1S.
(f) Additional acre-feet diverted: February 49.
(g) Combined acreage this plant and Holly Sugar Corp. at Mile 2.1S.
(h) Listed as replaced in 1947.
(i) See plant at Mile 2.0S.
(j) Additional acre-feet diverted: February 8.
(k) Combined acreage for this plant and ones at miles 6.3S, 8.3S and 9.0S.
(l) Additional acre-feet diverted: February 286.
(m) See plant at Mile 2.9S.
(n) Additional acre-feet diverted: February 15.
(o) Additional acre-feet diverted: February 34.

TABLE 118

DIVERSIONS AND ACREAGES IRRIGATED - SAN JOAQUIN RIVER DELTA UPLANDS - 1948
(Stockton to Vernalis)

Water User	*Mile and Bank	Number and Size of Pump	Monthly Diversions in Acre-Feet								Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.		General	Rice
--GARWOOD BRIDGE - MILE 45.3--													
Flotill Cannery Co.	45.45R	1-8"									(a)	(a)	
A. Jury	45.5R	1-6"									(a)	(a)	
C. R. Van Buskirk	45.6R	1-5" 1-8"									(a)	(a)	
C. R. Van Buskirk	46.0R	1-4"									(a)	(a)	
Carolyn Weston	46.1R	(b) 1-3" 1-4"				8	17	13	12		50	28	
Carolyn Weston	46.3R	1-6" 1-10"				129	78	99	27		(c) 333	225	
Ivy Ranney	46.65R	(d) 1-8"		1		11	18	20	11		61	50	
Frank West	46.85R	1-10"	28		57	98	68	95	57	26	(e) 429	160	
Y. Takashiro	47.2R	1-6"	1						17		(f) 18	25	
Wolfinger Bros.	47.3R	1-10"					1	6	48		55	47	
C. C. Young (g)	47.55R	1-10"						123			123	100	
Alma A. Haack	48.0R	1-14"	66		31	155	180	170	2	1	605	360	
Lee Young	48.3R	1-4½"		1	4	10	6	19	8	2	(h) 50	30	
Lee Young	48.5R	1-3"				NO DIVERSION							
Joe Calcagno, et al.	48.5R	1-6"	1		28	24	35	18	44		150	(i)193	
Dr. J. M. Carr	48.55R	1-6"	1	8	10	8	8	8	5	1	(j) 49	18	
G. B. Figari	48.6R	1-5"				NO DIVERSION							
Calcagno Bros.	48.66R	1-8"			59	82	64	53	87		345	(k)	
M. O. Cooper Estate	49.0R	1-10"				NO DIVERSION							
Herbert Spangenberg and S. B. Chapman	49.3R	1-14"	5	25	62	86	78	83	77	41	(l) 457	(m) 250	
Herbert Spangenberg and S. B. Chapman	49.5R	1-12"		8	13	16	21	20	14	7	99	(n)	
A. A. Rodgers	50.1R	1-10"	4	7	14	14	44	55	23	12	(o) 173	67	
--BRANDT BRIDGE - MILE 50.2--													
A. Hirata	50.4R	1-8"	22	4	5	25	64	57	6	3	186	(p) 72	
R. K. and F. Watanabe	50.6R	1-6"	4	4	2	9	9	13	6	2	(q) 49	10	
D. Toscano	50.8R	1-6"	1		2	3	6	18	7	2	39	22	
Pastorino Bros.	51.0R	(r)1-6" 1-10"	2	3		37	66	60	30	8	206	150	
Philip Esteban	51.2R	1-12"	1	7	26	14	29	46	16	4	(s) 143	95	
J. Burchel	52.1R	1-6"			5	3	2				10	3	
D. Santini	52.4R	1-5"	2	2	6	3	7	7	3	5	(t) 35	17	
D. J. Macedo	52.65R	(u)1-10"	51		36	29	33	20	54		223	94	
J. Widmer (v)	53.2R	1-12"	50	15	76	74	173	134	190	12	(w)724	350	
William Nishimura	53.4R	1-8"	11		18	10	19	15	17	5	(x) 95	25	
I. N. Robinson Jr., and John Domingo	53.7R	1-12"	83	68	67	49	175	192	61		(y)695	435	
R. E. Albertson	54.9R	1-10"	6		3	1	80	114	132	44	(z)380	155	
Oakwood Stock Farm	56.0R	1-10"				NO DIVERSION							

* Distance along San Joaquin River from its mouth 4½ miles below Antioch. (Mileage as established by War Department Survey 1913-15.)
(a) Formerly listed as Delta Uplands, now classed as lands in Delta area and is included in the Delta Crop Survey for 1948.
(b) No operation of 3" unit in 1948.
(c) Additional acre-feet diverted: February 14.
(d) Replaces the 4" and 6" units listed at this location in 1947.
(e) Additional acre-feet diverted: February 9.
(f) Additional acre-feet diverted: November 5.
(g) New installation in 1948.
(h) Additional acre-feet diverted: November 1.
(i) Combined acreage this plant and plant at Mile 48.66R.
(j) Additional acre-feet diverted: February 9 and November 2.
(k) See plant at Mile 48.5R.
(l) Additional acre-feet diverted: February 16 and November 2.
(m) Combined acreage this plant and one at Mile 49.5R.
(n) See plant at Mile 49.3R.
(o) Additional acre-feet diverted: November 17.
(p) Includes 50 acres served by this plant for plant at Mile 51.0R.
(q) Additional acre-feet diverted: February 3 and November 1.
(r) The 6" unit replaces 12" unit listed at this location in 1947.
(s) Additional acre-feet diverted: November 9.
(t) Additional acre-feet diverted: February 2 and November 1.
(u) Replaces 6" unit previously listed at this location.
(v) Formerly listed as Joe Widner.
(w) Additional acre-feet diverted: February 60 and November 87.
(x) Additional acre-feet diverted: February 6.
(y) Additional acre-feet diverted: February 57.
(z) Additional acre-feet diverted: February 4 and November 12.

TABLE 118 (CONT'D)

DIVERSIONS AND ACREAGES IRRIGATED - SAN JOAQUIN RIVER DELTA UPLANDS - 1948
(Stockton to Vernalis)

Water User	*Mile and Bank	Number and Size of Pump	Monthly Diversions in Acre-Feet								Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.		General	Rice
--JUNCTION WITH MIDDLE RIVER - MILE 56.2L--													
Oakwood Stock Farm	57.0R	1-14"	83	50	200	169	282	256	112	43	(a)1195	305	
James Tobin	57.15R	1-7"				7	30	26	2		65	42	
Frank DeWar, et al.	57.38R	1-4"	1	1	4	6	9	16	3	1	41	12	
G. Gardella & Company	57.5R	1-4"	4	1	5	2	4	2		1	(b)19	19	
A. Queirolo	57.65R	1-2½"	4	2							6	2	
A. Queirolo	58.6R	1-3"	2	1			1		1		5	5	
R. Mauro	58.7R	1-4"									(c)		
Dell Osso Bros.	58.8L	1-15"									(d)	(d)	
--MOSSDALE BRIDGE - RECORDING GAGE - MILE 58.9--													
C. C. Abersold	59.25R	1-6"	2	2	18	21	30	34	24	10	(e)141	33	
H. A. Neistrath	59.3R	1-15"	84	6	106	200	180	208	188	15	(f)987	130	
G. Giovacchini	59.5L	(g)1-14"	69		78	90	26	101	116		480	135	
H. A. Neistrath	60.1R	1-6"	7	3	12	20	36	28	13	3	(h)122	50	
Wendler (Mrs.)	60.5L	1-12"	8			36	27	13	6	84	(i)174	165	
Wendler (Mrs.)	(j)61.5L	1-8"	40								40	46	
A. A. Jensen	62.0L	1-12"	6	6	27	31	48	46	12		(k)176	200	
Paradise Mutual Water Co.	62.2L	1-20"	131		501	531	447	562	286	67	(l)2525	820	
--PARADISE DAM - (HEAD OF PARADISE CUT) - MILE 62.6L--													
Dethlefsen Bros.	62.75L	1-10"		7			14	13			34	12	
Dethlefsen Bros.	63.0L	(m)2-20"	351	233	436	344	1151	917	380	125	(n) 3937	1900	
Manuel Brazil	66.7L	(o)1-8"	124	4	89	108	73	66	29	40	(p)533	140	
Banta-Carbona Irr. Dist.	67.5L	(q)2-8" 2-20" 3-24" 1-36"	4466	3784	7125	5442	9278	8991	5146	1749	(r)45981	(s)16647	
Bradford S. Crittenden	70.0L	1-6"	34	14	91	50	82	82	63	9	(t)425	115	
J. Y. Matsumoto	(u)70.5R	1-10"	7				35				(v) 42	85	
Reclamation District #2075	71.0R	1-16"	169	102	333	76	554	165	343	148	(w)1890	1247	
H. J. Mortensen, Borges and Whitman	73.2R	1-12"	32	26	244	141	235	254	147	81	(x)1160	410	
San Joaquin River Club	75.1L	2-6"	49	169	126	79	89	118	86	131	(y)847	50	
Totals			6012	4564	9919	8251	13912	13356	7911	2682	66607	25551	
Average cubic feet per second			98	77	161	139	226	217	133	44	137		
Monthly use in per cent of seasonal			9.0	6.9	14.9	12.4	20.9	20.0	11.9	4.0			

* Distance along San Joaquin River from its mouth 4½ miles below Antioch. (Mileage as established by War Department Survey 1913-15.)
(a) Additional acre-feet diverted: February 57 and November 5.
(b) Additional acre-feet diverted: February 2 and November 2.
(c) Domestic use only.
(d) Formerly listed as Delta Uplands, now classed as lands in Delta area and is included in the Delta Crop Survey for 1948.
(e) Additional acre-feet diverted: January 3, February 7 and November 5.
(f) Additional acre-feet diverted: February 103.
(g) Replaces 10" unit listed at this location in 1947.
(h) Additional acre-feet diverted: February 12.
(i) Additional acre-feet diverted: January 14, February 74, and November 10.
(j) Listed as Mile 61.3L in 1947.
(k) Additional acre-feet diverted: February 102.
(l) Additional acre-feet diverted: February 326.
(m) A new 20" unit installed to replace the 18" unit listed at this location in 1947.
(n) Additional acre-feet diverted: November 189.
(o) Listed as 3-8" units in 1947.
(p) Additional acre-feet diverted: February 41.
(q) Two 8" units installed in 1948.
(r) This figure includes following acre-feet furnished outside district. Banta Farms 1810, Kasson District 2390 and outside contracts 2817. Additional acre-feet diverted: January 1329, February 5389 and November 192.
(s) This includes the following acreage outside the District: Banta Farms 589 acres, Kasson District 433 acres and other outside contracts 1035 acres. Additional acreage of double crops as follows: Banta-Carbona I.D. 322 acres and Banta Farms 76 acres.
(t) Additional acre-feet diverted: January 12 and February 13.
(u) Listed as Mile 70.5L in 1947.
(v) Additional water received from plant at Mile 71.0R.
(w) Additional acre-feet diverted: February 257, November 205 and December 91. Furnished some water to plant at Mile 70.5R.
(x) Additional acre-feet diverted: February 101.
(y) Additional acre-feet diverted: January 186, February 169, November 125 and December 119.

TABLE 119

DIVERSIONS AND ACREAGES IRRIGATED - SAN JOAQUIN RIVER - 1948
(Vernalis to Fremont Ford Bridge)

Water User	*Mile and Bank	Number and Size of Pump	Monthly Diversions in Acre-Feet								Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.		General	Rice
--U.S.G.S. GAGING STATION - SAN JOAQUIN RIVER NEAR VERNALIS - MILE 76.7--													
A. J. Chisholm	78.9R	1-10"			28	4					32	40	
Kruse, Kirby, Genova (a)	79.4R	1-20"					132	18	51	25	(b) 226		
--STANISLAUS RIVER - MILE 79.7R--													
--MAZE ROAD BRIDGE - MILE 81.85--													
W. C. Blewett Estate	81.95L	3-12"	97	508	585	464	600	776	418	100	(c) 3548	1090	
El Solyo Ranch Co.	82.0L	1-12"	1454	2029	1399	1210	2398	2549	1322	321	12682	3846	
--GAGING STATION - SAN JOAQUIN RIVER AT HETCH HETCHY WATER SUPPLY CROSSING - MILE 82.65--													
--TUOLUMNE RIVER - MILE 91.0R--													
West Stanislaus Irr. Dist.	91.8L	3-26"	6883	8490	10411	4864	14520	13311	6364	1946	(e)66789	(f)22448	
J. B. Erkenbrecher #1	91.8L	1-14"	55		22	88	127				(g)292	100	
Frank Sarmento (Mr. & Mrs.) #2	91.8L	2-16"	268	215	278	270	522	571	279	43	(h)2446	895	
J. B. Erkenbrecher #3	91.8L	1-16"		10	12	37	61	75	64		(i)259	75	
Frank Sarmento (Mr. & Mrs.) #4 (a)	91.8L	1-16"					46	4	38	8	96	100	
Rancho Dos Rios (#3 RB) (a)	94.7R	1-12"			79	111	222	174	76	95	757	155	
Rancho Dos Rios (#2 LB) (a)	95.2L	1-10"					102	73	152		327	80	
Rancho Dos Rios (#2 RB) (a)	95.5R	1-10"	41		74		60	201	29	65	(j)470	295	
Rancho Dos Rios (#1 RB)	95.8R	1-10"		24	14	14	152	142	76		422	65	
Rancho Dos Rios (#1 LB) (a)	95.9L	1-10"			88		103	77			268	120	
--LAIRD SLOUGH BRIDGE - GAGING STATION - SAN JOAQUIN RIVER NEAR GRAYSON - MILE 96.05--													
Rancho El Pescadero	98.9L	1-18"	390	326	75	263	435	275	135		(k)1899	805	
--PATTERSON BRIDGE - MILE 104.4--													
Patterson Water Company	104.4L	1-14" 1-18" 3-20" 1-36"	2879	5234	6312	6477	7168	7168	5043	366	(l)40647	(m)14071	
Chase Brothers	104.5R	1-10"	150	80	87	88	150	156	165	49	925	150	
M. L. Simmons	104.52L	1-5"		1	5	4	1	7	1		19	12	
Twin Oaks Irrigation Co. (n)	109.8L	1-12" 3-16"	505	1442	1889	1272	1818	1926	1398	259	(o)10509	1100	535
Roy Ustick	112.55R	1-16"	145	16	123	148	137	147	127	83	(p) 926	410	
--CROWS LANDING BRIDGE - MILE 113.4--													
A. J. Silveria	113.85R	1-6"			4	2	6	2	3		(q) 17	16	
A. J. Silveria	114.35R	(r)1-7"	15	12	20	6	15				(s) 68	24	
Frank C. Mosier (t)	114.63R	1-8"		11	33	49	47	47	43	31	(u)261	65	
Glen H. Crow Estate (a)	115.0L	1-10"		4	6	11	2	24	6		53	28	
G. L. Dutcher	115.05R	1-10"		11	33	3	20	20	14	10	(v)111	35	
L. B. Crow	116.05L	1-14"	20	30	71	60	97	130	133	22	(w)563	200	
Howard Bell	116.95R	1-12"		6	27	46	21	33	40		(x)173	115	
--MERCED RIVER SLOUGH - MILE 122.2R--													
--U.S.G.S. GAGING STATION - SAN JOAQUIN RIVER NEAR NEWMAN - MILE 123.7--													
--MERCED RIVER - MILE 123.75R--													
--FREMONT FORD BRIDGE - GAGING STATION - MILE 129.5--													
Totals			12902	18449	21675	15491	28962	27906	15977	3423	144785	46385	535
Average cubic feet per second			210	310	353	260	471	454	268	56	298		
Monthly use in per cent of seasonal			8.9	12.8	15.0	10.7	20.0	19.3	11.0	2.3			

*Mileage along San Joaquin River from its mouth 4½ miles below Antioch. (Mileage established by War Department Survey of 1913-15.)
(a) New installation in 1948.
(b) Additional acre-feet diverted: November 20.
(c) Additional acre-feet diverted: February 82. Received additional acre-feet from plant at Mile 82.0L: March 65, April 44.
(d) Additional acre-feet diverted: February 883 and November 423. Includes acre-feet furnished to plant at Mile 81.95L, March 65, April 44.
(e) Additional acre-feet diverted: January 3321, February 30, November 396 and December 176.
(f) An additional 2035 acres of double crop.
(g) Additional acre-feet diverted: February 103.
(h) Additional acre-feet diverted: February 100.
(i) Additional acre-feet diverted: February 30.
(j) Additional water from Turlock Irrigation District.
(k) Additional acre-feet diverted: January 191 and February 210.
(l) Additional acre-feet diverted: January 1719.
(m) An additional 510 acres double cropped.
(n) Formerly listed as Patterson Ranch Company.
(o) Additional acre-feet diverted: January 10 and February 444.
(p) Additional acre-feet diverted: February 10 and November 29.
(q) Additional acre-feet diverted: February 5.
(r) Formerly listed as an 8" unit.
(s) Additional acre-feet diverted: February 14 and November 3.
(t) Formerly listed as Stewart C. Galt.
(u) Additional acre-feet diverted: February 38 and November 21.
(v) Additional acre-feet diverted: January 15.
(w) Additional acre-feet diverted: January 36, February 32 and November 2.
(x) Additional acre-feet diverted: February 30.

TABLE 120

DIVERSIONS AND ACREAGE IRRIGATED - UPPER SAN JOAQUIN RIVER - 1948
FREMONT FORD TO FRIANT DAM

(The following table arranged from data furnished by U. S. Bureau of Reclamation.)

Table Extended on Opposite Page

Item No.	Name	*Mile and Bank	No. and Size of Pump	Monthly Diversions in Acre-Feet				Item No.
				Jan.	Feb.	Mar.	Apr.	
1	--FREMONT FORD BRIDGE - GAGING STATION - MILE 129.5 ABOVE MOUTH--							1
2	Arch Stevinson	133.76R	(a)					2
3	--DELTA BRIDGE - GAGING STATION - MILE 158.7 ABOVE MOUTH--							3
4	Erreca Farms	161.4R	1-14"		PLANT REMOVED			4
5	Erreca Farms	161.9R	1-18"		NO DIVERSION			5
6	Erreca Farms	(b) 163.6R	Gravity		NO DIVERSION			6
7	D. L. McNamara	(c) 163.6R	1-16"	10	23	7	89	7
8	--GAGING STATION - NEAR EL NIDO - MILE 168.0--							8
9	--GAGING STATION - NEAR DOS PALOS - MILE 186.0--							9
10	San Luis Canal Co.	(d) 186.6L	Gravity	1648	4990	4840	6805	10
11	--FIREBAUGH BRIDGE - MILE 198.4--							11
12	Ivan N. Zaninovich**	205.11L	1-6"					12
13	Ivan N. Zaninovich**	205.33L	1-7"					13
14	Ivan N. Zaninovich**	205.59L	1-5"					14
15	Antone Zaninovich	206.02R	1-4"					15
16	--GAGING STATION - NEAR MENDOTA - MILE 206.2--							16
17	--MENDOTA DAM - MILE 208.63 ABOVE MOUTH AND MILE 61.0 BELOW FRIANT DAM--							17
18	San Joaquin Canal Co.	(g)(h)208.63	Gravity	12291	15471	29307	33857	18
19	Firebaugh Canal Co.	(h)208.63	2-24" 2-36" 1-42"	2406	2456	1781	3822	19
20	Grass Lands Water Association**	(h)208.63	Gravity				230	20
21	Dr. E. L. Mott**	(j)(h)208.63	Gravity	119	442	141	157	21
22	Panoche Water Distribution Association** (k)	(l)(h)208.63	Gravity		1771	1744	1576	22
23	Sam Hamburg**	(m)(h)208.63	Gravity					23
24	--FRESNO SLOUGH - MILE 208.91--							24
25	James M. Thuesen**	(n)217.0L	Gravity					25
26	Charles Gotfried**	(p)218.9L	Gravity			125		26
27	--LONE WILLOW SLOUGH - MILE 219.8R ABOVE MOUTH--							27
28	Columbia Canal Co.	219.8R	Gravity	2727	1924	2739	4096	28
29	Breakwater Duck Club**	(t)219.8R	Gravity	42				29
30	Dave Hay (u)	(v)219.8R	Gravity		NO DIVERSION			30
31	Ray Flanagan**	(v)219.8R	Gravity	487	1433			31
32	W. P. Roduner (w)	219.8R	Gravity		NO DIVERSION			32
33	Joe S. Perry (w)	219.8R	Gravity		NO DIVERSION			33
34	--GAGING STATION - AT WHITEHOUSE - MILE 219.83 ABOVE MOUTH--							34
35	Aliso Water Association**	226.2R	Gravity	60				35
36	Chas. Gotfried** (aa)	226.8L	Gravity					36
37	R. E. Jones	232.65L	(bb)1-5"				1	37
38	--HEAD OF GRAVELLY FORD CANAL - MILE 232.8R ABOVE MOUTH--							38
39	Gravelly Ford Water Association**	232.8R	Gravity					39
40	Roland Betzer (cc)	233.66R	1-6"			22	4	40
41	W. A. Kochergen	234.00R	1-6" 1-7"		NO DIVERSION			41
42	N. Nazaroff	234.62L	1-5"	4	5	3		42

*Mileages listed are miles above mouth of San Joaquin River.
** Diversions by these users are subject entirely to temporary contracts with U.S.B.R. Contracts are limited to one year periods.
(a) Size of unit not listed.
(b) Head of East Side Canal. Point of diversion is siphon in East Side Canal 0.3L below head.
(c) Pump located below East Side Canal 1.4R below head. Major source of water was Sand Slough joining East Side Canal at 1.0R below head.
(d) This is at head of Temple Slough.
(e) Includes some double-cropping and interplanting.
(f) Acreage combined under plants at Mile 205.11L, Mile 205.33L and Mile 205.59L.
(g) Includes Main Canal, Helm Canal, Outside Canal and Helm Ditch. Excludes diversions through Outside Canal to Dr. E. L. Mott and Panoche Water Distribution Association. Also excludes Sam Hamburg's diversions from June 15 through September 15.
(h) Point of delivery is considered to be Mendota Pool.
(i) Scattered flooding of grazing lands and duck ponds.
(j) Rediverted from Outside Canal by means of 2-12" pumps on intake channel at Mile 18.24L below head and 2-12" pumps at Mile 19.24L below head.
(k) Formerly listed as Panoche Water.
(l) Rediverted from Outside Canal by means of 3-30" and 2-24" pumps on intake channel at Mile 23.58 below head.

Item No.	Monthly Diversions in Acre-Feet								Total Ac. Ft.	Acreage Irrigated	
	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		General	Rice
1											
2					19	19			38	20	
3											
4											
5											
6											
7	54	22	124	69	38	35			471	138	
8											
9											
10	13803	14313	25987	26440	20166	13603	4848	2973	140416	(e)33810	
11											
12	2	3	3	3					11	(f)100	(f)
13		8	18						26	(f)	(f)
14			8	4	2				14	(f)	(f)
15			1	1	1				3	10	
16											
17											
18	62977	52848	83000	77410	54476	20905	9663	4305	456510	(e)132720	5324
19	8850	8430	11393	10752	5966	3921	1230	1926	62933	(e)22687	2193
20	4286	8631	6404	190	21712	21354		9271	72078	(i)70000	
21	450	405	622	688	267	244	33		3568	1666	213
22	3700	4546	7918	7905	8391	8254	4145	542	50492	29292	60
23		590	1825	1564	561				4540	5526	
24											
25						395		52	447	(o)60	
26		226			171				(q)522	(r)(s)500	(s)
27											
28	4980	5068	8162	8908	6145	4294	2162	2465	53670	(e)16624	40
29						238		95	375	(o)90	
30											
31	2473	2856	4578	5196	1576	118	1706		20423	(x)5385	600
32											
33											
34											
35									(y)60	(z)30	
36									(q)	(s)	(s)
37	2	2	10	15	17	9	1	1	58	15	
38											
39	206	1912	2101	2283	2208	516			9226	4030	240
40			32	55	23				136	68	
41											
42			14			2	6		34	(dd) 30	

(m) Rediverted from Outside Canal by means of 3-24" pumps on intake channel located at Mile 25.75L below head. Except for June 15-September 15 period, water was received from San Joaquin Canal Company.
(n) Head of Mowry Canal.
(o) Duck ponds.
(p) Formerly listed at Mile 217.0L
(q) Combined diversions at miles 218.9L and 226.8L.
(r) Scattered flooding of grazing lands.
(s) Acreage combined under points of diversion at miles 218.9L and 226.8L
(t) Point of rediversion is on Lone Willow Slough at Mile 2.2R below head.
(u) Purchased water under temporary contracts with U.S.B.R. in 1946 and 1947. No contract in 1948.
(v) Delivery is through Chowchilla Canal rediverting from Lone Willow Slough 2.3 miles below head.
(w) Purchased water under temporary contracts with U.S.B.R. in 1946. No contracts in 1947 or 1948.
(x) Approximately 715 acres of this figure double-cropped. However, the double-cropped acreage listed once.
(y) Received only surplus operational spillage.
(z) Acreage estimated.
(aa) Installed prior to 1948 but this is first year reported.
(bb) Listed as 6" pump in 1947.
(cc) Formerly listed as William Bucknoff.
(dd) Additional water received from Fresno Irrigation District.

TABLE 120 (CONT'D)

DIVERSIONS AND ACREAGE IRRIGATED - UPPER SAN JOAQUIN RIVER - 1948
FREMONT FORD TO FRIANT DAM

(The following table arranged from data furnished by U. S. Bureau of Reclamation)

Table Extended on Opposite Page

Item No.	Name	*Mile and Bank	No. and Size of Pump	Monthly Diversion in Acre-Feet				Item No.
				Jan.	Feb.	Mar.	Apr.	
43	E. Arata	234.68L	1-4"			4		43
44	Wheeler	(b)235.02S	(c)	DOMESTIC USE (INCLUDING FAMILY GARDEN)				44
45	J. A. Kochergen	235.03R	1-5"		NO DIVERSION			45
46	G. V. Hart	235.03L	1-3"		NO DIVERSION			46
47	E. F. Carlson	(d)235.33R	1-5"	8	6	8	10	47
48	Madera Irrigation District (Wm. Talmasoff)**	236.28R	1-6"	INCLUDED IN MADERA IRRIGATION DISTRICTS DIVERSIONS AT MILE 269.63				48
49	Morello Winery	237.33L	1-8"	18	62	155	107	49
50	Anna E. Beatty	237.43L	1-6"					50
51	J. Peterson	237.98R	1-6"			6		51
52	--SKAGGS BRIDGE - MILE 238.18 ABOVE MOUTH--							52
53	D. Verduzco	239.45R	1-6"		NO DIVERSION			53
54	--BOWSER RECORDER STATION - MILE 242.41L ABOVE MOUTH--							54
55	P. J. Vincent	243.84R	2-6"	12	7	15	17	55
56	C. B. Hines (e)	244.03L	(c)					56
57	Lionel Steinberg	244.86L	1-7"	32	38	30	2	57
58	C. L. Hammar	245.36R	1-6"	33	22	4	31	58
59	Lionel Steinberg	245.81L	1-6"		9			59
60	Josephine Jasper	246.15L	1-5"					60
61	Josephine Jasper	246.34L	1-8"					61
62	H. W. Valentine (g)	246.73L	1-5"	4	6	9		62
63	Vincent Jura (h)	246.98L	1-4"					63
64	Brockway	247.33R	(c)		PLANT REMOVED			64
65	--HERNDON BRIDGE - MILE 247.38 ABOVE MOUTH--							65
66	Sam Deanda	247.50R	1-5"		NO DIVERSION			66
67	Frank, James and Adolph Oberti	247.64R	1-5"	17	11	31		67
68	Frank, James and Adolph Oberti	247.65R	1-4"			1	1	68
69	San Joaquin Light & Power Company	247.82R	1-3"	5	5	3		69
70	--HERNDON RECORDER STATION - MILE 248.31L ABOVE MOUTH--							70
71	Bud Bradburn	248.51L	1-3"	3				71
72	John Danisi	248.72L	1-5"	9	4	18	7	72
73	--SANTA FE RAILROAD CROSSING - MILE 249.23 ABOVE MOUTH--							73
74	Moosios, Moosios and Vlahos	249.51R	1-4"		NO DIVERSION			74
75	Moosios, Moosios and Vlahos	250.56R	1-6"	4	5	9		75
76	Moosios, Moosios and Vlahos	250.76R	1-7"					76
77	D. M. Folsom	251.19L	1-4"		NO DIVERSION			77
78	Sandstone Land & Cattle Company	251.46L	1-5"					78
79	W. A. McGillivary	(k)251.83L	(c)		NO DIVERSION			79
80	W. A. McGillivary	(k)251.93L	(c)		NO DIVERSION			80
81	West Coast Life Insurance Company	(k)252.03L	(c)		NO DIVERSION			81
82	George F. Seeman	252.79L	1-5"		PLANT REMOVED			82
83	D. M. Folsom	253.10L	1-4"					83
84	D. M. Folsom	253.38L	1-5"		NO DIVERSION			84

* Mileages listed are miles above mouth of San Joaquin River.
** Diversions by these users are subject entirely to temporary contracts with U.S.B.R. Contracts are limited to one year periods.

(a) Additional water received from Fresno Irrigation District.
(b) Point of diversion and place of use is on island in midstream.
(c) Size of unit not listed.
(d) Plant was moved 0.10 mile downstream in 1948.

Item No.	Monthly Diversions in Acre-Feet								Total Ac. Ft.	Acreage Irrigated	
	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		General	Rice
43			6			4			14	(a) 20	
44											
45											
46											
47	48	45	55	53	29	25	3		290	52	
48											
49		43	206	226	35		3	22	877	(a)262	
50			5	9	6				20	5	
51	24	28	56	40	16		11		181	57	
52											
53											
54											
55	30	77	49	46	29	10	23	8	323	146	
56		6	7	2					15	12	
57	33	8	39	23	5		34	33	277	(a)140	
58	62	75	85	70	36	6	9	32	465	84	
59	15		6	9				9	48	35	
60	4	3	5	2					14	13	
61	1		12	6		5	34		58	(f)29	
62	38	27	52	67	39	15	1		258	98	
63		5							5	(i)30	
64											
65											
66											
67	6	26	53	50	60	27	2	48	331	(j)111	
68	4	10	14	16	20	14			80	(j)	
69	16	16	22	25	23	4	5		124	30	
70											
71		6	18	11	9				47	20	
72	13	20	29	18	6		3		127	40	
73											
74											
75	17	20	75	44	23			18	215	75	
76			3	3					6	6	
77											
78				9	6				15	20	
79											
80											
81											
82											
83	6	6	5	10	4	2			33	10	
84											

(e) Installed prior to 1948 but this is first year reported.
(f) Additional water can be obtained from wells and from Fresno Irrigation District.
(g) Formerly listed as J. Reed.
(h) Formerly listed as Mike Jura.
(i) Probably one partial irrigation.
(j) Acreage combined under plants at Mile 247.64R and Mile 247.65R.
(k) Plant located on river slough.

TABLE 120 (CONT'D)

DIVERSIONS AND ACREAGE IRRIGATED - UPPER SAN JOAQUIN RIVER - 1948
FREMONT FORD TO FRIANT DAM

(The following table arranged from data furnished by U. S. Bureau of Reclamation.)

Table Extended on Opposite Page

Item No.	Name	*Mile and Bank	No. and Size of Pump	Monthly Diversions in Acre-Feet				Item No.
				Jan.	Feb.	Mar.	Apr.	
85	Fred Russell	253.79R	1-6"	1	4	2		85
86	Howard & Epperson	254.57R	(a)		NO DIVERSION			86
87	Howard & Epperson	254.82R	1-5" 1-6"					87
88	Howard & Epperson (c)	254.93R	1-6"					88
89	Bullard Ranch	254.98L	1-7"					89
90	War Dads Memorial	255.05L	1-4"					90
91	McEacherm & Larson	(e)254.98S	1-5"		NO DIVERSION			91
92	McEacherm & Larson	(e)255.28S	1-5"		NO DIVERSION			92
93	McEacherm & Larson	(e)255.33S	1-5"		PLANT REMOVED			93
94	McEacherm & Larson	255.34R	1-7"					94
95	McEacherm & Larson	(e)255.84S	1-6"		19	11	22	95
96	McEacherm & Larson	255.84R	1-5"		PLANT REMOVED			96
97	McEacherm & Larson	256.40R	1-5"					97
98	McEacherm & Larson	256.52R	1-5" (g) 1-6"					98
99	W. W. Pitman	256.60R	1-5"			4		99
100	Richard Holland	257.09L	1-7"		NO DIVERSION			100
101	Richard Holland	257.70L	1-8"		14	12	11	101
102	L. D. Cobb	258.08R	1-7"					102
103	--NEW LANES BRIDGE - MILE 258.33 ABOVE MOUTH--							103
104	R. J. Curtis	258.39L	1-7"		4			104
105	W. E. Roberts	258.50L	1-4"			5		105
106	W. E. Roberts	258.66L	1-24"		NO DIVERSION			106
107	W. E. Roberts	258.80L	1-6"			24	21	107
108	--LANES BRIDGE RECORDER STATION - MILE 258.93L ABOVE MOUTH - COMPLETELY DISMANTLED AND REMOVED IN 1948--							108
109	W. E. Roberts	259.07L	1-8"		NO DIVERSION			109
110	J. E. Cobb	259.30R	(a)		NO DIVERSION			110
111	J. E. Cobb	259.39R	1-7"	26	9	20		111
112	--SITE OF OLD LANES BRIDGE - MILE 259.78 ABOVE MOUTH--							112
113	Marjorie E. Sims	259.80L	1-6"					113
114	R. C. Arnold	261.53R	1-6"			16	10	114
115	E. G. Rank	(e)262.07S	1-6"		NO DIVERSION			115
116	Isabel Burnham	262.13R	1-6"		NO DIVERSION			116
117	D. M. Folsom	262.27L	1-7"		4	51		117
118	R. W. Fewel	262.43L	1-5"	13	4			118
119	E. G. Rank	262.48L	1-5"	15	3		5	119
120	Richard Holland	262.66R	1-7"	17	19	18	14	120
121	Isabel Burnham	263.40R	1-7"					121
122	Isabel Burnham	263.42R	1-6"		PLANT REMOVED			122
123	H. W. Ball	263.63L	(a)		GRAVEL WASH WATER			123
124	Andrew Jensen (c)	263.76R	1-5"				8	124
125	H. W. Ball	264.08L	1-10"		NO DIVERSION			125
126	W. F. Ball	264.83L	1-4"	2	10	20	4	126

* Mileages listed are miles above mouth of San Joaquin River.
** Diversions by these users are subject entirely to temporary contracts with U.S.B.R. Contracts are limited to one year periods.

(a) Size of unit not listed.
(b) This is combined acreage for plants at Miles 254.82R and 254.93R.
(c) Installed in 1948.
(d) Additional water received from wells.

Item No.	Monthly Diversions in Acre-Feet								Total Ac. Ft.	Acreage Irrigated	
	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		General	Rice
85	10	4	26	18	10	1	1	5	82	33	
86											
87			90	56	18				164	(b) 59	
88			84	70	15				169	(b)	
89		5	3						(d) 8	47	
90			7	11					18	2	
91											
92											
93											
94	7	22	31	7					67	(f)113	
95	34	25	33	32	21	10			207	17	
96											
97	5	9	21	29					64	(f)	
98	24	8	55	74	9				170	49	
99									(d) 4	(h) 2	
100											
101	15	24	19	2	3				100	8	
102	37	128	89	29	61	22			366	(i)123	
103											
104	42	12	71	33	17				179	29	
105		12	12	11	13	3	4		60	(j)125	
106											
107	43	67	68	44	57	12	17	1	354	(j)	
108											
109											
110											
111	42	54	146	84	41				422	(k) 92	
112											
113			57	36	19				112	43	
114	14	36							76	105	
115											
116											
117	16	88	158	125	53	22			517	(d)193	
118	22	40	33	39	17	17			185	(l) 72	
119	18	29	33	46	24	14			187	(m) 22	
120	62	54	65	69	51	40	27	2	438	96	
121	108	26			91	91	43		359	70	
122											
123											
124	19	15	8	3	3				56	145	
125											
126	17	29	23	23	19	5	2	1	155	26	

(e) Point of diversion and place of use is on island in midstream.
(f) Acreage combined for plants at Mile 255.34R and 256.40R.
(g) Only the newly installed 6" unit operated during 1948.
(h) Acreage estimated.
(i) An additional 23 acres served by plant at Mile 259.39R.
(j) Acreage combined for plants at Mile 258.50L and Mile 258.80L.
(k) Includes 23 acres of L. D. Cobb lands.
(l) Additional water received from E. G. Rank pump at Mile 262.48L.
(m) Does not include additional acreage of F.W. Fewel served by this pump.

TABLE 120 (CONT'D)

DIVERSIONS AND ACREAGE IRRIGATED - UPPER SAN JOAQUIN RIVER - 1948
FREMONT FORD TO FRIANT DAM

(The following table arranged from data furnished by U. S. Bureau of Reclamation)

Table Extended on Opposite Page

Item No.	Name	*Mile and Bank	No. and Size of Pump	Monthly Diversion in Acre-Feet				Item No.
				Jan.	Feb.	Mar.	Apr.	
127	V. D. Roullard	265.40L	1-4"					127
128	B. B. Durando	267.56L	1-6"	18	9	34	23	128
129	--BELOW FRIANT GAGING STATION - MILE 268.13L ABOVE MOUTH--							129
130	--FRIANT BRIDGE - MILE 268.88 ABOVE MOUTH - MILE 0.65 BELOW MOUTH OF COTTONWOOD CREEK AND MILE 0.75 BELOW FRIANT DAM--							130
131	Wishon Watson Company	269.18R	1-5"			62	6	131
132	--COTTONWOOD CREEK - MILE 269.53R ABOVE MOUTH--							132
133	FREMONT FORD TO FRIANT DAM							133
134	Totals			20031	28789	41281	50936	134
135	Average Cubic Feet Per Second			326	503	671	856	135
136	Monthly Use in Per Cent of Seasonal			2.3	3.3	4.7	5.7	136
137	Madera Irrigation District**	(a) 269.63R	Gravity	0	520	2708	240	137
138	D. W. Moody**	(d) 269.63R	1-4"	0	0	0	0	138
139	C. L. Floto (e)	269.63R						139
140	--FRIANT DAM - MILE 269.63 ABOVE MOUTH OF SAN JOAQUIN RIVER AND 0.1 MILE ABOVE MOUTH OF COTTONWOOD CREEK--							140

* Mileages listed are miles above mouth of San Joaquin River.
** Diversions by these users are subject entirely to temporary contracts with U.S.B.R. Contracts are limited to one year periods.

(a) Point of delivery is considered to be at "Canal Side." Points of diversion are at Hildreth Creek Turnout Mile 13.1L, Fresno River Wasteway Mile 18.8L, Dry Creek Mile 24.2L, Berenda Creek Mile 30.4L and Ash Slough Mile 35.6L. All mileages listed above are below head of Madera Canal.

TABLE 121

DIVERSIONS AND ACREAGE IRRIGATED - FRESNO SLOUGH AND FRESNO SLOUGH BY-PASS* - 1948

(The following table arranged from data furnished by U.S. Bureau of Reclamation.)

Table Extended on Opposite Page

Item No.	Name	**Mile and Bank	No. and Size of Pump	Monthly Diversions in Acre-Feet				Item No.
				Jan.	Feb.	Mar.	Apr.	
1	B. H. Jennings (a) (b)	2.9L	(c)1-12"					1
2	Charles Sachs (b)	8.2L	(d)1-30" (d)1-36"					2
3	Frank Arcelus (b)	9.5R	(e)					3
4	Traction Ranch (f)	9.6R	1-20"				296	4
5	--CONFLUENCE OF FRESNO SLOUGH BY-PASS AT MILE 11.8R ABOVE MOUTH OF FRESNO SLOUGH--							5
6	Traction Ranch (f)	11.8R	(i)					6
7	Kerman Cattle Co. (b)	(j)11.8R	1-12"					7
8	James Irrigation Dist., "P" Booster (f) (l)	(m)11.8R	(n)1-14"					8
9	James Irrigation Dist., "N" Booster (f)	13.25R	1-14" 1-20" 1-24"				665	9
10	J. W. Wilson	13.5L	1-12"		41	63		10
11	Tranquillity Irr. Dist. Lift #1 (f)	14.1L	2-24"			693	2686	11
12	Tranquillity Irr. Dist. Lift #2	15.9L	1-24" 2-30"					12
13	Totals			0	41	756	3647	13
14	Average Cubic Feet per Second			0	1	12	61	14
15	Monthly Use in Per Cent of Seasonal			0	0.1	1.7	8.4	15

* Water in Fresno Slough is derived from surplus flows of Kings River via Fresno Slough By-Pass and from San Joaquin River by Mendota Pool backwater created by Mendota Dam.
** Mileage listed is Fresno Slough mileage above its mouth on San Joaquin River. Mouth of Fresno Slough at Mile 208.93L above mouth of San Joaquin River and Mile 60.7L below Friant.
(a) Listed as E. P. Jennings in 1947.
(b) Diversions by these users are subject entirely to temporary contracts with the U.S.B.R. Contracts are limited to one year periods.
(c) Formerly listed as 10" pump.
(d) Installed in 1948. Replaces old pumps formerly at same location.
(e) Portable pump. Size not listed.
(f) These diverters have established riparian rights but receive supplemental water through temporary annual contracts with the U.S.B.R.
(g) Duck ponds.
(h) Acreage combined under plants at Miles 9.6R and 11.8R.
(i) Size of pump not listed. Diverted from Fresno Slough By-Pass 0.75R above confluence.

Item No.	Monthly Diversions in Acre-Feet								Total Ac. Ft.	Acreage Irrigated	
	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		General	Rice
127	2	14	21	15	8				60	35	
128	11	17	118	125	73	10		1	439	238	
129											
130											
131	9	45	59	34	2		27	37	281	44	
132											
133											
134	102657	101044	154332	143237	122710	74266	24043	21847	885173	(f)325919	8670
135	1672	1701	2510	2330	2063	1208	405	355	1220		
136	11.6	11.4	17.4	16.2	13.8	8.4	2.7	2.5			
137	7082	9529	18362	21351	7013	0	0	0	(b)66805	(c)140000	
138	0	3	3	1	1	0	0	0	8	3	
139											
140											

(b) Total includes diversion from Wm. Talmasoff pump at Mile 236.28R. This pump diverted 15 A.F. in May, 27 A.F. in September for a total of 61 A.F.
(c) This is acreage considered irrigable under ultimate development.
(d) Not previously listed. Diverts from Dry Creek approximately 500' below Madera Canal. Point of diversion for Dry Creek is Mile 24.2L below Head of Madera Canal.
(e) Purchased water under temporary contract with U.S.B.R. in 1946. No contracts in 1947 or 1948.
(f) Total incorrect. Should be 325884.

Item No.	Monthly Diversions in Acre-Feet								Total Ac. Ft.	Acreage Irrigated	
	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		General	Rice
1	127	126	136	138	104				631	825	190
2			287	2711	1564				4562	2854	
3						75			75	(g)50	
4	486	347	677	532	190	216	75	3	2822	(h)576	(h)681
5											
6					120	167			287	(h)	(h)
7	75	151	233	136	271	200			1066	(k)2000	
8			114	1163	429				1706	(o)5461	
9	711	806	2003	1601	1089	523	99	100	7597	(o)	(o)
10		37	64	88					293	180	
11	4028	1908	5738	5691	2670	602	254		(p)24270	(q)7760	(q)708
12									(p)	(q)	(q)
13	5427	3375	9252	12060	6437	1783	428	103	43309	19706	1579
14	88	57	150	196	108	29	7	2	60		
15	12.5	7.8	21.4	27.9	14.9	4.1	1.0	0.2			

(j) Diverted from Fresno Slough By-Pass 4.5R miles above confluence.
(k) Scattered flooding of grazing land and duck ponds.
(l) Not previously listed.
(m) Diverted from Fresno Slough By-Pass 4.4L miles above confluence.
(n) Installed July 1948.
(o) Acreage combined under plants at Miles 11.8R and 13.25R approximately 65 acres of this figure double-cropped. However, the double-cropped acreage listed once.
(p) Diversions combined under plants at Miles 14.1L and 15.9L.
(q) Acreage combined under plants at Miles 14.1L and 15.9L. Approximately 55 acres of this figure double-cropped. However, the double-cropped acreage listed once.

TABLE 122

DIVERSIONS AND ACREAGES IRRIGATED - MERCED RIVER - 1948

Water User	Mile and Bank above Mouth	Number and Size of Pump	Monthly Diversions in Acre-Feet								Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.		General	Rice
--GAGING STATION - MERCED RIVER NEAR MOUTH - MILE 1.1--													
Stevinson Water District #1	1.8R	(a)1-16"			40		3	6			49	100	
Stevinson Water District #2	3.8R	1-20"	202	42	510	134	558	558	340	201	(b)2545	600	
Milton Gordon	4.0L	1-10"	5	7	18	36	77	84	38	10	(c)275	88	
--GAGING STATION - NEAR STEVINSON - MILE 4.6--													
Salvador DeAngelis	4.8L	1-12"		4	15	6	13	22			(d)60	33	
Maria DeAngelis	5.8L	1-12"	54		31	52	56	49	40	6	288	98	
Lydell Peck (e)	6.1L	1-15"	43	94	191	124	504	424	136		(f)1516	200	
Stevinson Water District	(g)7.7L	1-20"	8	32	147		599		155		(h) 941	1100	
James F. Corado	8.5L	1-12"	2		5	1	17	14			39	40	
Manuel Clemintino	8.85L	1-12"	4		15	16	10	9	3	2	59	85	
Samuel B. McCullagh	9.4L	1-12"	48	40	69	100	120	97	76	24	(i)574	233	
Joe R. Jacinto	9.6L	1-12"	26		67	79	91	68	49	41	(j)421	115	
R. W. Adams and Mrs. J. B. Silva	10.35L	1-8" 1-10"	111	7	181	210	351	272	137	60	(k)1329	404	
R. E. Prusso	10.8R	1-6"					13	9			22	55	
Manuel Freitas (l)	10.84L	1-12"					61	239			300	195	
R. E. Prusso and John Vierra	10.85L	1-5" 1-12"	94		73	102	122	102	29		522	(m)205	
J. Regello (n)	11.6L	1-12"	6		60	30	74	53	47		270	90	
Tony Vierra	11.6L	1-8"	94		86	24	140	143	58	20	565	102	
--MILLIKEN BRIDGE - MILE 11.65--													
E. & J. Gallo Winery Ranch	12.35L	1-10"	14		16	71	37	7			(o) 145	100	
Soren Husman	12.36L	1-6"	20		15	10	11	13	5	3	77	40	
E. & J. Gallo Winery Ranch	12.85L	1-10"	100			59	252	113	17		(p) 541	160	
E. & J. Gallo Winery Ranch	16.5L	1-10"			46	126	183	112			(q) 467	150	
C. J. Carpenter	17.05L	1-7"				8	5	4	3	2	(r) 22	15	
Ervey V. Schmidt (s)	17.7L	1-5"					6	7	2		15	14	
J. H. Thomas	(t) 17.85L	1-6"	7		5	14	15	15	8	3	67	28	
C. P. Hockett	18.5L	1-4"	1	1	3	4	6	3	5	2	25	10	
S. P. Magsalay	19.8L	1-6"	2	8	7		32	11	6	3	69	30	
Frank P. Dutra	19.8L	1-6"			18	11	15	14	14		72	25	
John Reininghaus	20.4L	1-6"	4		14	21	28	21	22		110	80	
G. L. Carlson (u)	20.6R	1-6"	8	5	12	14	24	19	12	5	99	31	
G. L. Carlson (u)	20.65R	1-4"				NO DIVERSION							
--HIGHWAY 99 BRIDGE - MILE 21.04--													
--SOUTHERN PACIFIC RAILROAD (MAIN LINE) - 21.05--													
A. C. Jorgensen #1	21.05R	1-6"			14	5	6	18	13		(v) 56	27	
A. C. Jorgensen #2	22.2R	1-16"	26	25	110	393	162	318	102	12	(w)1148	270	
A. C. Jorgensen #3A	23.25R	1-6"				5	5	3	2		15	3	
A. C. Jorgensen #3	23.3R	1-12" 1-15"	34	34	37	81	138	132	36	2	494	195	
A. C. Jorgensen #4	23.6R	1-8"					39	24			63	60	

(a) Replaces 10" unit formerly listed at this location.
(b) Additional acre-feet diverted: January 9, February 133.
(c) Additional acre-feet diverted: January 4, February 4.
(d) Additional acre-feet diverted: February 11.
(e) Formerly listed as J. F. Peck.
(f) Additional acre-feet diverted: November 16.
(g) Formerly listed at Mile 7.1L.
(h) Additional acre-feet diverted: February 217, November 30.
(i) Additional acre-feet diverted: November 3.
(j) Additional acre-feet diverted: November 19.
(k) Additional acre-feet diverted: February 27, November 12.
(l) Formerly listed as Taz LaFollette.
(m) Acreage should have been listed in 1947 as 206.
(n) Listed as J. Rebello in 1947.
(o) Additional acre-feet diverted: November 54.
(p) Additional acre-feet diverted: November 133.
(q) Additional acre-feet diverted: February 129, November 174.
(r) Additional acre-feet diverted: November 3.
(s) Formerly listed as Eusibia Goth.
(t) Formerly listed at Mile 18.15L.
(u) Formerly listed as W. J. Hoskins.
(v) Additional acre-feet diverted: February 11.
(w) Additional acre-feet diverted: February 75, November 33 and December 11.

TABLE 122 (CONT'D)

DIVERSIONS AND ACREAGES IRRIGATED - MERCED RIVER - 1948

Water User	Mile and Bank above Mouth	Number and Size of Pump	Monthly Diversions in Acre-Feet								Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.		General	Rice
Manuel A. Bettencourt	23.8R	1-6"			12	3	9	11	13		48	40	
Warren F. McConnell	24.2L	1-5"				NO DIVERSION							
T. Nishihara (a)	24.3R	1-5"			8	7	8	2	6		31	24	
Warren F. McConnell	(b) 24.5L	1-6"				NO DIVERSION							
T. Nishihara	24.6R	1-6"				3	17	15	18		53	23	
T. Nishihara	25.0R	2-5"			14	11	41	43	15		124	25	
T. Nishihara	25.5R	1-6"			21	12	25	65	11		134	69	
Merced River Farms Assn.	26.3R	1-8"	6	21	94	178	203	169	92	48	811	97	
W. C. Magneson	26.55R	(c)1-5" 1-6"			5	31	22	5			63	63	
Carl Cunningham (a)	26.8L	1-8"			32						32	40	
W. C. Magneson	27.0R	1-6"				PLANT REMOVED							
--SANTA FE RAILROAD CROSSING - MILE 27.05--													
W. C. Magneson	(d)27.5R	1-10"	7		50	135	160	154	83		589	155	
--CRESSEY BRIDGE - MILE 27.6--													
--GAGING STATION - MERCED RIVER AT CRESSEY - MILE 27.6--													
T. Nishihara	27.8R	1-4" 1-6"	2		6	4	15	7			(e) 34	30	
M. Uyekubo	28.1R	1-5"	2	2	4	2	8	7	5		(f) 30	20	
John Farie	28.4R	1-5"			15	18	10	10	10		63	47	
J. Campadonica	28.6R	1-6"			8	1	7	7	6		29	18	
Oliver Alves	28.6R	1-8"			18	20	45	35	38	11	167	80	
Anthony Demchille	29.1R	1-7"			3	37	33		4	1	78	45	
Anthony Demchille	29.75R	1-6"			3	22	14	17	2		58	12	
Manuel Silva	29.9R	1-6"				NO DIVERSION							
Manuel Silva	29.9R	1-6"			13	76	73	57	23	10	252	70	
Rose & Schaefer	30.7L	1-6"		2	23	35	57	45	23	6	191	(g)90	
Manuel Silva	30.95R	1-12"			31	82	108	142	56	27	446	185	
Rose & Schaefer	31.1L	1-8"		3	76	114	118	54	46	15	426	(h)	
Manuel Silva	31.5R	1-6"	1	1	26	51	71	77	44	20	291	150	
--SOUTHERN PACIFIC RAILROAD (OAKDALE BRANCH) - MILE 32.52--													
Robert J. Ramsey	33.1R	1-6"			20	22	33	130	10		215	(i) 230	
Robert J. Ramsey	33.55R	1-6"			34	34	49	127	93		337	(j)	
Reinero Bros.	39.2L	1-24"box				NO DIVERSION							
--GAGING STATION - MERCED RIVER AT YOSEMITE VALLEY R. R. CROSSING - MILE 42.1--													
Totals Average cubic feet per second Monthly use in per cent of seasonal			931 15 5.2	328 6 1.8	2321 38 13.1	2634 44 14.9	4899 80 27.6	4162 68 23.4	1953 32 11.0	534 9 3.0	17762	6494	
Merced Irrigation District	(k)46.0L	Gravity											
Totals Average cubic feet per second Monthly use in per cent of seasonal			192 3 0.1	11734 197 2.6	84063 1367 18.5	83810 1409 18.4	110155 1791 24.2	92094 1498 20.3	71529 1202 15.7	919 15 0.2	(l)454496 935	109500	

(a) New installation in 1948.
(b) Listed at Mile 24.2L in 1947.
(c) Listed as 1-5" and 2-6" units in 1947.
(d) Formerly listed at Mile 27.6R.
(e) Additional acre-feet diverted: November 2.
(f) Additional acre-feet diverted: November 3.
(g) Combined acreage this plant and one at Mile 31.1L.
(h) See plant at Mile 30.7L.
(i) Combined acreage this plant and one at Mile 33.55R.
(j) See plant at Mile 33.1R.
(k) Approximate mileage of Crocker-Hoffman Diversion Dam.
(l) Additional acre-feet diverted: January 274, February 296, November 535 and December 434. Additional water received from wells supplied by gravity canal.

TABLE 123

DIVERSIONS AND ACREAGES IRRIGATED - TUOLUMNE RIVER - 1948

Water User	Mile and Bank above Mouth	Number and Size of Pump	Monthly Diversions in Acre-Feet								Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.		General	Rice
E. T. Mapes	1.9R	1-20"	177	92	339	160	472	538	297	38	(a)2113	(b)2400	
J. DeSouza and J. B. Silva	2.2R	1-6"			30	17	25	31	12	5	120	27	
Katheiser Bros.	3.1R	1-16"		1	1			1	1		4	(b)42	
--GAGING STATION - TUOLUMNE RIVER AT TUOLUMNE CITY - MILE 3.35--													
Bancroft Fruit Farms	4.1R	1-12"	27	36	26	41	67	56	42		(c)295	75	
Bancroft Fruit Farms	5.0R	1-10"	43	69	109	99	130	145	61	8	(d)664	160	
Eugene Boone, Galen Hartwich and William Podesto	7.1R	1-10"	15	2	88	285	160	195	339	120	(e)1204	124	
W. F. Duffy	7.2R	1-7"	2		18	18	17	8	8		(f) 71	40	
Ella T. Rahilly (Miss)	7.8L	1-10"	2	9	13	16	15	23	12		90	80	
W. F. Duffy	8.4R	1-10"	25	38	95	120	98	116	82	21	(g)595	103	
Leland Martin	9.4L	1-12"			NO DIVERSION								
Tuolumne Cooperative Farms, Inc.	10.2R	(h)1-10" 1-14"		32	66	49	74	63	56	22	(i)362	55	
Kenneth H. Durand	15.25R	1-5"			PLANT REMOVED								
G. B. and L. D. Podesto	15.75R	1-3"		1	3	5	3	6	1		(j)19	17	
--OLD HIGHWAY BRIDGE - MILE 15.75--													
--SOUTHERN PACIFIC RAILROAD (MAIN LINE) - MILE 15.8--													
--TIDEWATER SOUTHERN RAILROAD BRIDGE - MILE 15.92--													
--HIGHWAY 99 BRIDGE - MIIE 16.05--													
--DRY CREEK CONFLUENCE - MILE 16.5R--													
W. L. Bowron	20.1R	1-8"			10	8	24	20	24		(k)86	29	
L. R. Hughson (Mrs.)	20.3R	1-8"	8		9	2	37	31	8	10	105	35	
Ray L. Heimann (Mrs.)	20.5R	1-12"			1	23	16	31	25	4	100	83	
--SANTA FE RAILROAD - MILE 21.6--													
L. DeMartini Co.	29.6L	1-7"			NO DIVERSION								
Firpo Ranch	30.2L	1-10"				8	40	70	33	5	156	55	
--SOUTHERN PACIFIC RAILROAD - (OAKDALE BRANCH) - MILE 31.5--													
--GAGING STATION - TUOLUMNE RIVER AT HICKMAN BRIDGE - MILE 31.7--													
George H. Sawyer	(l)39.8L	1-6"			14	38	97	70	31		250	(m) 420	
--GAGING STATION - TUOLUMNE RIVER AT ROBERTS FERRY - MILE 39.9--													
--GAGING STATION - TUOLUMNE RIVER AT LA GRANGE - MIIE 50.5--													
Totals			299	280	822	889	1275	1404	1032	233	6234	3745	
Average cubic feet per second			5	5	13	15	21	23	17	4	13		
Monthly use in per cent of seasonal			4.8	4.5	13.2	14.3	20.4	22.5	16.6	3.7			
Turlock Irrigation District	(n)53.5L	Gravity											
Totals			4760	24940	88040	90730	94510	94950	63920	15970	(o)477820	(p)157700	
Average cubic feet per second			77	419	1432	1525	1537	1544	1074	260	983		
Monthly use in per cent of seasonal			1.0	5.2	18.4	19.0	19.8	19.9	13.4	3.3			
Modesto Irrigation District	(n)53.5R	Gravity											
Totals			8580	21720	76260	71170	51510	53410	31980	9240	(q)323870	(r)70300	
Average cubic feet per second			139	365	1240	1196	838	869	537	150	666		
Monthly use in per cent of seasonal			2.6	6.7	23.5	22.0	15.9	16.5	9.9	2.9			

(a) Additional acre-feet diverted: January 59, February 345 and November 256.
(b) Also received water from Modesto Irrigation District.
(c) Additional acre-feet diverted: February 19 and November 45.
(d) Additional acre-feet diverted: February 74 and November 52.
(e) Additional acre-feet diverted: February 91.
(f) Additional acre-feet diverted: February 6.
(g) Additional acre-feet diverted: February 23 and November 36.
(h) No operation of 10" unit in 1948.
(i) Additional acre-feet diverted: February 9 and November 16.
(j) Additional acre-feet diverted: February 2.
(k) Additional acre-feet diverted: January 4.
(l) Listed at Mile 39.8R in 1947.
(m) Also served by wells
(n) Approximate mileage of La Grange Dam.
(o) Additional acre-feet diverted: January 1610, February 18500, November 16250 and December 1940. Additional water received from wells supplied by gravity canals.
(p) Receives an indeterminate amount of re-used controlled drainage water.
(q) Additional acre-feet diverted: January 26, February 44, November 13 and December 14350.
(r) This figure was derived from a combination of 1947 crop survey and preliminary data on 1948 survey.

TABLE 124

DIVERSIONS AND ACREAGES IRRIGATED - STANISLAUS RIVER - 1948

Water User	Mile and Bank	Number and Size of Pump	Monthly Diversions in Acre-Feet								Total Diversion March to October Acre-Feet	Acreage Irrigated	
			Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.		General	Rice
Chris Baron	1.1R	1-6"			3		5	1			9	(a)30	
E. W. Hawkins (Mrs.)	1.8R	1-6"				12	16	14	3		45	37	
C. M. Carroll	2.9R	1-8"			4	24	7	13			(b) 48	18	
C. M. Carroll	3.OR	1-6"	2		19	15	15	12	11	4	(c) 78	27	
N. Smallwood (d)	4.OR	1-5"				NO DIVERSION							
--GAGING STATION - STANISLAUS RIVER NEAR MOUTH - MILE 4.3--													
Overton Ranch (D. F. Koetitz)	5.25L	(e)2-12"	25	92	107	159	187	332	383	191	(f) 1476	(g)365	
Reclamation District #2064	5.9R	1-14" (h)2-16"	430	415	1875	2043	2001	1512	977	453	(i)(j)9706	1695	
Reclamation District #2075	5.95R	2-16"	322	350	1599	1304	1665	1879	1410	442	(k) 8971	(l) 2380	
Henry Pelucca	6.7L	1-15"			71	50	62	132			315	90	
C. C. Updike (Mrs.)	8.2L	1-12"				12	10	15	59	21	117	125	
Caswell Bros.	9.8R	1-16"	123	76	289	272	317	361	215	97	(m)1750	373	
N. E. Cannon	10.OR	1-10"	66	74	180	165	321	273	207	132	(n)1418	190	
D. F. Koetitz	10.1L	1-10"	101	93	79	69	242	267	230	58	(o)1139	308	
Joseph Hertle	10.5L	1-10"	6	14	39	17	32	49	20	16	(p) 193	100	
--SOUTHERN PACIFIC RAILROAD BRIDGE - MAIN LINE) - MILE 15.9--													
--GAGING STATION - STANISLAUS RIVER NEAR RIPON - MILE 16.0--													
A. Girardi	17.OL	1-12"	76		75	118	295	191	236		(q) 991	(r) 310	
Edward B. Regan	18.5R	1-10"			54	46	101	114	51	38	(s) 404	160	
Allen Ranch	20.75R	1-14"	93		136	295	350	283	196		(t)1353	500	
Heath Ranch	20.9L	1-5"			6	10	7	4	3		30	16	
B. Bonora	21.75R	1-10"				40	225	308			573	110	
Slate and Jardine (u)	22.3R	1-10"				NO DIVERSION							
--MODESTO-ESCALON BRIDGE - MILE 28.15--													
--SANTA FE RAILROAD CROSSING - MILE 31.85--													
--GAGING STATION - STANISIAUS RIVER AT RIVERBANK (BURNEYVILLE BRIDGE) - MILE 32.0--													
Oakdale Irrigation District (Riverbank Pump)	32.9L	1-12"				PLANT REMOVED							
Oakdale Irrigation District (Crawford Pump)	(v)35.9L	1-14"	17		95	115	124	135	111		(w) 597	624	
Oakdale Irrigation District (Brady Pump)	(v)37.OL	1-12"				60	107	175	147	3	(x) 492	458	
--SOUTHERN PACIFIC RAILROAD (OAKDALE BRANCH) - MILE 39.0--													
--GAGING STATION - STANISLAUS RIVER AT ORANGE BLOSSOM BRIDGE - MILE 44.7--													
Totals			1261	1114	4631	4826	6089	6070	4259	1455	29705	7916	0
Average cubic feet per second			21	19	75	81	99	99	72	24	61		
Monthly use in per cent of seasonal			4.2	3.8	15.6	16.3	20.5	20.4	14.3	4.9			
South San Joaquin Irr. Dist.	(y)55.OR	Gravity											
Totals			15640	17080	47100	50800	54110	43720	21660	1380	(z)251490	(aa)64685	160
Average cubic feet per second			254	287	766	854	880	711	364	22	518		
Monthly use in per cent of seasonal			6.2	6.8	18.7	20.2	21.5	17.4	8.6	0.6			
Oakdale Irrigation District	(y)55.OL	Gravity											
Totals			0	2580	19680	23450	22790	19240	10090	509	98339	50278	1987
Average cubic feet per second			0	43	320	394	371	313	170	16	202		
Monthly use in per cent of seasonal			0	2.6	20.0	23.8	23.2	19.6	10.3	0.5			

(a) Unable to irrigate satisfactorily.
(b) Additional acre-feet diverted: January 10 and February 10.
(c) Additional acre-feet diverted: January 4, February 5 and November 3.
(d) Formerly listed as R. D. March.
(e) Listed as 1-12" unit in 1947.
(f) Additional acre-feet diverted: February 70 and November 37.
(g) 1947 acreage should have been 365.
(h) One additional 16" unit installed in 1948.
(i) Furnished 420 acre-feet to plant at Mile 5.95R.
(j) Additional acre-feet diverted: January 127, February 701 and November 190.
(k) Additional acre-feet diverted: January 171, February 377 and November 192.
(l) Received 420 acre-feet from plant at Mile 5.9R during July and August.
(m) Additional acre-feet diverted: February 80 and November 56.
(n) Additional acre-feet diverted: November 63 and December 26.
(o) Additional acre-feet diverted: February 43 and November 8.
(p) Additional acre-feet diverted: February 15.
(q) Additional acre-feet diverted: February 59.
(r) Received additional water from Modesto Irrigation District.
(s) Additional acre-feet diverted: November 15.
(t) Additional acre-feet diverted: February 120.
(u) Formerly listed as J. L. Merrill.
(v) Oakdale Irrigation District for season of 1948 maintained plants at Miles 35.9L and 37.OL to supplement District gravity supply.
(w) Additional acre-feet diverted: January 44 and February 64.
(x) Additional acre-feet diverted: January 43 and February 23.
(y) This mileage is the approximate mileage of Goodwin Dam.
(z) Additional acre-feet diverted: January 13660, February 10740, November 86 and December 80. Additional water received from wells supplied by gravity canals.
(aa) Includes 11,000 acres of sub-irrigated lands.
(bb) Additional acre-feet diverted: January 14, February 8 and December 52. Oakdale Irrigation District maintains plants on the Stanislaus River at Miles 32.9L, 35.9L and 37.OL.

TABLE 125

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

	Period of Record	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.
SACRAMENTO VALLEY									
Sacramento River - Redding to Sacramento	1939 to 1948	0.9	6.5	17.6	18.8	20.8	19.9	11.7	3.8
Feather River - Oroville to Mouth	1939 to 1948	0.1	4.1	17.5	19.2	21.0	19.3	12.9	5.9
Yuba River - Smartville to Mouth	1939 to 1948	0.2	4.4	13.9	17.2	18.3	17.9	15.5	12.6
American River - Fairoaks to Mouth	1939 to 1948	1.1	2.9	6.0	19.9	28.4	22.0	15.3	4.4
DELTA UPLANDS									
Old San Joaquin River	1939 to 1948	3.0	9.2	16.1	17.4	21.0	17.4	11.1	4.8
Tom Paine Slough	1939 to 1948	1.7	8.2	15.1	17.6	19.7	19.0	14.2	4.5
San Joaquin River below Vernalis	1939 to 1948	3.7	12.0	15.3	14.2	22.3	19.1	9.7	3.5
SAN JOAQUIN VALLEY									
San Joaquin River - Fremont Ford Bridge to Vernalis	1939 to 1948	3.5	10.5	15.4	15.5	22.3	18.9	11.1	2.8
San Joaquin River - Friant to Fremont Ford Bridge	1947 to 1948	6.3	10.8	13.5	13.3	18.0	16.6	13.1	8.4
Merced River - Yosemite Valley Railroad Crossing to Mouth	1939 to 1948	1.1	6.3	13.6	18.7	24.4	19.9	12.6	3.4
Tuolumne River - La Grange to Mouth	1939 to 1948	2.2	7.7	15.9	17.3	19.6	19.0	13.3	5.0
Stanislaus River - Orange Blossom to Mouth	1939 to 1948	1.8	8.1	14.8	17.9	20.2	18.9	12.7	5.6

TABLE 126

ANNUAL COMPARATIVE MONTHLY DIVERSION IN ACRE-FEET 1939 TO 1948

SACRAMENTO RIVER - SACRAMENTO TO REDDING

Year*	March	April	May	June	July	August	September	October	Seasonal Diversions
1939	63636	202428	227491	233319	230319	209735	90708	43412	1301048
1940	1802	18073	182534	218505	249012	228765	119951	43988	1062630
1941	1883	5274	157567	228387	265229	259557	177189	55029	1150115
1942	1991	11727	187657	268091	286655	278848	186708	61298	1278975
1943	1769	61409	257673	276759	288930	288024	190456	51915	1416935
1944	3236	155666	310227	305633	338429	318184	180858	65917	1678150
1945	2134	117302	316912	305333	346868	326148	200601	60473	1675771
1946	7968	187267	333991	328508	341952	326956	179671	71666	1777979
1947	2743	167131	346326	313389	344334	326100	170785	36296	1707104
1948	53935	16451	251478	271737	365701	351666	217464	65042	1593474
Average Acre-Feet	14109	94273	257186	274966	305743	291398	171439	55504	1464218
Average c.f.s.	229	1584	4183	4621	4972	4739	2881	903	3013
Monthly Diversion in per cent of Seasonal	0.9	6.4	17.6	18.8	20.9	19.9	11.7	3.8	

* See 1946 Water Supervision Report for prior years.

TABLE 127

ANNUAL COMPARATIVE MONTHLY DIVERSIONS IN ACRE-FEET 1939 TO 1948

FEATHER RIVER - OROVILLE TO MOUTH

Year*	March	April	May	June	July	August	September	October	Seasonal Diversions
1939	3583	71539	99567	90960	92044	83292	37752	22620	501357
1940	188	2207	84408	95502	105337	93454	59182	33695	473973
1941	0	2448	70513	72971	103334	100433	78451	47090	475240
1942	0	0	61352	113416	125530	122146	86814	30435	539693
1943	0	13290	101599	125318	131210	123282	93309	35495	623503
1944	205	43792	130779	126206	142128	133130	85924	50747	712911
1945	0	26056	130729	133918	142224	132832	92953	39682	698394
1946	47	53967	156398	140210	145235	132948	82010	33985	744800
1947	90	30240	152827	130731	138055	124426	77215	20873	674403
1948	3181	5717	66373	127596	140904	120658	85122	36722	586273
Average Acre-Feet	729	24926	105455	115683	126600	116660	77873	35134	603054
Average c.f.s.	12	419	1715	1944	2059	1897	1309	571	1241
Monthly Diversion in per cent of Seasonal	0.1	4.1	17.5	19.2	21.0	19.4	12.9	5.8	

* See 1946 Water Supervision Report for prior years.

TABLE 128

ANNUAL COMPARATIVE MONTHLY DIVERSIONS IN ACRE-FEET 1939 to 1948

YUBA RIVER - SMARTVILLE TO MOUTH

Year*	March	April	May	June	July	August	September	October	Seasonal Diversions
1939	176	8986	13174	12890	12889	12739	8304	3955	73113
1940	0	1326	9377	14114	15190	11798	10780	7383	69968
1941	0	2624	10589	13076	13574	13419	10672	9576	73530
1942	0	36	5703	14736	14955	14841	13086	11349	74706
1943	0	1903	10622	15237	17203	16972	16610	15252	93799
1944	1665	7327	13857	15601	16786	15532	13311	9185	93264
1945	0	4338	9815	15479	14112	13848	13046	13590	84228
1946	0	7222	15231	15845	17082	16356	13940	13010	98686
1947	0	3820	17316	16339	17364	19152	15577	10517	100085
1948	33	23	12350	13849	17305	17954	16994	14256	92764
Average Acre-Feet	187	3761	11803	14717	15646	15261	13232	10807	85414
Average c.f.s.	3	63	192	247	254	248	222	176	176
Monthly Diversion in per cent of Seasonal	0.2	4.4	13.8	17.2	18.3	17.9	15.5	12.7	

* See 1946 Water Supervision Report for prior years.

TABLE 129

ANNUAL COMPARATIVE MONTHLY DIVERSION IN ACRE-FEET 1939 TO 1948

AMERICAN RIVER - FAIROAKS TO MOUTH

Year*	March	April	May	June	July	August	September	October	Seasonal Diversions
1939	73	380	932	1616	1699	1151	557	246	6654
1940	44	339	488	1216	1785	1038	686	456	6052
1941	150	253	379	836	1531	1202	673	285	5309
1942	0	0	13	678	1395	1187	789	104	4166
1943	0	0	54	941	1513	1226	753	94	4581
1944	0	6	113	980	1566	1211	790	153	4819
1945	0	8	119	909	1017	894	760	149	3856
1946	0	10	228	1022	1104	889	766	105	4124
1947	308	422	483	1113	1193	1086	1071	237	5913
1948	92	34	209	866	1737	1420	1030	495	5883
Average Acre-Feet	67	145	302	1018	1454	1130	788	232	5136
Average c.f.s.	1	2	5	17	24	18	13	4	11
Monthly Diversion in per cent of Seasonal	1.3	2.8	5.9	19.8	28.3	22.0	15.4	4.5	

* See 1946 Water Supervision Report for prior years.

TABLE 130

ANNUAL COMPARATIVE MONTHLY DIVERSIONS IN ACRE-FEET 1939 TO 1948

OLD SAN JOAQUIN RIVER - DELTA UPLANDS

Year*	March	April	May	June	July	August	September	October	Seasonal Diversions
1939	7728	12880	8746	12055	13453	9855	4977	1669	71363
1940	0	1015	9527	10943	14091	10217	6148	3306	55247
1941	0	447	5492	11541	13087	10009	7382	2909	50867
1942	0	516	7175	11077	13143	11425	6740	2878	52954
1943	0	2048	11293	12463	13745	11945	7568	3104	62166
1944	2921	11827	13918	13224	16911	15667	10753	4694	89915
1945	595	7544	16791	17092	19809	14818	10873	4433	91955
1946	4640	14371	17736	16948	19662	18238	9914	4927	106436
1947	1637	15687	18983	15788	19269	14525	9633	3105	98627
1948	11808	4765	18259	15460	21943	21547	14574	7029	115385
Average Acre-Feet	2933	7110	12792	13659	16511	13825	8856	3805	79491
Average c.f.s.	48	119	208	230	269	225	149	62	164
Monthly Diversion in per cent of Seasonal	3.7	8.9	16.1	17.2	20.8	17.4	11.1	4.8	

* See 1946 Water Supervision Report for prior years.

TABLE 131

ANNUAL COMPARATIVE MONTHLY DIVERSIONS IN ACRE-FEET 1939 TO 1948

TOM PAINE SLOUGH - DELTA UPLANDS

Year*	March	April	May	June	July	August	September	October	Seasonal Diversions
1939	763	1620	1218	1703	1414	1789	1015	645	10167
1940	0	159	1509	1974	2129	1612	1133	873	9389
1941	0	0	1406	1972	2163	1788	1704	529	9562
1942	0	0	1292	1852	2434	1930	1158	278	8944
1943	0	891	2526	2728	2629	2578	2041	589	13982
1944	84	1630	2186	2466	3046	2852	2487	1019	15770
1945	34	539	2527	2792	2891	3153	2144	377	14427
1946	874	2588	2756	3145	3324	3732	2490	798	19707
1947	74	3064	3136	3319	3735	3487	2816	414	20045
1948	629	998	2795	2866	4327	4222	3422	953	20212
Average Acre-Feet	246	1149	2135	2482	2809	2714	2041	648	14221
Average c.f.s.	4	19	35	42	46	44	34	11	29
Monthly Diversion in per cent of Seasonal	1.7	8.1	15.0	17.4	19.8	19.1	14.4	4.5	

* See 1946 Water Supervision Report for prior years.

TABLE 132

ANNUAL COMPARATIVE MONTHLY DIVERSIONS IN ACRE-FEET 1939 TO 1948

SAN JOAQUIN RIVER-DELTA UPLANDS - STOCKTON TO VERNALIS

Year*	March	April	May	June	July	August	September	October	Seasonal Diversions
1939	4012	9394	5398	6901	11721	8744	3862	1178	51210
1940	4	4638	6974	7011	12805	7978	3300	1932	44642
1941	4	1086	6162	5944	12007	8735	4384	1762	40084
1942	188	2232	5210	6602	12203	9651	4014	2085	42185
1943	0	3169	10172	8940	11617	10886	5142	1793	51719
1944	1110	10346	8439	8039	11349	11489	6261	2275	59308
1945	7	6476	12035	9658	13109	12537	7090	1793	62705
1946	5246	13974	10681	9238	15347	13071	6727	2875	77154
1947	5322	13337	14168	11615	15439	14676	7782	2052	84391
1948	6012	4564	9919	8251	13912	13356	7911	2682	66607
Average Acre-Feet	2191	6922	8916	8220	12951	11112	5647	2043	58000
Average c.f.s.	36	116	145	138	211	181	95	33	119
Monthly diversion in per cent of Seasonal	3.8	11.9	15.4	14.2	22.3	19.2	9.7	3.5	

* See 1946 Water Supervision Report for prior years.

TABLE 133

ANNUAL COMPARATIVE MONTHLY DIVERSION IN ACRE-FEET 1939 TO 1948

SAN JOAQUIN RIVER - VERNALIS TO FREMONT FORD BRIDGE

Year*	March	April	May	June	July	August	September	October	Seasonal Diversions
1939	7044	17485	17212	18955	25161	21288	10366	2505	120016
1940	555	4547	15524	18950	26396	17707	10769	3365	97813
1941	0	302	13633	15486	26484	20840	12725	3947	93417
1942	573	2044	14158	17059	28352	25384	12575	4235	104380
1943	0	4417	20849	20115	29913	25046	16595	4789	121724
1944	4790	21177	22013	20102	27066	24430	14554	4128	138260
1945	1327	14036	21325	21383	30463	25540	15202	2087	131363
1946	6967	21399	24961	23751	32002	28792	17026	5144	160042
1947	11658	31645	28072	27725	34079	27812	17318	3049	181358
1948	12902	18449	21647	15487	28830	27888	15926	3398	144527
Average Acre-Feet	4582	13550	19939	19901	28874	24473	14306	3665	129290
Average c.f.s.	75	228	324	334	470	398	240	60	266
Monthly Diversion in per cent of Seasonal	3.5	10.5	15.5	15.4	22.3	18.9	11.1	2.8	

* See 1946 Water Supervision Report for prior years.

TABLE 134

ANNUAL COMPARATIVE MONTHLY DIVERSION IN ACRE-FEET 1939 TO 1948

MERCED RIVER - YOSEMITE VALLEY RAILROAD CROSSING TO MOUTH

Year*	March	April	May	June	July	August	September	October	Seasonal Diversions
1939	38	951	1791	2162	2520	1803	808	236	10309
1940	2	220	1541	2275	2206	1597	949	317	9107
1941	0	0	870	1644	1995	1537	1306	236	7588
1942	0	14	475	1619	2716	2005	1207	363	8399
1943	0	198	1782	2249	3077	2258	1680	474	11718
1944	84	1117	1845	2535	2564	2466	2071	820	13501
1945	30	558	1696	2292	3058	2500	1552	132	11818
1946	231	1380	1595	2393	3608	2787	1720	684	14398
1947	228	2863	3128	3420	4322	4077	2499	529	21066
1948	931	328	2321	2634	4899	4162	1953	534	17762
Average Acre-Feet	154	763	1704	2322	3096	2519	1574	432	12567
Average c.f.s.	3	13	28	39	50	41	26	7	26
Monthly diversion in per cent of Seasonal	1.2	6.1	13.6	18.5	24.6	20.0	12.6	3.4	

* See 1946 Water Supervision Report for prior years.

TABLE 135

ANNUAL COMPARATIVE MONTHLY DIVERSION IN ACRE-FEET 1939 TO 1948

TUOLUMNE RIVER - LA GRANGE BRIDGE TO MOUTH

Year*	March	April	May	June	July	August	September	October	Seasonal Diversions
1939	160	149	414	501	455	558	193	104	2534
1940	3	19	577	415	642	436	335	151	2578
1941	0	122	519	685	603	607	438	173	3147
1942	7	75	443	462	645	683	343	112	2770
1943	0	116	354	541	542	520	360	183	2616
1944	80	304	517	665	778	801	656	300	4101
1945	33	463	535	630	748	723	376	47	3555
1946	216	565	765	734	940	889	559	254	4922
1947	283	893	1132	1112	1245	1135	1229	439	7466
1948	299	280	822	889	1275	1404	1032	233	6234
Average Acre-Feet	108	299	608	663	787	775	552	200	3992
Average c.f.s.	2	5	10	11	13	13	9	3	8
Monthly Diversion in per cent of Seasonal	2.7	7.5	15.3	16.6	19.7	19.4	13.8	5.0	

* See 1946 Water Supervision Report for prior years.

TABLE 136

ANNUAL COMPARATIVE MONTHLY DIVERSION IN ACRE-FEET 1939 TO 1948

STANISLAUS RIVER - ORANGE BLOSSOM BRIDGE TO MOUTH

Year*	March	April	May	June	July	August	September	October	Seasonal Diversions
1939	198	1848	2201	2873	3222	3310	1752	827	16231
1940	217	682	2143	3330	3858	2924	1741	851	15746
1941	12	392	2696	3173	3413	3228	2466	1280	16660
1942	240	356	2533	4242	4590	3972	2721	1360	20014
1943	3	873	3439	4241	4458	3935	3518	1598	22065
1944	186	2013	3266	3565	4246	4292	2659	1603	21830
1945	0	2664	3013	3869	4431	4136	2866	681	21660
1946	862	3316	3780	4563	5046	4832	2754	1655	26808
1947	1206	4320	4933	4644	5417	5085	3462	1008	30075
1948	1261	1114	4631	4826	6089	6070	4259	1455	29705
Average Acre-Feet	419	1758	3263	3933	4477	4178	2820	1232	22079
Average c.f.s.	7	30	53	66	73	68	47	20	45
Monthly Diversion in per cent of Seasonal	1.9	8.0	14.8	17.7	20.3	18.9	12.8	5.6	

* See 1946 Water Supervision Report for prior years.

TABLE 137

COMPARATIVE SEASONAL DIVERSIONS AND ACREAGES IRRIGATED - SACRAMENTO RIVER - 1939-1948

Year		River Sections							Total Reach Redding to Sacramento
		Redding to Red Bluff	Red Bluff to Butte City	Butte City to Colusa	Colusa to Wilkins Slu	Wilkins Slu to Knights Ldg.	Knights Ldg. to Verona	Verona to Sacramento	
1939	Seasonal diversion acre-feet	141403	587358	29668	292226	89153	21496	139744	1301048
	Average cubic feet per second	291	1209	61	601	183	44	288	2677
	Acreage irrigated - rice	0	32917	750	17360	3667	0	9159	63853
	Acreage irrigated - general	13423	58185	6802	51711	13120	2727	12800	158768
1940	Seasonal diversion acre-feet	116052	479028	15683	249532	70974	34057	97304	1062630
	Average cubic feet per second	239	986	32	513	146	70	200	2187
	Acreage irrigated - rice	0	31754	463	19475	4024	1541	7134	64391
	Acreage irrigated - general	9696	43885	6354	41548	7318	1318	9611	119730
1941	Seasonal diversion acre-feet	135305	493667	16903	305187	95969	25970	77114	1150115
	Average cubic feet per second	278	1016	35	628	197	53	159	2367
	Acreage irrigated - rice	0	40183	530	30716	6786	1013	5968	85196
	Acreage irrigated - general	12205	45217	6772	37039	7923	980	8445	118581
1942	Seasonal diversion acre-feet	119216	553834	37714	335431	116200	26820	89760	1278975
	Average cubic feet per second	245	1140	78	690	239	55	185	2632
	Acreage irrigated - rice	0	49299	2668	39415	8957	660	6664	107663
	Acreage irrigated - general	13513	47696	5123	30095	5425	1476	7898	111226
1943	Seasonal diversion acre-feet	139086	594046	60963	333715	136688	35934	116503	1416935
	Average cubic feet per second	286	1222	125	687	281	74	240	2916
	Acreage irrigated - rice	0	55316	4275	35777	9299	1115	9817	115599
	Acreage irrigated - general	14362	62663	4765	29580	4594	1250	9052	126266
1944	Seasonal diversion acre-feet	155303	715850	77255	405665	142341	31565	150171	1678150
	Average cubic feet per second	320	1473	159	835	293	65	309	3453
	Acreage irrigated - rice	0	56620	5743	32161	14459	1573	11686	122242
	Acreage irrigated - general	15324	40614	4475	32591	8086	1997	8781	111868
1945	Seasonal diversion acre-feet	143229	690859	85269	409292	162825	21776	162521	1675771
	Average cubic feet per second	295	1432	175	842	335	45	334	3449
	Acreage irrigated - rice	0	48715	5574	34461	12994	795	12476	115015
	Acreage irrigated - general	15390	36103	4680	28843	9607	2506	9266	106395
1946	Seasonal diversion acre-feet	163925	729606	98953	402022	159077	38680	185716	1777979
	Average cubic feet per second	337	1501	203	827	327	80	382	3659
	Acreage irrigated - rice	0	53195	6445	30828	13995	2485	17187	124135
	Acreage irrigated - general	15373	38934	8719	30861	10923	2024	10722	117556
	Acre-feet per acre (1)	10.5	7.9	6.6	6.5	6.4	8.6	5.7	7.3
1947	Seasonal diversion acre-feet	138036	704544	103476	405829	140736	56993	157490	1707104
	Average cubic feet per second	284	1450	213	835	290	117	324	3513
	Acreage irrigated - rice	0	56080	7393	31584	12549	2688	13687	123981
	Acreage irrigated - general	17517	38149	4361	33853	11070	2982	13658	121590
	Acre-feet per Acre (1)	7.7	7.5	8.8	6.2	6.0	10.1	4.7	6.8
1948	Seasonal diversion acre-feet	154758	632230	92661	387490	132701	56342	137292	1593474
	Average cubic feet per second	318	1301	191	797	273	116	283	3279
	Acreage irrigated - rice	0	53477	8299	33503	12125	3947	15145	128314
	Acreage irrigated - general	18421	53602	7860	35760	12685	1568	18117	146195
	Acre-feet per Acre (1)	8.3	5.9	5.7	5.6	5.3	10.2	3.3	5.7
	Average 1939 - 1948								
	Seasonal diversion acre-feet	140631	618102	61855	352639	124666	34963	131362	1464218
	Average cubic feet per second	289	1272	127	726	257	72	270	3013
	Per cent of total reach	9.6	42.2	4.2	24.1	8.5	2.4	9.0	100.0
	Acreage irrigated - rice	0	47756	4214	30528	9886	1582	10892	105039
	Acreage irrigated - general	14522	46505	5991	35188	9075	1883	10835	123818

(1) Excluding such diversions for municipal use as the City of Sacramento and the City of Redding.

TABLE 138

RICE ACREAGE IN CALIFORNIA

A Comparison of Total Rice Acreage in California with Rice Acreage Irrigated from the Sacramento and San Joaquin River Systems Covered by Sacramento-San Joaquin Water Supervision

Rice Acreage							
Year	Total in State (1)	Irrigated from Sacramento & San Joaquin River Systems	Ratio in Per Cent (2)	Year	Total in State (1)	Irrigated from Sacramento & San Joaquin River Systems	Ratio in Per Cent (2)
1924	90000	89000	99	1937	149000 (4)	109000	73
1925	103000	95000	92	1938	125000	95000	76
1926	149000	129000	87	1939	120000	104000	87
1927	160000	123000	77	1940	118000	94000	80
1928	132000	101000	76	1941	153000	120000	78
1929	95000	74000	78	1942	212000 (4)	159000	75
1930	110000	88000	80	1943	237000	186000	77
1931	125000	126000	100	1944	246000	200000	81
1932	110000	91000	83	1945	239000 (4)	187000	78
1933	108000	87000	80	1946	255000 (4)	200000	78
1934	108000	92000	85	1947	250000 (4)	215000(3)	86
1935	100000	78000	78	1948	238000	193000	81
1936	138000	104000	75				
				Average 1924-1948	155000	126000	82

(1) As reported by Federal-State Crop Reporting Service.
(2) Ratio of acreage on Sacramento and San Joaquin River systems to total State acreage.
(3) Prior to 1947 rice acreage on Upper San Joaquin River was not included.
(4) The years 1937, 1942, 1945, 1946 and 1947 were previously listed as 132000, 207000, 249000, 253000 and 237000, respectively.

TABLE 139

DIVERSIONS - STANISLAUS, TUOLUMNE AND MERCED RIVERS - 1947
Supplemental to Tables 107, 109, 110 and 111 in
1947 Report

Water User	Monthly Diversions in Acre-Feet												Total Diversions Jan.-Dec. Acre-Feet
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
Stanislaus River													
South San Joaquin I.D. Canal	17450	144	7960	48810	58250	47450	36120	36390	17570	3500	187	211	274042
Oakdale I.D. Canal	0	0	266	22100	25020	20630	14670	15720	9150	1160	0	0	108716
Total	17450	144	8226	70910	83270	68080	50790	52110	26720	4660	187	211	382758
Tuolumne River													
Modesto I. D. Canal	1850	7000	2670	57710	60940	46140	51780	41740	3440	10	0	16570	289850
Turlock I.D. Canal	16630	753	7990	88620	103200	72100	86160	84440	40080	1070	5980	13720	520743
Total	18480	7753	10660	146330	164140	118240	137940	126180	43520	1080	5980	30290	810593
Merced River													
Merced I.D. Canal (Main and North)	123	149	10800	75777	88652	83777	94926	79822	38043	421	288	268	473046
Total	36053	8046	29686	293017	336062	270097	283656	258112	108283	6161	6455	30769	1666397

NOTE: Diversion records of these districts for years prior to 1947 can be found in previous Water Supervision Reports in tables covering San Joaquin Valley Return Water Flows.

TABLE 140

MAXIMUM RECORDED SALINITY AT PRESENTLY INDICATIVE BAY AND DELTA STATIONS

1938 - 1948, INCLUSIVE (a)

YEAR	1938	1939	1940	(e)1941	1942	1943	1944	1945	1946	1947	1948
Sacramento-San Joaquin Runoff in per cent of Normal (b)	170	43	115	137	129	114	56	86	92	54	78
Station (d)	Maximum Recorded Salinity in Parts of Chlorine per 100,000										
	San Francisco, San Pablo and Suisun Bays										
Point Orient	1700	1920	1840				1730	1800	1740	1880	1740
Point Pinole									1530	1680	1500
Hercules									1510	1700	1480
Point Davis	1460	1840	1760				1520	1340	1660	1650	c1420
Grand View							1530	1430	1500	1800	1330
Crockett									1400	1790	1330
Benicia							1390	1230	1200	1510	1130
Martinez								c1000	1110	1340	1260
West Suisun									1020	1350	1180
Port Chicago									950	1240	930
Nichols									800	1160	740
O & A Ferry	256	1180	720				730	260	350	610	360
Innisfail Ferry	330	1360	790				790	440	450	820	440
Pittsburg								160	210	500	170
	Sacramento River Delta										
Collinsville	86	1040	450	195	190	340	470	114	170	450	179
Three Mile Slough Bridge		590					161	7	8	125	13
Rio Vista Bridge		405					55	4	5	27	12
Isleton Bridge		250					5	3	5	5	7
	Mokelumne River Delta										
Terminous											11
Southwest Point		86									6
	San Joaquin River Delta										
Winter Island								123	133	c490	127
Antioch	51	920	440	158	140	312	400	96	109	470	150
Millers Harbor								64	93	300	44
Jersey	9	500									
Opposite Jersey							164	6			
Webb Pump	8	265	27				52	5	8	45	10
Opposite Central Landing	10	138	15				20	5	8	20	9
Dutch Slough	11	225	42				69	8	13	84	12
Orwood Bridge		54									18
East Contra Costa Irr. Dist.		32					14	11	20	19	32
Victoria									11	19	20
Stockton Country Club		32									26
Clifton Court Ferry		19								16	23
Garwood Bridge											15
South Fabian										19	26
Williams Bridge											15
Grant Line Bridge										17	22
Mossdale	12	16	14				13	10	12	18	25
At Vernalis										c18	24

(a) For maximum salinities recorded 1924-1937 see previous reports.
(b) Normal taken as 50-year mean (1889-1936) of natural runoff at foothill stations of major tributaries.
(c) Estimated.
(d) For location and description see Table 141.
(e) Sampling by State discontinued in 1941 and resumed in 1944 in cooperation with the U. S. Bureau of Reclamation.

TABLE 141

DESCRIPTION OF ACTIVE SALINITY OBSERVATION STATIONS - 1948

(Refer to previous Water Supervision Reports for description of stations which have been discontinued.)

STATION	Miles from Golden Gate (a)	Time Interval (b) Hours	Time Interval (b) Mins.	LOCATION
				SAN FRANCISCO, SAN PABLO AND SUISUN BAYS
Point Orient	12.3	2	20	North end of San Francisco Bay, East Shore, one-half mile south of Point San Pablo Wharf of Standard Oil Company.
Point Pinole	19.0	2	50	South Shore of San Pablo Bay, at Point Pinole on wharf of Atlas Powder Company.
Hercules	22.7	3	10	South Shore of San Pablo Bay, at Refugio Point on wharf of Hercules Powder Company.
Point Davis	25.2	3	15	East end San Pablo Bay, South Shore, Oleum Wharf of Union Oil Company.
Grand View	25.2	3	15	Northwest shore of San Pablo Bay at mouth of Petaluma Creek.
Crockett	27.7	3	30	West end of Carquinez Strait, South Shore, 0.2 mile east of Carquinez Bridge on wharf of C. and H. Sugar Refining Corporation.
Benicia	32.5	3	50	East end of Carquinez Strait, North Shore, 1.1 mile west of Southern Pacific Co. railroad bridge, at Benicia Arsenal.
Martinez	32.7	3	50	East end of Carquinez Strait, South Shore, 1.0 mile west of Southern Pacific Co. railroad bridge, at Municipal Ferry Slip.
West Suisun	37.0	4	10	West end of Suisun Bay, North Shore, 2.5 miles northeast of Southern Pacific railroad bridge at service pier of U. S. Maritime Commission, Reserve Fleet Mooring area.
Port Chicago	41.0	4	20	South Shore of Suisun Bay at U. S. Naval ammunition loading wharf below Point Chicago.
Nichols	42.7	4	25	South Shore of Suisun Bay, on Middle Point at Wharf of General Chemical Company.
O & A Ferry	46.5	4	40	Upper end Suisun Bay between Mallard Station and Chipps Island at Sacramento Northern Railroad Ferry Crossing.
Innisfail Ferry	47.3	4	50	Montezuma Slough, about one mile east of junction with Cutoff Slough, near North end of Grizzly Island.
Pittsburg	48.0	5	00	East end of Suisun Bay, South Shore, at Pittsburg Yacht Harbor.
				SACRAMENTO RIVER DELTA
Collinsville	50.8	5	25	Sacramento River, North Bank at junction with San Joaquin River.
Three Mile Slough Bridge	60.0	5	55	At junction of Slough and Sacramento River.
Rio Vista Bridge	63.5	6	05	At Highway Bridge near northerly limits of Rio Vista.
Isleton Bridge	68.7	6	30	Sacramento River, one mile upstream from Isleton.
				MOKELUMNE RIVER DELTA
Southwest Point	78.8	7	25	Staten Island, North Fork Mokelumne River, South Bank, just above junction with South Fork.
Terminous	83.4	7	50	South Fork Mokelumne River at Terminous.
				SAN JOAQUIN RIVER DELTA
Winter Island	53.1	5	50	Upper end of Winter Island, north shore New York Slough at junction of Broad and New York Sloughs.
Antioch	54.9	5	55	San Joaquin River, at City Water Works pumping plant.
Millers Harbor	58.2	6	10	South Shore San Joaquin River at Antioch Bridge.
Webb Pump	72.0	7	00	False River, two miles below Old River Junction.
Opposite Central Landing	72.0	7	00	Mokelumne River, on Andrus Island directly opposite Central Landing on Bouldin Island.
Dutch Slough	73.0	7	05	At Bethel Island Bridge.
Orwood Bridge	86.3	8	10	Old River, at Santa Fe Railroad Crossing, Orwood.
East Contra Costs Irr.Dist.	86.7	8	20	Indian Slough, at East Contra Costa Irrigation District Pumping plant.
Victoria Island	89.6	8	35	Old River at Borden Highway Crossing.
Clifton Court Ferry	94.2	9	10	Old River just below junction with Grant Line Canal.
Stockton Country Club	94.8	9	15	Near Head of Stockton Channel at Wharf of California Transportation Company.
Garwood Bridge	95.3	9	15	San Joaquin River, at Drawbridge one mile above Santa Fe Railroad Crossing.
South Fabian	100.0	9	40	Old River, two miles East of Bethany.
Grant Line Bridge	101.0	9	50	Grant Line Canal, 5.5 miles above junction with Old River, at Tracy Road Crossing.
Williams Bridge	101.6	9	55	Middle River, about four miles below Salmon Slough Junction.
Mossdale Bridge	108.5	10	50	San Joaquin River at U. S. 50 Highway Crossing about three miles southwest of Lathrop.
At Vernalis	127.0	11	00	San Joaquin River at Durham Ferry Bridge, above tidal influence.

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

(b) Time interval between high tide at Golden Gate and time for taking samples at station.

TABLE 142

SALINITY OBSERVATIONS, SACRAMENTO-SAN JOAQUIN DELTA AND UPPER BAYS

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 - 1948							
	2	6	10	14	18	22	26	30
	San Francisco, San Pablo and Suisun Bays							
Point Orient	1650	e1670	1480	1330	1300	1500	1560	*1490
Point Pinole		1410		960		1210	1280	
Hercules	1390	1250	a980		940			
Point Davis				690	840	1090	1170	1150
Grand View	1130	1140	1120	1080	1070	890	940	960
Crockett	1280	1160	730	610	750	980	1120	1010
Benicia		990	590	370	b620	820	860	560
Martinez	830	750	290	230	520	690		550
West Suisun		b410	190	230	152	170	460	310
Innisfail Ferry	420	390	b110	ab90	116	b170	210	220
Port Chicago	720	660	150	128	a100	600		380
Nichols			90		190	b170	440	
O & A Ferry	260	150	20	6	32	92	150	98
Pittsburg	a114	43	8	5	3	7	23	21
	Sacramento River Delta							
Collinsville		32	3	a1	2		50	15
Rio Vista Bridge	1	1	2	3	1	2	1	2
Isleton Bridge	1	1	3				2	1
	San Joaquin River Delta							
Winter Island		13	11	c5	4	6	28	19
Antioch	62	29	7	7	5	6	13	15
Millers Harbor	31	16	6	4	4	4	12	7
Webb Pump	6	5	a6	a5	4	5	a7	6
Opposite Central Landing	2	4		a2	1	4	4	a3
Dutch Slough	9	7	a7	a9	a7	10	6	8
East Contra Costa I. D.	11	12	a13	a16	15	5	ab14	16
Victoria	13	12	12	14	13	13	12	12
Clifton Court Ferry	12	9	11	11	15	11	13	10
South Fabian		a12	a13			ab13	a13	
Grant Line Bridge	8	10	10	a10	a10	12	9	11
Mossdale	11	a12	a10	a11	13	a12	a7	9
	FEBRUARY - 1948							
	San Francisco, San Pablo and Suisun Bays							
Point Orient	1550	b1420	1440		1440	1530	1570	
Point Pinole					1230		1290	
Hercules	1150	1210						
Point Davis	990	1150	1020	1050	1140	1080	1120	
Grand View	920	990	970	990	970	950	1050	
Crockett	990		940	870	970	1170	1150	
Benicia	680	730	730		870		740	
Martinez	680	730	640	510	680	*520	550	
West Suisun	410	570	400	260	b550	520	370	
Innisfail Ferry	220	210	230	320	200	210	210	
Port Chicago	520	400	350	a370	680	320	ac330	
Nichols		340	200	260		500		
O & A Ferry	108	150	45	a46	94	156	140	
Pittsburg	23	33	24	12	37	55	30	
	Sacramento River Delta							
Collinsville	20	31	10	5	25	44	a14	
Three Mile Slough Bridge				2		5	4	
Rio Vista Bridge	1	b6	2	1	3	1	1	
Isleton Bridge	1		2		1	5		
	San Joaquin River Delta							
Winter Island	19	34	5	11	24	23	24	
Antioch	11	27	11	9	9	18	18	
Millers Harbor	7	10	8	8	ab7	12	e9	
Webb Pump		4	a8	6	4	6	6	
Opposite Central Landing	2	4	a2	a4	4		a4	
Dutch Slough	bkn	6	a6	7	6	7	a6	
East Contra Costa I. D.	13	13	a14	13	14	15	16	
Victoria	11	14		15		19	b16	
Clifton Court Ferry	12	13	12	15	16	19	23	
South Fabian		a12		15		a22		
Grant Line Bridge	b12		a15	a19	20		c22	
Mossdale	11	a14	a20	19	20	a21	a22	
At Vernalis	12	17		23	19	17	24	

(a) Taken at Low High Tide.
(b) Taken on following day.
(c) Taken two days later.
(e) Taken one day earlier.
(*) Presumed.

TABLE 142 (CONT'D)

SALINITY OBSERVATIONS, SACRAMENTO-SAN JOAQUIN DELTA AND UPPER BAYS

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 - 1948							
	2	6	10	14	18	22	26	30
	San Francisco, San Pablo and Suisun Bays							
Point Orient	1480		1510	1550	1510	1510	1510	1230
Point Pinole			1320			1280	a1100	
Hercules				ab1290				
Point Davis	1090	1120	1000	1220	a1110	*1010	910	a580
Grand View	a1050	1130	1120	b1130	1120	1210	1080	1100
Crockett	a740		1110	1060	a960		a600	a600
Benicia	880	730	740	750	770		560	
Martinez	630	620	610	bkn	730	550	430	340
West Suisun	710	660	530	510	550	310	160	74
Innisfail Ferry	210	180	b210	210	260	160	ab190	110
Port Chicago	a290	610	600	680	480	400	190	126
O & A Ferry	94	112	116	a110	144	a42	a32	4
Pittsburg	26	25		a41	34	14	12	4
	Sacramento River Delta							
Collinsville	11	12	15	27	25		a2	2
Three Mile Slough	2	2		a1			2	1
Rio Vista Bridge	1	1	1	4	1	1	1	6
Isleton			3	1	1	1		
	San Joaquin River Delta							
Winter Island	26		24	36	34	12	11	5
Antioch	14	14	13	22	19	10	10	4
Millers Harbor	8	9	9	15		14	6	4
Webb Pump	4	5	a7	4	4	6	6	5
Opposite Central Landing	5	4	3	3	4	4	1	1
Dutch Slough	7	a7	7	6	bkn	6	7	7
East Contra Costa I. D.	15	17	ab15	b18	16	19	18	21
Victoria	15	17	17		25	17	20	20
Clifton Court Ferry	17	bkn	18	19	19	21		18
South Fabian	22	a22	a15	26	24	24	20	21
Grant Line Bridge	b22		20	21	21	21	18	14
Mossdale	16	a25	a21	20	17	18	18	14
At Vernalis	17					18		
	APRIL - 1948							
	San Francisco, San Pablo and Suisun Bays							
Point Orient	1290	1230	1200	1090	1060	1160	1050	720
Point Pinole	1220	870				a630		
Hercules	ab720							
Point Davis	650	790	710	560	e350	d390	220	350
Grand View	1100	830	a800	810	780	710	710	600
Crockett	450	600	550	a260	390	340	160	220
Benicia	280	320		170	150	200	150	60
Martinez	340	a130	220	100	11	a7	8	99
West Suisun	160	b30	22	22	e56	9	7	12
Innisfail Ferry	98	a116	a110	84	b94	a70	54	35
Port Chicago	36	46	36	6	4	5	3	3
Nichols				4	4	3	6	
O & A Ferry	4	*4	a7	4	2	a2	1	2
Pittsburg	4	a3	a4	4	1	a3	a4	3
	Sacramento River Delta							
Collinsville	2	a2		2			1	2
Three Mile Slough		1	3	a1	1	5	1	1
Rio Vista Bridge	1	3	1	1	4	1	1	2
Isleton	1	1		a1	a1		1	1
	San Joaquin River Delta							
Winter Island	4	3		4	4	a2		5
Antioch	5	4	5	3	5	5	3	3
Millers Harbor	2	6	3	4	b3	a4	2	a4
Webb Pump	4	a6	a6	4	8	a3	3	5
Opposite Central Landing	3	a2	a1	bkn	2	a1	a1	3
Dutch Slough	8	a7	9	7	7	8	6	8
East Contra Costa I. D.	23	32	29	29	23	22	20	9
Victoria	20	19	17	17	17	18	5	8
Clifton Court Ferry	9	17	17	17	bkn	14	8	
South Fabian	21	a19	b19	19	18	14		
Grant Line Bridge	b13		17	14	a8	10	4	
Mossdale	15	7	13	11	9	7	2	5
At Vernalis	c16	17	a14	10	e7	13	4	e4

(a) Taken at Low High Tide
(b) Taken on following day.
(c) Taken two days later.
(d) Over 1 hour off scheduled time.
(e) Taken one day earlier.
(*) Presumed.

TABLE 142 (CONT'D)

SALINITY OBSERVATIONS, SACRAMENTO-SAN JOAQUIN DELTA AND UPPER BAYS

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 - 1948							
	2	6	10	14	18	22	26	30
	San Francisco, San Pablo and Suisun Bays							
Point Orient	e670	e1100	970	750	e1130	1320	1150	790
Point Pinole		a920			a710			
Hercules			330					
Point Davis	310		290	400	b500	440		450
Grand View	560	500	580	640	b620	660	710	740
Crockett		330	270		137	410	440	
Benicia	196	280	190	70	240	290	130	
Martinez	e38	a9	a6	a30	8	88	87	310
West Suisun	b8	35	5	12	c19	12	7	112
Innisfail Ferry	25	a19	a17	a18	a18	ab17	16	18
Port Chicago	4	2	4	3	e4	9	5	100
O & A Ferry	a1	a1	a3	a2	a6	a3	3	bkn
Pittsburg	a2	a2	a3	a2	a1	a3	a2	a2
	Sacramento River Delta							
Collinsville	a1				a2	a2	a1	
Three Mile Slough	1	1	1	1	b1	1	2	b1
Rio Vista Bridge	2	1	5	1	b1	2	4	b2
Isleton				b2	b1		2	a3
	San Joaquin River Delta							
Winter Island	bkn	a2	6		a2	a2	2	a3
Antioch	a3	a6	a2	a2	a3	a2	a6	a2
Millers Harbor	3	1	6	2	b11	3	5	b2
Webb Pump	a4	a5	a7	a5	a9	a3	2	a3
Opposite Central Landing	a1	a1	a2	a2	a1			a2
Dutch Slough	a9	a8	7	a9	a6	7	1	a5
East Contra Costa I. D.	a3	6	b5	a3	a4	a3	5	b4
Victoria	5	7	2	b2	b3	3	3	b2
Clifton Court Ferry			4			1		a1
South Fabian	4		b3		b3	b8		a2
Grant Line Bridge		2	1	4	2	1	1	
Mossdale	3	3	2	a4	b2	1	3	b2
At Vernalis	bd6		b5	5	2		b5	
	JUNE - 1948							
	San Francisco, San Pablo and Suisun Bays							
Point Orient	1060	e1140	1140	1040	e1100	1360		1400
Point Pinole	a820				a650			
Hercules						280	880	
Point Davis	e510	510	520	500	e510	580	630	840
Grand View	700	610	640	bkn	e700	680	720	660
Crockett		190	410	a180	e460	250	480	730
Benicia	500	e200	e150	180	11	e204	e320	
Martinez	170		270	60	71	148	218	440
West Suisun	e350	e60	8	34	31	48	12	300
Innisfail Ferry	a18	a19	17	21	19	ab17	13	18
Port Chicago	b80	30	6	5	b80	e102	62	380
O & A Ferry	a3	a3	a3	a4	a4	a3	5	a4
Pittsburg	a3	a3	a2	ab2	a3	a3	1	a4
	Sacramento River Delta							
Collinsville		a1			a1	a1		a2
Three Mile Slough	b5	2	1		2	2	2	
Rio Vista Bridge	b1	2	1	b1	1	1	1	a2
Isleton	a1	2						a3
	San Joaquin River Delta							
Winter Island	a3	a2	3	a1	a2	1	1	a2
Antioch	a3	a2	2	a4	a2	a2	a2	a1
Millers Harbor	b2		2	b4	1	a1	3	2
Webb Pump	a4	a3	2	a3	a4	3	1	a1
Opposite Central Landing	a2				a6	2	1	a2
Dutch Slough	a4	a4	3	a3	a3	2	1	a2
East Contra Costa I. D.	a5	4	2	a4	bkn	2	2	
Victoria	b1	3	2	b2	a2	3	3	
Clifton Court Ferry	a2	a4				2	2	
South Fabian				a6	2	2		
Grant Line Bridge				2	1	2		
Mossdale	a1	2	1	a2	2	3	1	a5
At Vernalis		c2	3		e2	c2	2	e3

(a) Taken at Low High Tide.
(b) Taken on following day.
(c) Taken two days later.
(d) Taken 1 hour off scheduled time.
(e) Taken one day earlier

TABLE 142 (CONT'D)

SALINITY OBSERVATIONS, SACRAMENTO-SAN JOAQUIN DELTA AND UPPER BAYS

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 - 1948							
	2	6	10	14	18	22	26	30
	San Francisco, San Pablo and Suisun Bays							
Point Orient	1090	1270	1340	1410	1600	1500	1570	1530
Point Pinole	1170			a1190				a1380
Hercules		a950	a1130					
Point Davis			860	1010	1250	1100	1180	1210
Grand View	e700	710	830	870	880	910	a910	a960
Crockett	620	a760	a940	a960	1150		980	
Benicia	420	e520	640		e990	840		ab1080
Martinez		e580	550	500	710	800		890
West Suisun	e260	340	250	330	550	580	620	700
Innisfail Ferry		a21	30	a35	a46	21	a86	a98
Port Chicago	320	400	b360	420	700	630	490	710
O & A Ferry	14	a30	42	a40	a90	a150	180	a108
Pittsburg	2	a11	a15	ab24	a32	a56	59	a60
Nichols			270					
	Sacramento River Delta							
Collinsville	a4	a2	6		a26		a47	*60
Three Mile Slough	1	2	a2	3	4		2	b4
Rio Vista Bridge	2	1	2	e1	a2	6	b2	b3
Isleton			2			4		
	Mokelumne River Delta							
Terminous **			3	3	2	a3	6	4
Southwest Point **				a1	1	2	a2	a2
	San Joaquin River Delta							
Winter Island	3	5	10	a18	40	58	a38	a45
Antioch	bkn	a4	7	a6	a11	a22	29	a22
Millers Harbor		2	a3	ab5	8	29	16	
Webb Pump	1	3	2					
Opposite Central Landing	1	2	3	a2	a3	2	a3	a3
Dutch Slough	1	2	3	a2	2	4	a4	a5
East Contra Cost I. D.	2	4	3	a6	4	5	a26	a7
Victoria		4	3	b5	4	5	b14	b4
Clifton Court Ferry	3	3	5	b6	6	10		b10
South Fabian	ab3				8			
Grant Line Bridge		5	4		10	12		
Mossdale	a5	4	8	b10	11	13	a2	ab15
At Vernalis	e4	5	e9	e10	e10	e11		

Station	AUGUST - 1948							
	San Francisco, San Pablo and Suisun Bays							
Point Orient	1730	a1600		bkn	1530	1550	1620	1720
Point Pinole			a1490				a1470	a1350
Hercules		a1350	1480	a1440	a1340			
Point Davis	*1420	1340	*1270	*1390	1250		1200	1330
Grand View	1010	1060		1150	1090	1220	1260	1260
Crockett	a1170	1300		e1320	1310	1250	1240	a1280
Benicia	e1130	f1000	1050		960	890	1080	1060
Martinez	1020	e780	f800	950	900	940	760	1260
West Suisun	840	700	580	b840	780	650	950	e850
Innisfail Ferry	a133	240	240	a440	ab370	310	370	a280
Port Chicago	750	730	760	740	740	a620	640	760
Nichols			590	660	690	560	630	740
O & A Ferry	a210	a230	a160	a240	a220	a210	a220	a190
Pittsburg	a78	140	a104	a170	a170	a83	110	a110
	Sacramento River Delta							
Collinsville		96	a179	a101	ac108	b72	86	a50
Three Mile Slough	3	a5	b6	5		5	10	
Rio Vista Bridge	2	4	b3	4	4	2	1	3
Isleton		5	b2		a2			a3
	Mokelumne River Delta							
Terminous	4	2	b4	4	5	a4	2	3
Southwest Point	3	3	a2		3	4	a2	a3
	San Joaquin River Delta							
Winter Island	96	127	a79	a78	97	102	96	
Antioch	a29	57	66	a80	a80	90	80	a50
Millers Harbor	a23		26	a33	35	44	37	30
Opposite Central Landing	a3	4	a4	a4	3	6	a3	a2
Dutch Slough	a6	6	a6	a6	9	7	a9	a8
East Contra Costa I. D.	b5	6	a4	b14	5	7	a8	ab9
Victoria	4	a4		3	5	10	a7	11
Stockton Country Club***						10		a10
Clifton Court Ferry	9	9	a10	9		9	a11	17
Garwood Bridge***						2	b10	11
Williams Bridge***						5	b6	1
South Fabian				a9	17			
Grant Line Bridge	c14				14	13		
Mossdale	a9	14	a12	16	13	16	9	12
At Vernalis		15	b13	15	c13			b11

(a) Taken at Low High Tide.
(b) Taken on following day.
(c) Taken two days later.
(e) Taken on preceding day.
(f) Taken two days earlier.

(**) Stations reestablished 7/9/48.
(***) Stations reestablished 8/19/48.

TABLE 142 (CONT'D)

SALINITY OBSERVATIONS, SACRAMENTO-SAN JOAQUIN DELTA AND UPPER BAYS

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	2	6	10	14	18	22	26	30
	SEPTEMBER - 1948							
	San Francisco, San Pablo and Suisun Bays							
Point Orient	b1720	1700	1630	e1750	1490		1680	1690
Point Pinole	a1460		a1430	a1400				
Point Davis	1370			e1270				
Grand View	1220	1290	1270	1260	1300		b1330	b1310
Crockett	a1210	1330	1070	ae1040	1240	1220	b1060	
Benicia	1060	e990	1090	810		1040	730	830
Martinez		710	820		720	780	690	b620
West Suisun	920	790	690	b750	530	590	690	700
Innisfail Ferry	a310	340	a350	280		360	a310	a280
Port Chicago	610	710	650	b680	650	600	490	b580
Nichols	630	530	570	550	490	470	e430	470
O & A Ferry	a180	270	a250	a180	190	200	a120	a120
Pittsburg	a80	100	a90	a70	90	a60	60	a50
	Sacramento River Delta							
Collinsville	a76	130		a140	66	46	28	a28
Three Mile Slough	6	4	7	a4	4		2	
Rio Vista Bridge	2	2	5	4	3	2		4
Isleton						2		2
	Mokelumne River Delta							
Terminous	a4	5	3	4	7	5	11	6
Southwest Point	2	a3	a3	a3	a2	a3		a6
	San Joaquin River Delta							
Winter Island	a67	100		a57	54	59	41	a30
Antioch	a40	80	90	a150	70	b70	a20	a22
Millers Harbor	32	37	33	32	24		19	17
Opposite Central Landing	3	4	a4		4	5		4
Dutch Slough	9	9	a9	a8	a8	a7	a7	a8
East Contra Costa I. D.	a12	10	a12	11	17	a13	a15	16
Victoria	7	12	b9	11	13	14	b15	20
Stockton Country Club	12			a12	a9	a3	a13	
Clifton Court Ferry	13		a13	14	a13			13
Garwood Bridge	13	12	a12	a13	a11	a13	a11	a12
Williams Bridge	7	7		9	11	13	12	11
Grant Line Bridge	c13			12	13			8
Mossdale	11	bkn	a13	15	a14	a11	10	8
At Vernalis		c12		c11			b8	
	OCTOBER - 1948							
	San Francisco, San Pablo and Suisun Bays							
Point Orient	1550	1340	1380	e1330	1550	1570	1570	
Point Pinole				1350	1400		a1250	
Grand View	1330	bkn	1310	1270	1220	1240	1270	1150
Crockett	1170	1180	1040	1110	1240	980		
Benicia	920	e540	940		1000	900	b790	
Martinez			800		680	740	610	
West Suisun	b460	440	730	730	810	430	470	760
Innisfail Ferry	270	260	a250	250	260	a270	a270	250
Port Chicago	550	640	530	b550	540	b450	b590	540
Nichols		440				530	450	
O & A Ferry	150	130	a130	120	200	a120	a80	a180
Pittsburg	40	50	60	60	40	44	20	30
	Sacramento River Delta							
Collinsville	b28	58	a22	34	28	40	a18	42
Three Mile Slough		4	3	4	7	4	6	3
Rio Vista Bridge	6	3	b3	4	3	2	ab5	4
Isleton	3	5	b3	4	3	5	b2	2
	Mokelumne River Delta							
Terminous	5	6	4	a5	a6	4	6	a6
Southwest Point		a2	a3		a2			
	San Joaquin River Delta							
Winter Island	49		a38	15	22	40	36	27
Antioch	21	19	a14	a16	17	21	a14	12
Millers Harbor	16	16		10				
Opposite Central Landing	5		a4	3	4			
Dutch Slough	7	8	a9	7		7	a8	7
Orwood Bridge**						12	b11	10
East Contra Costa I. D.	a14	a18	a17	14	14	a16	b16	15
Victoria	a14		b10	9	11	10	a11	12
Stockton Country Club	12	a12		e9		a26		11
Clifton Court Ferry	a10	10	a8	9	10	10	10	
Garwood Bridge	a9	a7	b8	9	a9	a10	b17	
Williams Bridge	8		a10	9	8	11	ab11	9
South Fabian				a11				
Grant Line Bridge	ac8				a9	ac12		10
Mossdale	6	a8	a9	a8	a8	a11	a11	a11
At Vernalis	8							

(a) Taken at Low High Tide
(b) Taken on following day.
(c) Taken two days later.
(e) Taken on preceding day.
(**) Station reestablished 10/21/48

TABLE 142 (CONT'D)

SALINITY OBSERVATIONS, SACRAMENTO-SAN JOAQUIN DELTA AND UPPER BAYS

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 - 1948							
	2	6	10	14	18	22	26	30
	San Francisco, San Pablo and Suisun Bays							
Point Orient	1720	1380	1630		1570	1550	1640	1740
Point Pinole	1340		1270		1340	a1260	1360	1420
Point Davis	1240	960		1200	1150			1000
Grand View	1200	1210	1240	1230	1140	1200	1150	1150
Crockett	1210	1050	940	*1230	1050	1050	1170	1150
Benicia	930	e680	950	1060	870	660	890	1000
Martinez	600	630	a620	800	760		a680	750
West Suisun	460	490	710	950	480	440	710	780
Innisfail Ferry	270	a330	b270	b270	310	ab280	b290	b250
Port Chicago		380	440	620	720		430	a420
Nichols					a240	b380	460	
O & A Ferry	170	a100	150	190	180	a120	100	180
Pittsburg	100	ab30	a15	31	36	44	42	32
	Sacramento River Delta							
Collinsville	72	22		74	b110	a8		31
Three Mile Slough	4		7	2		8	ab5	3
Rio Vista Bridge	4	2	2	3	2	4	6	3
Isleton	2	2	3	4	4	7	5	3
	Mokelumne River Delta							
Terminous	7	5	a3	a2	4	6	a4	4
Southwest Point	a3	a3	4				3	2
	San Joaquin River Delta							
Winter Island	44	a24	18	36	a62	91		59
Antioch	27	21	9	17	24	18	13	21
Millers Harbor	17	12	10	13	14	17		15
Opposite Central Landing								
Dutch Slough	8	a6	8	12	7	a9	12	a6
Orwood Bridge	12	13	12	12	13		12	
East Contra Costa I. D.	a14	a15	14	16	a16	a16	15	a15
Victoria	14	11	14	13	12	b13	15	11
Stockton Country Club			13			a11	10	a13
Clifton Court Ferry	a12	a12	12	18	a10	a12	ab19	11
Garwood Bridge	a12	a12	11	bkn	15	ab12	11	11
Williams Bridge	10	b11	12	15	9	b13	13	12
South Fabian					14		12	a14
Grant Line Bridge		ab11		a11	a11	a12	a11	
Mossdale	11	a12	12	a9	a12	a11	ab12	a14
At Vernalis				e12	c12			13

Station	DECEMBER - 1948							
	San Francisco, San Pablo and Suisun Bays							
Point Orient	1460	1560	1560	1690	1550	1600	1530	
Point Pinole	1500	a1260	1150	1410		1220		1300
Point Davis	1280		1100	1340	1080		1260	1100
Grand View	1180	1150	1170	a1210	1070	1080	1070	1030
Crockett	1120	a820	990	1220		1040	980	930
Benicia				1060	790	520	940	
Martinez	970		750	940	780	e550	840	650
West Suisun	510	410	740	830	500	540	730	400
Innisfail Ferry	240	260	250	290	280	270	b260	250
Port Chicago	610	e590	680	750	540		440	520
Nichols	520	280					460	
O & A Ferry	200	a110	130	360	180	100	140	100
Pittsburg	31	30	35	67	36		27	20
	Sacramento River Delta							
Collinsville	75	19	19	110	17	9		13
Three Mile Slough	3	3	4		3	a3	1	13
Rio Vista Bridge	3	3	3	2	2	12	3	1
Isleton	bkn	1	3	3	2	1	1	
	Mokelumne River Delta							
Terminous	a6	bkn	a8	6	bkn	a3	a1	a6
Southwest Point	a3		2	4	5			
	San Joaquin River Delta							
Winter Island	68		19	76	21	19	32	29
Antioch	30	16	14	31	23	15	15	13
Millers Harbor	18	12	6	14	17	ad10	10	9
Opposite Central Landing	5	a2	2	4	10	2	3	3
Dutch Slough	a8	a7	7	9	a7	7	6	6
Orwood Bridge	12	13	18	13	13	12	11	14
East Contra Costa I. D.	16	a14	14	14	a13	12	17	16
Victoria	12	14	7	13	13	12	b12	13
Stockton Country Club		a11		a13	a14			10
Clifton Court Ferry	14	a12	12	19	13	12	*17	10
Garwood Bridge	a13		11	a11	a11	12	b10	a9
Williams Bridge	b13		12	15			4	13
South Fabian	ab13		14	a17			a11	
Grant Line Bridge		a13		a13	bkn		a8	a8
Mossdale	a10	12	11	a13	a10	11	9	a9
At Vernalis			e12		e13-		9	b10

(a) Taken at Low High Tide.
(b) Taken on following day.
(c) Taken two days later.
(e) Taken on preceding day.
(*) Presumed.

TABLE 143

DAILY SALINITY OBSERVATIONS TAKEN AT WEST SUISUN STATION
NORTH SHORE, WEST END OF SUISUN BAY - 1948

Samples taken by U. S. Maritime Commission, Reserve Fleet Mooring Area, approximately one and one-half hours after high high tide

Date	Salinity expressed in parts of chlorine per 100,000 parts of water											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1		360	530	128		350			850		410	510
2		410	710	160				840	920		460	510
3		420	410	136	8	180	270	840	620	460	480	710
4		470	420		15	60	290	950	590	750	460	500
5		570	670	36	47	60	290	1000	560	450	420	450
6		570	660	22	35		340	700	790	440	490	410
7	410	510	630	30	13	60	400	720	570	420	460	480
8	360	330	660	24	7	40	330	660	640	450	460	450
9	300	330	620	34	5	30	290	820	640	800	460	570
10	190	400	530	22	5	8	250	580	690	730	710	740
11	90	320	380	30	7	6	360	630	710	500	630	820
12	92	300	400	12	9	8	210	730		670	470	770
13	54	200	430	12	9	10		680	660	640	590	870
14	70	260	510	22	12	34	330			730	950	830
15		300	560		8			840	750	720	820	700
16	170	360	470	62			510		700	500	740	710
17	168	550	620	56	9	49	580	740	530	520	580	580
18	152		550			31	550	780	530	810	480	500
19	260	550	660		10	26	580	780	770	480	540	510
20	340	730	480	10	19	40	620	600	810	480	590	450
21	660	390	310	15	6	73	850	600	650	450	600	400
22	170	570	310	9	12	48	580	650	590	430	440	540
23	890	500	310	6	30	54	610	750	640	580	490	710
24	650	610	380	6	35	32	580		620	580	680	520
25	440		180	7	21	26	510	1180	540	540	730	bkn
26	460	370	160	7	7	12	620	950	690	470	710	730
27	440	300	110	6	12	22	450	920	690	590	530	770
28	370	320	90	10	7	36	600	950	780	700	620	570
29	390	330	60	14	11	116	740	850		430	740	580
30	310		74	12	112	300	700		700	760	780	400
31	380		114		250		970			730		410

TABLE 144

DAILY SALINITY OBSERVATIONS TAKEN AT PORT CHICAGO STATION
U. S. NAVAL AMMUNITION LOADING WHARF - 1948

Samples taken by U. S. Marine Corps approximately one and one-half hours after high high tide

Date	Salinity expressed in parts of chlorine per 100,000 parts of water											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	680	430		14	4	200	390			580		
2	720	520	a290	36	4		320	780	610	590		610
3	750	420	410	98		80			720	560		
4	680	670			5		250	930	730	590		
5	*720	630	a430	106			420	740	650	450	270	590
6	660	400	a610	46	2	30	400	730	710	640	380	
7	650	520	a630	*a8	a2	40	370			570		
8	500		a600	bkn	5	40		900	740	540		
9	380	450	a590	12		20	450	a720	670	550		560
10	150	350	a600	36	4	6		760	650	530	440	680
11	150		a650		3	5	360	740	650	350	550	640
12	135	360	a580	8	3	4	370	790	720	450		680
13		450	a530	6	3		430		650		710	610
14	128	a370	a680	6	3	5	420	740			620	750
15	*144	290	a640		2	*6			680	550		570
16	a140	450		15	4	64	590	720	660	500	560	570
17	290	600	660	6	4	bkn		750		570	*460	510
18	a100	680	480	4			700	740	650	540	720	540
19	430	520				80	620	690	650		520	560
20	580	680	410	4		76	670	680	520			
21	550	570	400	5	57	102	650		650			420
22	600	320	400	5	9		630	a620	600			
23	650	510		2	50	136		610	580	450		570
24	680	440		3	7	108	590	750	660	200		550
25	730		280	2	9	76	430	690		430		
26			190	3	5	62	430	740	600		430	440
27			a60	3	4	26	570	680	bkn	590	*440	530
28	490	a330	170	3	9		610	690	630	650	610	620
29	470	430	a108	4	3	26	690	270	580		550	620
30	380		126	3	100	380	710	760		540	a420	520
31	430		34		120		720	780		570		630

TABLE 145

DAILY SALINITY OBSERVATIONS TAKEN AT ANTIOCH STATION
ANTIOCH WATER WORKS WHARF - 1948

Samples taken by Municipal Water Company approximately one and one-half hours after high high tide

Date	Salinity expressed in parts of chlorine per 100,000 parts of water											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	60	12	13	4	a2	a2	a2	a24	a32	a18	22	22
2	60	12	14	3	a2	a2	a2	a30	a38	20	26	26
3	60	11	12	3	a3	a2	a2	a41	a46	26	27	42
4	52	13	10	3	a3	a2	a2	a28	a58	26	20	24
5		18	11	a3	a3	a2	a2	a43	60	24	15	33
6	26	16	13	a4	a3	a2	a3	a58	64	23	18	14
7	19	13	14	a4	a3	a2	a3	a76	73	25	12	13
8	14	11	15	a3	a3	a2	a4	a79	71	27	9	12
9	10	11		a4	a3	a2	7	62	71	27	9	12
10	7	11	13	a4	a3	2	6	64	64	a15	10	12
11	5	8		a3	a3	2	6	78	a35	17	11	12
12	5	8	15		2	a2	7	a40	a34	13	11	14
13	5	6	a16	3	3	a2	a5	a36	a36	15	12	23
14	4	8	21	3	2	a2	a5	a52	a36	15	15	34
15	4	7	20	3	2	a2	a7	a41	a35	14	18	27
16	3	7	22	3	a2	a2	a9	a41	a35	14	22	27
17	4	7	24	3	a2	a2	a11	a41	a36	14	18	31
18	4	8	18	3	a2	a2	a11	a48	38	16	21	23
19	4	10	15	a3	a3	a2	a19	a41	38	16	32	16
20	4	11	12	a3	a3	a2	a18	a46	40	15	29	15
21	4	16	9	a3	a3	a2	a25	a64	42	15	17	11
22	5	17	10	a3	a3	a2	a22	a58	38	19	16	11
23	7	11	11	a3	a2	a2	a29	54	40	19	aa14	11
24	11	10	14	a3	a2	a2	39	56	34	18	13	14
25	16	13	9	a3	a2	a2	33	50	30	15	14	10
26	11	16	7	2	a2	a2	29	58	18	a13	12	13
27	12	13	6	3	2	a2	25	58	a20	a14	13	20
28	12	16	5	2	2	a2	37	a34	18	a16	12	17
29	11	14	4	2	a2	a2	a24	*a38	a17	19	16	14
30	12		3	2	a2	a2	a20	a34	a17	18	21	13
31	12		4		a2	a2	a22	a32		20		17

(a) Taken at Low High Tide.
(aa) Taken at High Low Tide.
(*) Presumed.

TABLE 146

COMPARATIVE ANNUAL MINIMUM 10-DAY FLOW TO DELTAS OF SACRAMENTO AND SAN JOAQUIN RIVERS AND AREA OF EACH AFFECTED BY SALINITY ENCROACHMENT GREATER THAN 100 PARTS OF CHLORINE PER 100,000 PARTS OF WATER

Year	Flow for Minimum 10-day period (1)					Runoff in % of Normal*			Area Affected by Salinity					
	Sacramento River at Sacramento		San Joaquin River at Vernalis		Sacramento and San Joaquin to Delta	Sacramento and San Joaquin to Delta	At Sacramento	At Vernalis	All Deltas		Sacramento and Mokelumne		San Joaquin	
	Date	c.f.s.	Date	c.f.s.	c.f.s.				% of Total	Acres (2)	% of Total	Acres (3)	% of Total	Acres
1920		(4)540		(4)450		52	48	66	15.1	65800	7.7	33500	7.4	32300
1921						118	126	95	2.1	9150	2.0	8715	0.1	435
1922						103	95	123	2.9	12600	2.4	10420	0.5	2180
1923						76	70	88	2.1	9150	2.0	8715	0.1	435
1924	7/14	858	7/26	407	1280	28	30	24	50.0	217500	18.4	80100	31.6	137400
1925	8/7	2860	8/29	743	3730	86	84	88	3.6	15630	3.1	13450	0.5	2180
1926	7/28	1460	8/21	586	2080	60	63	56	18.5	80500	8.5	37000	10.0	43500
1927	8/23	3560	8/23	1300	4850	121	127	104	2.9	12600	2.4	10420	0.5	2180
1928	8/15	2660	8/22	866	3550	84	89	70	5.7	24800	3.7	16100	2.0	8700
1929	7/18	2460	8/12	590	3090	44	44	46	7.1	30900	4.2	18300	2.9	12600
1930	8/5	2500	8/9	735	3230	65	71	53	5.4	23500	3.8	16500	1.6	7000
1931	7/20	-79	7/21	211	131	30	32	27	73.8	321000	30.2	131000	43.6	190000
1932	8/11	1980	9/10	1030	3030	78	69	106	5.7	24800	3.4	14800	2.3	10000
1933	8/21	1450	8/14	607	2070	48	46	54	9.8	42600	5.2	22600	4.6	20000
1934	7/20	1150	8/14	346	1530	43	45	37	37.5	163000	17.8	77500	19.7	85500
1935	8/12	2920	8/12	922	3940	91	87	103	2.9	12600	2.4	10420	0.5	2180
1936	8/20	2540	8/17	1040	3600	96	92	104	2.6	11600	2.2	9840	0.4	1760
1937	8/16	1720	8/24	1020	2820	80	70	105	3.5	15200	2.6	11280	0.9	3920
1938	8/12	5190	8/27	2130	7365	170	167	180	0	0	0	0	0	0
1939	8/5	630	7/25	610	1315	43	43	46	29.0	126000	17.0	74000	12.0	52000
1940	8/12	2550	8/9	1080	3620	115	118	105	4.2	18300	3.0	13000	1.2	5300
1941	8/24	4190	9/14	1480	5800	137	143	127	1.2	5100	1.2	5100	0	0
1942	8/22	3740	8/20	1520	5300	129	133	118	1.2	5100	1.2	5100	0	0
1943	8/17	2600	8/4	1480	4140	114	111	117	2.8	12200	2.2	9600	0.6	2600
1944	8/13	2790	8/9	1033	3830	56	54	62	7.2	31300	4.8	20800	2.4	10500
1945	8/24	6560	8/1	1530	8180	86	79	106	0.2	1000	0.2	1000	0	0
1946	8/7	6460	8/5	1160	7640	92	92	92	0.6	2500	0.6	2500	0	0
1947	7/7	4700	7/21	477	5270	54	54	55	7.5	32400	5.0	21500	2.5	10900
1948	7/24	7550	8/9	(5)606	8260	78	83	68	0.3	1200	0.3	1200	0	0

* Normal = 50 year mean (1889-1939).
(1) Does not include inflows from Mokelumne and Calaveras rivers, Yolo By-Pass and other minor tributaries.
(2) Delta area taken at 435,000 acres which includes all lands, levees, water surfaces, etc., within Delta boundary.
(3) Sacramento and Mokelumne deltas combined as the Sacramento River contributes a large flow to Mokelumne River Delta through Georgiana and Three Mile sloughs.
(4) No continuous record. Lowest discharge measured.
(5) Figure shown is minimum 10 day flow during summer. Minimum 10 day flow for year occurred March 8 with average flow of 357.

TABLE 147

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS - 1948

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of	Time of	Draw Down or G. H.	Depth or c.f.s.	Temperature Degrees	Parts per Million										
					Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	B	NO_3	Total Solids
					SACRAMENTO RIVER BELOW SHASTA DAM							T33N,R5W,Sec.15			
1/12	1245	579.14	5444	49					0.0	85	5.8	7.8			110
2/9	1545	577.70	3440	46					0.0	72	1.2	2.3			94
3/8	1545	578.14	4836	46					0.0	71	6.2	3.1			89
4/12	1400	579.03	5114	46					7.0	60	4.5	2.3			93
5/10	1530	587.4	16282	49					0.0	66	9.0	3.1			83
6/14	1500	581.42	9850	48					0.0	65	4.5	1.6			94
7/12	1500	580.3	7406	48					0.0	62	6.2	2.3			82
8/9	1330	581.72	10440	50					0.0	60	5.8	3.1			75
9/13	1445	581.9	10720	54					0.0	64	6.2	2.1			82
10/12	1415	580.15	7050						0.0	59	8.2	1.4			73
11/8	1345	579.64	6367	56					0.0	63	4.1	1.4			79
12/13	1525	581.72	6852	54											91
					SACRAMENTO RIVER AT ORD FERRY							T21N,R1W,Sec.33			
3/4	1000	56.20	4050	44	13	4.5	11	0.7	0.0	79	8.2	4.7		0.3	106
4/5	1000	60.94	14550	50					0.0	53	12.0	3.9			100
5/4	1040	104.5	29800	52					0.0	66	12.0	3.9			97
6/2	1055	100.62	15500	60					0.0	65	8.6	3.1			100
7/6	1000	97.90	7400	58					0.0	64	6.2	3.1			100
8/2	1025	98.20	8400	60					0.0	66	7.4	3.1			90
9/7	1030	98.15	8400	60					0.0	64	7.8	2.1			90
					SACRAMENTO RIVER AT COLUSA BRIDGE							T16N,R1W,Sec.29			
1/12	1355	48.0	14700	48					0.0	65	13.0	9.3			100
2/2	1110	40.51	5650	46	13	7.4	10	0.7	0.0	85	8.6	5.4		0.0	110
3/4	1315	38.63	4100	46					0.0	87	9.0	6.2			120
4/5	1020	48.26	13150	51					0.0	59	9.5	4.7			94
5/4	1515	61.4	30100	54					0.0	67	12.0	3.9			100
6/2	1400	50.10	15600	61					0.0	65	7.8	3.1			100
7/6	1445	42.47	7575	61					0.0	70	8.2	3.1			100
8/2	1410	43.18	8100	62					0.0	69	6.2	4.7			92
9/7	1420	43.34	8450	62					0.0	73	7.0	2.8			88
					SACRAMENTO RIVER ABOVE COLUSA TROUGH OUTFALL							T11N,R2E,Sec.14			
1/12	1115	29.45		49					0.0	55	13.0	5.8			92
2/3	1120	17.62		46					13.0	75	10.0	6.2			120
3/3	1030	16.37		45					0.0	85	8.2	6.2			110
4/7	1200	26.21		52					0.0	57	13.0	3.9			100
5/5	1040	36.08		56					0.0	66	13.0	3.9			85
6/3	1020	27.88		62					0.0	70	15.0	7.0			110
7/7	1000	17.75		62	16	8.3	15	0.5	0.0	95	13.0	10.0			130
8/3	1130			68					0.0	88	13.0	10.0			130
9/8	1040			63					0.0	82	14.0	9.2			120
					WILLOW CREEK NEAR PRINCETON							T18N,R2W,Sec.16			
1/12	1000	66.50	21	46					0.0	290	30.0	18.0			310
2/2	0955	66.02	12	42					0.0	280	27.0	9.3			280
3/4	1105	66.68	26	44					7.7	330	32.0	9.3			340
					COLUSA TROUGH AT HIGHWAY 20							T16N,R2W,Sec.34			
1/12	1150	0.90	137	46					0.0	330	280.0	140.0			940
2/2	1045	0.67	65	43					0.0	350	290.0	150.0			970
3/4	1340	0.33	68	45					0.0	360	310.0	140.0			1000
4/5	1330	1.42	209	54					0.0	280	270.0	130.0			850
5/4	1400	1.61	250	65	42	31.0	100	1.7	12.0	200	150.0	85.0		0.9	540
6/2	1330	8.50	1550	68					0.0	140	69.0	30.0			300
7/6	1400	3.20	490	65					0.0	190	67.0	41.0			350
8/2	1340	3.12	500	78					0.0	200	48.0	30.0			300
9/7	0900	4.38	678	70					0.0	205	47.0	28.0			280
					COLUSA TROUGH AT KNIGHTS LANDING							T11N,R2E,Sec.14			
1/12	1030	24.25		50					0.0	200	190.0	110.0			620
2/3	0950	19.88		49					0.0	360	290.0	180.0			970
3/3	1000	23.00		46					0.0	370	290.0	150.0			970
4/7	1300	27.23		50					0.0	54	12.0	3.9			84
5/5	1005	26.37		56					0.0	66	14.0	6.2			110
6/3	1000	27.95		70	20	15.0	60	0.7	0.0	150	71.0	33.0		1.9	300
7/7	0940	24.23		66					0.0	210	83.0	54.0			420
8/3	1040	24.20		78					0.0	230	75.0	47.0			380
9/8	0950	24.48		72					0.0	220	54.0	37.0			340
					SACRAMENTO RIVER AT KNIGHTS LANDING (BELOW COLUSA TROUGH OUTFALL)								T11N,R2E,Sec.14		
1/12	1122	29.45	15250	49					0.0	52	10.0	7.4			94
2/3	1045	17.62	6250	45					18.0	68	10.0	7.0			120
3/3	1040	16.37	4550	45					0.0	87	9.5	6.2			110
4/7	1300	27.23	11700	50	9.7	4.5	6.8	0.2	0.0	54	14.0	3.9		0.2	96
5/5	1100	36.08	22600	56					0.0	66	15.0	3.9			97
6/3	1030	27.88	14700	62					0.0	69	12.0	7.0			120
7/7	1405	17.75		63					0.0	120	32.0	20.0			220
8/3	1135	17.91	7300	68					0.0	86	19.0	11.0			140
9/8	1050	18.96	8100	63					0.0	110	26.0	16.0			180

TABLE 147 (CONT'D)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS - 1948

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Draw Down or G. H.	Depth or c.f.s.	Temperature Degrees	Parts per Million										
					Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	B	NO_3	Total Solids
					SACRAMENTO SLOUGH DRAIN						T11N,R3E,Sec.21				
1/12	1140	28.70		49.5					0.0	74	11.0	15.0			120
2/3	1200	14.67		45					10.0	220	10.0	33.0			300
3/3	1240	14.10		51					18.0	270	15.0	220.0			690
4/7	1300	24.20		56					0.0	89	13.0	12.0			120
5/5	1340	33.60							0.0	77	10.0	4.7			120
6/3	1120	25.00		68					0.0	110	7.4	7.0			130
7/7	1370	15.0		67					0.0	180	8.6	19.0			220
8/3	1300	14.30		78					0.0	210	6.6	33.0			260
9/8	1200	15.24		67	27	21	30	0.1	0.0	210	7.4	25.0		0.0	240
					FEATHER RIVER NEAR OROVILLE						T20N,R4E,Sec.32				
5/3	1510		10400	51					0.0	41	4.1	6.1			66
6/3	1430	18.25	9500	56					0.0	31	3.3	0.8			47
7/6	1350	9.06	2980	65					0.0	62	5.3	1.6			82
8/4	1405	7.55	2100	68	10	4.1	5.2	0.5	0.0	59	2.1	1.4		0.0	68
9/7	1415	7.30	1760	66.5					0.0	70	4.1	2.1			68
					FEATHER RIVER AT NICOLAUS						T12N,R3E,Sec.12				
1/12	1300	29.30		46					0.0	47	9.9	5.0			71
2/3	1300	24.51	4120	43					0.0	66	8.2	2.3			86
3/3	1345	24.35	4380	48					0.0	56	4.5	2.3			66
4/7	1115	30.23	15100	48					0.0	45	7.4	2.3			65
5/5	1445	35.38	23100	54					0.0	39	5.3	1.6			75
6/3	1315	30.98	14000	57					0.0	32	3.7	1.6			55
7/7	1435	22.56	1880	66					0.0	57	4.5	3.1			80
8/3	1400	21.40	890	78					0.0	89	12.0	5.4			110
9/8	1350	20.37	240	80					0.0	88	8.6	4.9			102
					SACRAMENTO RIVER AT SACRAMENTO WEIR						T9N,R4E,Sec.29				
3/3	1330	7.90		51	12	7.1	8.6	0.5	0.0	75	4.9	7.0		0.0	113
4/2	0945	13.78		57	14	6.1	8.6	0.2	0.0	75	13.0	5.4		0.2	99
5/3	1145	25.16		55	8.7	4.5	6.0	0.1	0.0	52	7.0	4.7		0.7	86
6/2	0910	7.78		59	10	4.1	9.1	0.3	0.0	57	9.0	5.4		0.6	89
6/28	1310	10.45		74	16	8.1	16	0.7	0.0	86	15.0	14.0		0.9	130
8/3	1100	8.02		72	14	11.0	22	0.9	0.0	100	19.0	18.0		0.9	160
9/7	1410	7.82		70	14	14.0	20	1.4	0.0	120	18.0	17.0		0.0	140
10/1	1535	7.88		66	21	9.7	22	2.6	0.0	120	16.0	19.0		1.2	150
11/1	1100			56	12	8.1	12	1.6	0.0	83	9.5	6.4		1.1	110
12/6	0920	7.86		48	12	9.3	16	0.7	0.0	86	11.0	13.0		0.0	100
					AMERICAN RIVER AT FAIR OAKS BRIDGE						T9N,R6E,Sec.13				
1/2	1455			49	7.6	2.8	4.3	0.5	0.0	35	3.3	3.5		0.0	54
3/31	0925	405.0		50	8.1	2.9	3.3	0.2	0.0	34	7.0	1.6		0.0	56
6/28	1510	4.60		76	3.0	1.1	2.0	0.2	0.0	18	2.1	0.8		0.0	31
10/11	1615			63	5.5	2.2	3.2	1.4	0.0	26	4.1	3.5		0.4	45
					SACRAMENTO RIVER AT SACRAMENTO (M STREET BRIDGE)						T9N,R4E,Sec.35				
1/4	0820	8.00		50	12	5.7	11	0.7	0.0	71	11.0	7.8		0.5	110
2/4	1430	5.45		45	12	6.7	8.7	0.5	0.0	79	9.0	5.4		0.0	100
3/2	1325	4.50		54	12	6.3	10	0.7	0.0	75	7.4	7.0		0.3	98
4/2	1615	9.60		55	11	5.2	7.5	0.2	0.0	59	13.0	5.4		0.2	90
4/30	1450	20.10		50	7.7	3.2	4.6	0.1	0.0	45	4.9	2.3		0.3	69
6/2	0845	13.20		59	10	5.2	9.2	0.5	0.0	57	7.4	7.0		0.5	91
6/28	1400	6.40		74	16	7.5	15	0.3	0.0	80	14.0	13.0		0.0	120
8/3	1130	4.10		72	17	10	19	1.2	0.0	97	17.0	17.0		0.0	150
9/7	1310	4.00		70	14	13	20	1.5	0.0	110	17.0	18.0		0.0	140
10/1	1600	3.90		66	11	12	23	1.6	0.0	110	14.0	19.0		0.0	170
11/1	1420			55	13	7.6	10	0.9	0.0	86	9.5	7.8		0.9	97
12/6	0950	3.5		48	13	4.9	15	0.5	0.0	75	12.0	11.0		0.0	100
					SACRAMENTO RIVER AT HEAD OF SNODGRASS SLOUGH						T6N,R4E,Sec.22				
2/3	1540	5.60		46	12	6.9	10	0.5	0.0	76	7.8	7.8		2.6	110
5/3	1015	13.90		54	8.7	4.8	5.9	0.1	0.0	51	6.6	3.9		0.7	82
8/4	0915	6.00		72	15	9.9	23	5.5	0.0	96	22.0	19.0		2.1	150
11/1	1505	5.99		56	14	7.6	18	0.9	0.0	93	12.0	9.2		1.6	110
					SACRAMENTO RIVER AT WALNUT GROVE						T5N,R4E,Sec.35				
1/5	1005	3.54		49	13	4.6	7.4	1.5	0.0	69	6.2	4.7		2.8	94
2/3	0950	3.21		45	13	7.4	10	0.9	0.0	76	15.0	7.0		0.0	110
3/2	1115	3.05		51	12	5.9	9.7	0.7	0.0	67	7.8	6.2		0.0	92
3/31	1500	2.94		56	11	4.9	7.3	0.2	0.0	57	11.0	3.9		1.6	89
5/3	0955	6.58		53	8.7	4.4	5.9	0.1	0.0	50	6.6	4.7		0.7	79
6/2	1155	4.10		59	8.8	4.5	8.9	0.5	0.0	50	9.5	5.4		0.6	81
6/30	1000	2.20		72	11	6.0	11	0.2	0.0	65	6.2	10.0		0.0	110
8/4	0950	2.00		72	16	9.6	20	3.4	0.0	96	16.0	18.0		0.0	140
9/7	1130	2.12		71	14	12	21	2.6	0.0	110	16.0	18.0		0.0	150
10/8	1600	1.45		68	9.2	14	25	1.6	0.0	110	15.0	18.0		0.6	150
11/1	1530	3.23		57	17	7.6	12	1.7	0.0	92	9.5	8.5		0.9	110
12/3	0955	5.40		49	14	6.6	13	0.3	0.0	80	11.0	9.9		1.2	120

TABLE 147 (CONT'D)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS - 1948

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Draw Down or G. H.	Depth or c.f.s.	Temperature Degrees	Parts per Million										
					Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	B	NO_3	Total Solids
					CACHE CREEK NEAR CAPAY							T10N,R2W,Sec.14			
1/2	1140			50	60	49	110	0.9	0.0	330	38	210		1.2	660
3/31	1220			62	28	25	46	0.7	0.0	210	26	55		0.9	300
6/28	1215			84	48	34	46	1.2	0.0	290	25	61		0.0	360
11/1	1245			58	45	38	67	1.9	0.0	290	29	92	2.5	0.0	400
					PUTAH CREEK NEAR WINTERS							T8N,R2W,Sec.28			
1/2	1055	4.35		48	28	46	29	0.9	0.0	310	28	19		2.5	300
2/4	1325	4.98		44	24	43	14	1.0	0.0	280	26	14		0.0	270
3/2	1435	4.90		56	27	41	19	1.0	21.0	255	21	13		2.6	270
3/31	1135	6.88		60	16	30	11	0.3	0.0	190	19	7.0		0.7	200
5/3	1255	8.15		61	14	30	4.6	0.1	0.0	180	18	5.4		1.3	180
6/1	0945	6.15		64	23	45	14	0.5	0.0	280	21	10		0.0	280
6/28	1120	4.60		78	39	50	22	1.0	44.0	290	28	18		1.1	330
8/3	1000	4.10		72	35	56	33	0.9	0.0	370	35	25		1.1	390
9/7	1510	4.24		78	35	59	37	1.7	0.0	380	39	30		1.6	400
10/1	1145	4.29		66	32	60	24	2.2	0.0	380	38	26		0.0	350
12/7	1405	5.55		49	48	61	42	1.9	36.0	370	46	30		0.0	400
					YOLO BY-PASS AT LITTLE HOLLAND FERRY							T6N,R3E,Sec.33			
1/5	1055	7.00		51	12	6.4	10	1.2	0.0	68	14	7.8		0.9	100
3/31	1400	5.00		61	23	28	46	0.7	0.0	190	56	41		1.2	310
6/28	0940	6.40		71	11	7.4	17	0.5	0.0	80	15	13		0.7	130
10/1	1445			67	39	48	88	3.4	0.0	230	98	100		1.4	460
					SACRAMENTO RIVER AT JUNCTION POINT (NEAR RIO VISTA)							T4N,R3E,Sec.17			
1/7	1435			51	8.8	4.6	9.2	1.7	0.0	54	14	3.9		2.8	80
4/2	1315			56	11	7.3	10	0.3	0.0	64	16	7.0		1.4	110
6/30	1320			74	15	6.3	12	0.5	0.0	78	10	10		0.0	120
10/8	1255			68	16	11	24	2.4	0.0	110	16	20		0.9	150
					SACRAMENTO RIVER AT COLLINSVILLE							T3N,R1E,Sec.27			
1/7	1340	6.52		50	19	20	100	1.4	0.0	87	43	170		1.1	440
2/3	1130	5.52		48	17	19	98	0.3	28.0	45	21	160		0.0	410
3/2	0940	4.06		51	19	22	120	1.5	0.0	75	48	200		1.3	490
4/2	1220	4.90		54	9.3	5.8	8.1	0.2	0.0	53	15	7.0		0.9	100
4/30	0945	5.20		55	9.9	5.9	8.3	0.1	0.0	57	11	5.4		0.4	94
6/2	1400	4.74		61	9.6	5.6	12	0.5	9.3	43	12	9.3		0.0	91
6/30	1225	4.36		69	11	5.7	12	0.3	0.0	64	12	10		0.0	100
8/6	0600	5.94		68	45	92	730	36	0.0	78	200	1300		0.0	2700
9/7	0900	4.90		69	35	62	460	9.0	12.0	92	130	790		0.0	1700
10/8	1145	4.50		66	33	21	57	3.3	0.0	110	32	120		0.0	350
11/10	1150	5.15		54	14	10	26	0.9	0.0	85	17	30		0.9	140
12/7	1220	4.7		49	15	8.9	31	0.9	0.0	83	16	43		1.4	180
					SAN JOAQUIN RIVER BELOW FRIANT DAM							T11S,R21E,Sec.7			
1/20	1340	3.42	440	48.5					0.0	18	11	3.9			36
2/24	0930	3.51	500	45					0.0	18	2.5	4.7			35
3/31	1000	4.46	1098	48					0.0	30	4.9	5.4			54
4/19	0940	4.32	1000	49					0.0	21	3.3	4.7			51
5/21	1135	5.78	2338	53	3.0	1.1	4.6	0.2	0.0	18	4.1	1.6		0.0	39
6/18	1125	5.69	2329	54					0.0	36	1.2	1.5			47
7/16	1025	6.12	2802	56					0.0	13	2.5	3.1			28
8/20	1245	5.99	2659	60					0.0	9.5	0.8	2.1			19
9/17	1020	5.59	2225	59					0.0	14	2.5	2.8			28
10/15	1430	4.48	1164	60	3.8	0.7	5.2	0.0	0.0	17	3.7	3.9		0.9	36
11/19	1335	3.36	442	58											25
12/17	1635		438	54											27
					SAN JOAQUIN RIVER AT MENDOTA POOL							T13S,R15E,Sec.19			
1/19	0930	10.25		46					0.0	29	2.5	4.7			44
2/24	0925	10.04		41					0.0	25	2.9	5.4			43
4/1	1305	12.31		64					0.0	23	0.8	5.4			49
4/19	1125	12.92		65					0.0	24	0.8	4.7			55
5/24	0955	13.80		65					0.0	18	3.3	3.1			44
6/21	0930	13.92		70					0.0	14	1.2	1.5			32
7/26	1240	13.70		69					0.0	13	2.1	3.1			25
8/23	0930	13.84	422	68					0.0	11	2.9	2.1			29
9/20	0950	13.82	313						0.0	13	4.1	2.8			23
10/18	1130	13.71	201	65.5	4.0	1.1	4.3	0.0	0.0	19	2.1	4.6		0.7	19
11/22	0940	12.36	75.3	49											35
12/20	0950	11.12		46											32
					SAN JOAQUIN RIVER AT TEMPLE SLOUGH							T11S,R13E,Sec.12			
1/19	1310	0.50	0.4	50	13	3.6	12	0.5	0.0	62	6.6	10		0.2	98
2/24	1300	0.23	0.0	60					0.0	55	3.3	7.8			87
4/1	1120	0.60		63					0.0	45	2.1	10			78
4/19	1440	0.52	0.80	76					0.0	53	4.5	8.5			86
5/24	1515	0.62	2.8	78					0.0	18	3.3	3.9			53
6/21	1330	0.64	3.2	80					0.0	25	2.1	4.7			50
7/26	1135	0.71	5.0	77					0.0	24	2.1	4.7			38
8/23	1340	0.64	3.0	80					0.0	25	3.7	3.5			41
9/20	1410	0.60	2.0	80					0.0	25	0.8	4.2			28
10/18	1520	0.54	1.2	70.5					0.0	27	5.4	3.5			42
12/20	1325	0.41	.08	46											70

TABLE 147 (CONT'D)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS - 1948

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Draw Down or G. H.	Depth or c.f.s.	Temperature Degrees	Parts per Million										
					Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	B	NO_3	Total Solids
					SAN JOAQUIN RIVER AT HEAD OF CHAMBERLAIN SLOUGH						T9S,R13E,Sec.31				
1/20	1005	0.54	5	45					0.0	60	8.6	12			84
2/25	0955	0.30	0.34	49	23	4.1	8.3	0.5	0.0	81	5.3	12		0.0	115
6/22	0940	0.69	*0.5	70					0.0	62	3.7	12			99
9/21	1015	0.85	1.0	68					0.0	45	2.9	7.8			59
11/23	0830	0.335	1.45	47	29	5.8	15	0.7	0.0	110	4.5	20		0.0	140
12/21	0915	0.32	.98	44											150
					POSO DRAIN ABOVE BELMONT DRAIN CROSSING						T9S,R12E,Sec.31				
1/20	1115			45					36.0	25	120.0	130			450
2/25	1115		1.99	51	39	17	71	1.2	0.0	132	65	97		2.5	401
4/1	1355			71					0.0	150	49	66			330
4/20	1145		8.26	67					0.0	140	68	110			430
5/25	1125		61.0	68					0.0	97	81	36			280
6/22	1120		47.6	71					0.0	89	99	61			330
7/27	1130			75					0.0	72	63	42			230
8/24	1200		73	71					0.0	58	51	28			180
9/21	1155		53	68					0.0	100	54	40			250
10/19	1150		22	57	27	14	67	2.1	0.0	98	61	88		0.5	580
11/23	1000		6.28	46											660
12/21	1025		5.39	46											610
					SALT SLOUGH AT SAN LUIS RANCH						T9S,R11E,Sec.7				
1/20	1240	2.26	54.0	50					28.0	94	300	320			1100
2/25	1315	1.945	32.6	57					0.0	160	370	470			1500
4/1	1420	1.92	35	70					0.0	150	320	440			1300
4/20	1340	2.44	82.3	68					0.0	130	170	250			820
5/25	1330	2.90	135	73					0.0	95	93	90			390
6/22	1315	2.67	97.6	73	30	11	80	1.0	0.0	97	91	94		1.9	390
7/27	1225	2.56	*85	78					0.0	80	44	56			250
8/24	1355	3.02	128	75					0.0	70	34	31			180
9/21	1410	3.49	193	70					0.0	65	36	40			190
10/19	1520	2.69	95	61					0.0	81	97	130			440
12/21	1145	2.07	38.7	47	68	55	330	3.4	0.0	160	350	440		1.6	1400
					BEAR CREEK NEAR MOUTH						T8S,R11E,Sec.6				
1/20	1045	2.29	37	44					10.0	200	19	30			290
2/24	1015	1.74	8.64	45					0.0	180	200	85			500
4/1	0930	1.73	9	58					0.0	200	45	88			410
4/20	1150	2.14	15.1	63					16.0	150	20	33			230
5/25	1010	2.48	60	66					4.7	120	16	16			170
6/22	1105	2.36	54.0	66					0.0	160	12	16			210
7/27	0945	1.61	*13	70					0.0	170	31	55			300
8/24	1100	2.11	44	70	20	8.9	37	1.5	9.3	130	14	25		0.0	210
9/21	1015	2.54	77.5	67					0.0	120	9.9	11			160
10/19	1030	1.55	9.3	68					0.0	160	19	44			260
11/23	1010	1.32	2.84	47											600
12/21	1530	1.38	4.99	48	36	16	140	0.9	0.0	320	41	120		0.0	520
					SAN JOAQUIN RIVER AT FREMONT FORD						T7S,R9S,Sec.24				
1/20	1350	58.98	133	46					16.0	130	190	250			830
2/24	1240	58.43	59.7	49					0.0	190	360	580			1700
4/1	1010	58.55	88	64	76	51	250	4.1	0.0	150	240	400		1.8	1200
4/20	1430	58.91		66					0.0	130	160	240			780
5/25	1345	59.26	196	71					0.0	100	68	82			330
6/22	1410	59.41	214	70					0.0	120	63	78			350
7/27	1020	58.63	90	76					0.0	100	95	150			510
8/24	1330	59.07	155	72	23	11	62	5.2	0.0	120	41	71		1.2	300
9/21	1300	59.88	302	69					0.0	89	30	42			200
10/19	1255	58.86	114	63					0.0	110	110	170			540
11/23	1230	58.39	70	50											1100
12/21	1315	58.22	48.8	48	95	64	380	7.4	0.0	180	340	580		0.7	1600
					SAN JOAQUIN RIVER ABOVE MOUTH OF MERCED RIVER						T7S,R9E,Sec.3				
2/26	1125			52					0.0	210	520	720			2200
4/2	0955			60					0.0	170	390	540			1700
4/21	1130		*138	63	63	44	230	2.8	0.0	140	250	330		1.1	1100
5/26	1215			74					4.7	97	100	120			450
6/23	1055		314	71					0.0	84	48	58			250
7/28	1100		*110	74	46	25	170	4.3	0.0	120	170	230		0.7	740
8/25	1125		201	73					0.0	120	62	86			360
9/22	1120		344	68	17	10	43	1.6	0.0	92	31	50		0.0	220
10/20	1310		124	62					0.0	130	170	250			750
11/24	0905		81	48											1600
12/22	1135		58	45	120	91	500	11.0	0.0	190	520	750		0.0	2100

* Estimated

TABLE 147 (CONT'D)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS - 1948

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Draw Down or G. H.	Depth or c.f.s.	Temperature Degrees	Parts per Million										
					Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	B	NO_3	Total Solids
					MERCED RIVER AT STEVINSON DRAIN							T6S,R9E,Sec.36			
1/20	1510	1.51	146	53					100.0	1.3	6.6	15			140
2/24	1455	1.26	116	56					0.0	130	7.0	16			180
4/1	1050	1.52	148	62					0.0	130	7.0	15			150
4/20	1615	1.48	158	71	19	6.5	31	0.3	0.0	130	7.4	23		1.2	180
5/25	1500	2.13	262	73					0.0	82	8.2	12			120
6/22	1650	7.02	1377	63					0.0	30	4.1	2.3			52
7/27	1115	1.98	129	73	14	3.8	21	6.5	0.0	90	8.2	13		1.4	130
8/24	1515	2.04	176	74					0.0	88	7.8	21			140
9/21	1515	2.07	183	70	15	3.7	25	2.8	0.0	98	6.2	18		1.4	150
10/19	1430	1.77	140	64.5					0.0	130	9.1	17			180
11/23	1425	1.65	134	55											220
12/21	1030	1.70	147	51	18	5.8	31	2.8	0.0	120	6.2	17		2.3	170
					SAN JOAQUIN RIVER BELOW MOUTH OF MERCED RIVER (AT HILLS FERRY BRIDGE)								T7S,R9E,Sec.3		
2/26	1055	1.35	179	54					0.0	290	40	280			900
4/2	1015	1.62	251	60					0.0	150	180	250			970
4/21	1105	1.77	296	64					0.0	130	100	140			510
5/26	1150	2.22	468	72					0.0	91	63	75			310
6/23	1340	4.62	1505	70					0.0	39	9.5	12			82
7/28	1015	2.05	237	74	28	9.4	96	2.4	0.0	110	76	110		0.5	410
8/25	1105	2.28	339	72					0.0	100	31	47			230
9/22	1050	2.76	527	67					0.0	95	25	40			190
10/20	1500	2.13	264	64					0.0	130	60	110			410
11/24	1035	1.91	215	50											690
12/22	1105	1.87	205	46											700
					VIVIAN SLOUGH AT NORTH LINE OF SECTION 16, T6S,R9E							T6S,R9E,Sec. 16			
1/23	1205								0.0	230	28	210			600
2/26	1500			61					0.0	220	140	830			1900
3/29	1445			64	120	46	480	5.3	0.0	220	130	860		0.4	1900
4/26	1630			72					12.0	210	140	920			2100
5/20	1345			60					0.0	120	39	140			400
6/25	1530			81					0.0	140	16	73			290
7/26	1530			83					0.0	150	12	110			340
8/25	1400			76					0.0	130	9.9	71			270
9/24	1030			61					0.0	160	9.0	53			240
10/25	1215			62					0.0	200	30	270			700
11/23	1145														690
12/27	1100														700
					PATTERSON DRAIN AT SAN RAMON LAKE							T5S,R8E,Sec.27			
1/22	0915			46					0.0	290	970	140			2000
2/26	0930			50					0.0	260	740	200			1700
4/1	1220		*2	60	180	99	220	4.5	0.0	280	820	170		0.4	1800
4/22	1055			56					7.0	290	820	180			1800
5/27	1030			61					0.0	220	340	170			980
6/24	0930		*10	64					0.0	160	310	84			750
7/29	0920			65					0.0	210	210	130			700
8/26	1030			66					0.0	160	130	120			540
9/23	0940			61					0.0	180	190	100			620
10/21	1000			52					0.0	320	350	190			1300
11/24	0830			50											1800
12/22	0825			44											1800
					SAN JOAQUIN RIVER AT PATTERSON WATER COMPANY INTAKE							T5S,R8E,Sec.15			
1/22	0925	36.03		47	25	28	150	0.7	0.0	94	150	190			630
2/26	0905	34.90		52					0.0	170	240	330			1100
4/1	1200	35.75	*58	64					0.0	140	150	190			670
4/22	1110	35.58		62	47	25	140	1.2	0.0	150	140	180		1.4	650
5/27	1045	36.72	*92	70					0.0	110	58	86			340
6/24	0940	39.33	*138	70					0.0	56	14	22			120
7/29	0950	38.60		73	34	14	100	2.4	0.0	130	84	130		0.5	460
8/26	1045	36.70		74					0.0	140	66	98			380
9/23	1000	37.45		67	21	13	57	1.2	0.0	120	31	64		1.1	280
10/21	1015	36.44		62					0.0	160	110	170			590
11/24	0850	36.23		50											700
12/22	0805	36.10		45	52	29	180	1.7	0.0	170	160	240		2.1	780
					SAN JOAQUIN RIVER NEAR LAIRD SLOUGH BRIDGE							T4S,R7E,Sec.25			
1/22	1015	26.82		48					18.0	98	160	180			650
2/26	1050	25.93		55	67	44	206	2.2	0.0	193	232	272		3.2	1001
4/1	1330	26.44	*330	67					0.0	160	160	180			690
4/22	1330	26.32		62					0.0	170	160	170			680
5/25	1155	27.68		70					0.0	120	67	85			360
6/24	1100	30.69		72					0.0	34	16	19			130
7/29	1330	26.60		72					0.0	170	24	130			520
8/26	1145	27.15		74					0.0	140	76	98			400
9/23	1125	27.85		67					0.0	120	48	67			300
10/21	1155	26.95		62.5					0.0	170	130	170			610
11/24	1000	26.78		51	50	30	160	0.3	0.0	170	160	210		1.4	730
12/22	1100	26.62		46	55	33	180	2.4	0.0	170	180	230		2.1	790

* Estimated

TABLE 147 (CONT'D)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS
THEIR TRIBUTARIES AND THEIR DELTAS - 1948

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Draw Down or G. H.	Depth or c.f.s.	Temperature Degrees	Parts per Million										
					Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	B	NO_3	Total Solids
SAN JOAQUIN RIVER AT WEST STANISLAUS I. D. DIVERSION T4S,R7E,Sec.10															
1/22	0955	23.68		48	22	35	140	0.9	39.0	41	160	180		0.0	650
2/26	1020	22.95		54					0.0	190	230	270			990
4/1	1500	23.00	*150	68					0.0	170	150	180			710
4/22	1155	23.60		62					0.0	170	150	170			670
5/27	1120	26.02	*225	70	29	15	71	1.0	0.0	120	70	82		2.3	350
6/24	1030	28.20	*155	72					0.0	33	26	16			120
7/29	1040	23.08		74					0.0	150	100	140			500
8/26	1115	23.68		74					0.0	140	73	95			390
9/23	1050	24.07		67					0.0	130	50	70			310
10/21	1115	24.61		62					0.0	180	120	170			630
11/24	0925	24.67		51											730
12/22	1040	24.57		46	54	32	170	1.7	0.0	170	180	230		2.1	780
TUOLUMNE RIVER AT TUOLUMNE CITY T4S,R8E,Sec.7															
1/22	1235	28.75	698	51					0.0	55	8.2	61			170
2/26	1430	27.44	262	60					0.0	150	7.0	160			510
4/1	1400	27.49	287	68					0.0	140	7.4	160			420
4/22	1455	28.35	551	63					0.0	79	6.6	65			230
5/27	1435	31.92	2140	62					0.0	31	2.9	22			82
6/24	1335	32.93	2610	66					0.0	26	4.1	16			70
7/29	1620	28.00	317	80					0.0	150	9.9	150			400
8/26	1430	28.04	357	77	39	12	79	6.0	0.0	150	3.7	140		1.8	410
9/23	1445	27.94	325	70					0.0	140	8.2	150			440
10/21	1420	29.43	875	64	18	5.4	31	1.0	0.0	64	2.9	54		0.7	160
11/24	1305	29.36	860	54											180
12/22	1200	29.40	889	48	17	5.9	30	2.4	0.0	62	6.6	57		2.1	170
SAN JOAQUIN RIVER AT EL SOLYO PUMPS T3S,R7E,Sec.29															
1/23	1000	18.60		50	17	12	58	0.7	0.0	55	36	97		0.0	290
2/27	0920	17.15		55					0.0	170	92	240			740
4/1	1545	17.32		68					0.0	150	66	190			590
4/23	1035	18.55		60					0.0	120	33	110			360
5/28	1115	23.73	*20	61	11	4.4	19	0.5	0.0	41	13	27		0.0	110
6/25	1015	23.72	*40	67					0.0	32	8.2	1.6			83
7/30	1610	17.68		78					0.0	160	42	180			510
8/27	0945	18.11		74					0.0	160	41	140			460
9/24	1000	18.66		64					0.0	140	32	110			380
10/22	0920	19.38		62					0.0	100	45	100			320
11/30	1230	19.20		49	33	15	76	0.3	0.0	98	54	120		1.4	360
12/23	0820	19.33		46	31	15	70	1.7	0.0	94	49	110		1.8	350
STANISLAUS RIVER AT BRET HARTE PUMP T3S,R7E,Sec.9															
1/23	0920	22.20	355	48					18.0	50	9.5	3.1			92
2/27	0900	21.11		54					0.0	120	5.8	7.8			150
4/2	0915	20.90		61	22	9.5	16	0.3	0.0	130	7.8	9.3		2.5	170
4/23	0915	25.05		51					0.0	44	7.4	0.8			77
5/28	0955	30.32		55					0.0	23	2.9	0.8			41
6/25	0945	25.05		67					0.0	39	5.3	0.8			51
7/30	1300	22.03		74					0.0	120	10	8.5			150
8/27	0905	21.70		71					0.0	120	5.8	8.5			160
9/24	0935	21.55		64					0.0	130	6.2	16			170
10/22	0845	21.80		61					0.0	120	7.4	7.1			130
11/26	0855	21.80	224	52											140
12/23	0800	21.60	204	47	20	8.9	15	1.7	0.0	120	4.1	12		2.1	150
SAN JOAQUIN RIVER NEAR VERNALIS T3S,R6E,Sec.13															
1/23	1035	6.73	1357	50					0.0	88	31	77			270
2/27	1205	5.35	593	56					0.0	160	64	180			580
4/2	0950	5.30	590	62					0.0	150	50	160			530
4/23	1335	7.64	2028	56					0.0	70	14	29			150
5/28	1600	12.81	6966	58					0.0	31	6.2	10			66
6/25	1335	11.80	5671	69	7.6	3.8	11	0.3	0.0	37	6.2	14		0.0	72
7/30	1350	6.05	*680	77					0.0	150	33	140			440
8/27	1350	6.39	873	76					0.0	150	35	120			430
9/24	1305	6.67	1131	66					0.0	140	29	100			340
10/22	1030	7.30	1584	62					0.0	100	37	88			300
11/26	1150	7.23	1532	50											310
12/23	1115	7.11	1472	46	27	14	64	2.4	0.0	91	42	96		1.8	300
SAN JOAQUIN RIVER AT BANTA CARBONA I. D. DIVERSION T2S,R6E,Sec.34															
1/23	1025			50	21	13	53	0.5	0.0	71	53	86		0.0	280
2/27	1940		*100	55					0.0	160	74	210			640
4/2	1015	9.20	43	61					0.0	150	56	150			510
4/23	0950		100	55					0.0	63	14	30			140
5/28	1035		*120	58	7.0	2.8	9.7	0.3	0.0	30	7.9	12		0.0	74
6/25	1040		*160	64					0.0	39	7.4	1.5			98
7/30	1420			78					0.0	150	36	150			440
8/27	1020			74					0.0	160	34	120			400
9/24	1020			64					0.0	140	31	100			350
10/22	0940			62					0.0	110	1.2	92			300
11/26	0945			50											330
12/23	0900			44											340

* Estimated

TABLE 147 (CONT'D)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS - 1948

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Draw Down or G. H.	Depth or c.f.s.	Temperature Degrees	Parts per Million									
					Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	B	NO_3	Total Solids
					SAN JOAQUIN RIVER AT MOSSDALE BRIDGE						T2S,R6E,Sec.3				
1/6	1025	0.50		56	29	15	65	1.4	0.0	98	49	100		4.9	350
2/2	1445	3.32		50	27	14	59	1.2	0.0	90	42	93		1.4	310
3/1	1330	2.54		57	45	22	97	1.5	13.0	121	55	167		2.5	522
4/1	1415	3.10		68	40	19	80	1.4	0.0	140	45	130		1.9	440
4/29	1235	3.35		54	13	4.6	15	0.2	0.0	51	7.8	26		0.6	120
5/28	1205	5.90		61	6.8	2.8	8.9	0.5	0.0	32	7.0	11		0.4	70
7/1	1230	4.24		74	9.5	3.2	14	0.5	0.0	39	10	18		0.9	84
8/2	1250	1.70		78	39	18	83	10	7.0	140	35	140		1.1	460
9/8	1445	2.56		80	38	16	70	1.5	0.0	150	40	110		1.4	360
10/7	1540	2.0		71	16	12	57	3.8	0.0	110	28	76		0.6	280
12/6	1445	0.41		50	28	14	68	1.4	0.0	100	50	100		1.4	330
					SAN JOAQUIN RIVER AT BRANDT BRIDGE						T1S,R6E,Sec.9				
3/1	1350	5.30		56	50	26	126	4.5	0.0	159	82	204		2.5	630
5/28	1240	7.20		62	7.2	3.0	9.4	0.3	0.0	33	5.8	11		0.5	74
9/8	1500	5.50		79	35	16	76	2.6	0.0	160	34	110		1.2	380
12/3	1145	6.40		50	31	13	73	1.2	0.0	110	52	110		1.4	340
					SAN JOAQUIN RIVER AT GARWOOD BRIDGE						T1N,R6E,Sec.16				
1/6	0945	3.50		53	28	14	63	1.7	0.0	97	47	100		3.5	330
2/2	1515	3.90		49	20	15	64	0.7	0.0	80	31	110		0.0	310
3/1	1415	2.90		55	48	23	114	1.7	0.0	148	75	183		5.0	570
4/1	1500	3.80		62	40	19	88	1.0	0.0	140	54	140		1.9	470
4/29	1350	3.80		57	19	5.5	16	0.2	0.0	71	9.5	26		0.5	140
5/28	1415	3.70		62	12	3.1	10	0.3	0.0	50	5.8	12		0.7	91
7/1	1030	2.80		72	9.5	3.4	13	0.5	0.0	43	8.6	16		0.0	85
8/2	1205	2.20		78	40	17	63	6.9	21.0	130	29	93		1.1	330
9/8	1030	4.25		76	38	15	70	5.0	0.0	170	27	95		2.5	360
10/7	1630			72	29	12	36	5.0	0.0	110	25	65		0.8	250
11/5	1340			60	30	14	69	1.2	0.0	110	42	98		2.3	330
12/6	1125			49	28	13	71	0.5	0.0	100	47	100		1.6	330
					CALAVERAS RIVER NEAR STOCKTON						T2N,R6E,Sec.24				
3/1	1525	-0.22		63	26	9.1	10	0.7	0.0	113	18	7.8		0.8	138
5/28	1515	0.35		70	20	7.9	7.2	0.2	12.0	63	11	10		1.1	120
					STOCKTON SHIP CHANNEL AT BURNS CUT-OFF						T1N,R5E,Sec.1				
1/6	0910	3.41		50	32	16	67	2.2	0.0	97	50	110		8.4	370
2/2	1545	4.42		49	35	17	73	0.9	0.0	130	49	120		0.9	390
3/1	1440	3.50		56	40	20	89	1.4	0.0	121	63	140		5.0	454
4/1	1525	4.48		62	32	13	50	0.5	0.0	100	37	80		0.0	300
4/29	1325	4.40		60	25	11	37	0.3	0.0	94	22	60		2.3	240
5/28	1440	3.90		68	11	4.8	18	0.7	0.0	50	9.9	23		1.4	120
7/1	1015	3.52		74	17	3.9	14	0.5	0.0	59	9.9	19		0.9	110
8/2	1140	3.00		80	17	10	42	7.4	0.0	91	21	59		1.2	210
9/8	1015	5.30		76	34	16	71	2.6	0.0	160	26	110		0.0	350
10/7	1400	4.00		71	27	14	67	5.9	0.0	140	23	96		1.9	350
11/5	1430	3.73		63	31	12	72	2.6	0.0	120	37	110		2.1	330
12/6	1520	4.0		50	33	13	69	1.4	0.0	110	47	100		1.9	340
					MIDDLE RIVER AT SANTA FE RAILROAD						T1N,R4E,Sec.15				
3/1	1240			53	47	23	79	1.4	0.0	90	118	126		8.5	516
5/28	1350			65	9.4	3.9	15	0.7	0.0	41	11	19		0.0	100
9/8	1100			76	18	6.9	29	2.6	0.0	70	28	41		0.0	170
12/6	1200			49	35	17	74	0.5	0.0	89	85	110		1.8	400
					OLD RIVER AT CLIFTON COURT FERRY						T1S,R4E,Sec.21				
1/6	1100			52	28	14	60	1.4	0.0	93	42	93		4.0	330
2/2	1325			48	23	15	70	0.7	0.0	72	50	110		0.0	350
3/1	1145			53	51	25	114	1.7	0.0	134	102	182		4.3	595
4/1	1340			62	50	25	110	2.2	0.0	150	81	180		1.4	580
4/29	1145			59	15	7.2	22	0.3	0.0	62	15	34		0.5	150
5/28	1130			64	11	4.3	16	0.3	0.0	46	10	21		0.5	100
7/1	1120			74	9.5	3.8	16	0.7	0.0	37	14	21		0.0	100
9/8	1410			78	42	18	83	1.9	0.0	150	47	120		0.0	400
10/7	1430			72	25	12	55	3.4	0.0	110	29	76		0.4	270
11/5	1250			59	29	12	67	5.9	0.0	110	48	100		1.8	320
12/3	1310			50	31	13	73	1.4	0.0	100	55	100		1.8	360
					OLD RIVER AT VICTORIA						T1N,R4E,Sec.16				
3/1	1215	4.98		53	51	25	94	1.5	0.0	102	132	145		8.5	557
5/28	1320	4.80		65	13	5.6	23	0.7	0.0	57	20	29		0.0	130
9/8	1130	5.20		77	29	18	73	3.3	0.0	110	53	12		0.0	380
12/6	1325			49	31	14	72	0.9	0.0	100	61	110		1.8	350

TABLE 147 (CONT'D)

COMPLETE OR PARTIAL ANALYSIS OF THE WATERS OF THE SACRAMENTO, SAN JOAQUIN RIVERS, THEIR TRIBUTARIES AND THEIR DELTAS - 1948

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Sample	Time of Sample	Draw Down or G. H.	Depth or c.f.s.	Temperature Degrees	Parts per Million										
					Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	B	NO_3	Total Solids
ROCK SLOUGH AT CONTRA COSTA CANAL INTAKE T2N,R3E,Sec. 34															
1/6	1535	2.50		52	40	20	71	2.4	0.0	93	100	110		14.0	440
2/2	1245	2.55		47	53	26	85	2.2	0.0	97	150	130		11.0	560
3/1	1117	1.90		54	47	25	77	1.4	0.0	92	120	120		8.4	500
4/1	1310	2.15		64	48	24	82	1.4	0.0	100	120	130		4.4	530
4/29	1115	2.30		57	48	25	99	1.4	0.0	130	100	160		0.9	570
5/28	1100	2.21		65	23	7.4	27	0.9	0.0	82	24	34		1.4	180
6/29	1315	1.53		75	12	3.8	14	0.3	0.0	40	13	19		0.9	100
8/7	0915	3.35		74	15	7.0	24	0.9	0.0	57	24	30		0.0	130
9/8	1200	1.90		76	16	10	30	0.5	0.0	72	24	43		0.0	190
10/7	1345			69	26	15	66	2.9	0.0	110	45	93		0.0	350
11/5	1220	1.20		59	30	17	69	3.1	0.0	110	60	100		1.4	350
12/6	1330	1.41		49	34	13	71	0.5	0.0	110	60	100		1.4	360
MOKELUMNE RIVER AT WOODBRIDGE T4N,R6E,Sec.28															
2/4	0950	6.80		45	5.4	2.4	3.2	0.3	0.0	20	13	3.1		0.0	48
4/30	1310	11.64		50	4.6	1.1	3.1	0.1	0.0	20	3.7	2.3		0.5	43
8/2	1400	4.11		76	3.1	1.8	4.7	0.5	0.0	20	5.3	2.8		1.4	53
12/3	1315	6.06		49	14	1.1	2.7	0.0	0.0	45	4.1	2.8		0.0	56
COSUMNES RIVER AT McCONNELL STATION T6N,R6E,Sec. 20															
2/4	0910	29.90		41	8.4	5.5	3.9	0.3	0.0	51	9.5	2.3		0.0	95
4/30	1345	36.40		48	5.3	2.7	3.1	0.1	0.0	32	3.7	1.2		0.1	58
8/2	1450	29.90		82	10	4.8	6.4	0.9	0.0	58	11	2.1		0.0	95
11/10	1455	31.19		53	12	6.1	8.0	1.6	0.0	66	11	4.2		0.0	80
MOKELUMNE RIVER AT NEW HOPE BRIDGE T4N,R4E,Sec.15															
2/3	1005	2.08		44	7.5	4.4	7.0	0.5	0.0	39	14	5.4		0.0	75
5/3	0940	1.60		56	7.7	2.6	3.9	0.1	0.0	37	6.6	1.6		0.7	62
8/4	1020	1.95		73	11	5.5	13	1.2	0.0	49	9.9	2.9		0.0	96
11/8	1600	1.78		55	5.8	2.8	5.5	1.4	0.0	35	6.2	3.5		0.0	50
MOKELUMNE RIVER AT CENTRAL LANDING T5N,R4E,Sec.20															
1/7	1540			50	18	10	18	1.5	0.0	71	35	22		7.0	170
2/3	1255			49	21	12	28	0.5	0.0	79	44	40		4.4	200
3/2	1105			52	24	12	30	1.4	0.0	77	39	44		7.9	222
4/2	1400			55	12	6.4	10	0.3	0.0	57	17	12		1.8	91
4/30	1110			57	14	4.3	5.7	0.1	0.0	66	5.3	4.3		0.3	82
6/1	1400			65	8.4	4.2	7.9	0.3	0.0	45	7.0	7.0		0.7	82
6/30	1350			76	10	5.3	10	0.3	0.0	52	9.0	10		2.5	92
8/6	0720			72	15	6.4	22	0.9	0.0	80	18	22		0.5	130
9/7	1020			72	14	12	27	0.3	0.0	91	19	29		0.2	160
10/8	1405			72	11	13	31	1.7	0.0	100	19	31		0.0	180
11/10	1325			55	14	9.2	18	0.9	0.0	79	14	20		1.6	130
12/8	1500			49	14	6.4	16	0.0	0.0	76	16	14		1.2	120
SAN JOAQUIN RIVER NEAR WEBB POINT (OPPOSITE MOKELUMNE RIVER MOUTH) T3N,R4E,Sec.19															
1/6	1445			50	22	14	35	1.5	0.0	88	35	54		4.8	240
2/3	1300			49	21	11	29	0.7	0.0	73	33	45		0.0	210
3/2	1110			51	26	13	26	0.9	0.0	76	39	44		6.2	226
4/7	0709			57	15	9.2	20	0.3	0.0	64	26	30		1.8	160
4/30	1135			56	11	5.9	12	0.2	0.0	51	12	16		0.1	100
6/1	1415			65	10	5.0	13	0.5	0.0	45	12	16		0.7	100
6/29	1218			72	10	3.9	11	0.3	0.0	41	11	12		1.8	88
8/10	1115			74	15	8.1	26	6.0	0.0	78	20	32		0.7	110
9/7	1030			73	15	12	32	2.4	0.0	88	20	42		0.0	180
10/8	1510			71	20	14	26	3.4	0.0	110	21	38		0.0	200
11/12	1240			56	20	12	34	3.4	0.0	95	31	45		1.1	210
12/8	1440			49	19	10	30	0.5	0.0	91	25	40		1.4	190
SAN JOAQUIN RIVER AT ANTIOCH T2N,R2E,Sec.18															
1/6	1315	2.82		50	22	26	150	0.7	0.0	88	54	260		0.9	610
2/2	1045	2.80		48	18	16	73	0.5	0.0	71	35	120		0.0	340
3/1	0917	1.98		51	24	18	78	0.9	0.0	76	43	130		3.5	400
4/1	1110	2.12		56	17	9.6	24	0.3	0.0	66	29	33		2.8	170
4/29	0915	2.47		54	12	6.9	15	0.2	0.0	53	18	20		0.9	120
5/28	0900	1.98		61	12	6.3	16	0.7	0.0	55	15	20		0.5	120
6/29	1118	1.49		69	10	4.4	12	0.2	0.0	49	11	14		0.0	93
8/7	0720	2.65		68	27	69	500	26.0	0.0	78	140	910		0.0	1800
9/4	1810	2.38		68	45	50	350	9.5	0.0	94	100	610		0.0	1300
10/7	1120	1.00		66	39	22	63	3.6	0.0	110	34	140		0.0	410
11/5	1030	1.21		59	19	15	64	0.9	0.0	98	28	91		0.0	280
12/6	1135	1.52		50	19	17	92	1.7	0.0	86	38	140		1.2	380
KAWEAH RIVER AT McKAY POINT EAST QUARTER CORNER T18S,R27E,Sec.4															
1/15	0910			48	18	3.2	11	1.9	0.0	76	9.5	8.5		1.8	100
2/17	0920			49	20	4.0	7.8	0.5	0.0	79	6.6	7.6		0.0	110
3/30	0945			52.5									0.02		
3/30	0945			52.5	12	2.0	6.8	0.3	0.0	46	4.9	3.9		0.4	73
4/28	1615	0.96	737	57	6.3	0.9	3.3	0.2	0.0	26	2.1	0.8		0.4	46
6/15	1320			60	3.6	0.6	1.6	0.2	0.0	17	1.6	0.7		0.0	35
8/18	1329			79.5	20	3.8	9.2	0.9	0.0	77	6.6	9.9		2.1	110
TULE RIVER AT NORTH QUARTER CORNER (WORTH BRIDGE) T22S,R28E,Sec.3															
1/15	1045	1.75		49	52	11	26	0.9	0.0	240	19	14		0.5	270
2/17	1100	1.27		51	50	11	23	0.9	0.0	230	16	13		0.0	250
3/30	1130			56									0.1		
3/30	1130			56	28	5.1	14	0.3	0.0	120	9.0	7.8		0.4	160
4/28	1430	3.65		59	19	2.9	7.8	0.2	0.0	84	2.9	3.1		0.3	110
6/15	1515			72	25	4.0	15	0.3	4.7	110	5.3	4.7		0.0	140

Department of Public Works
Division of Water Resources
Sacramento-San Joaquin Water Supervision

TABLE 148

1948 - ACREAGES OF IRRIGATED CROPS AND NONIRRIGATED AREAS
SACRAMENTO-SAN JOAQUIN DELTA

Island or tract	Acreage of irrigated crops and water consuming areas*																				Acreage of nonirrigated areas			++ Total acreage
	Irrigated crop acreage																							
	Alfalfa	Asparagus	Beans	Beets	Celery	Corn	Fruit	Grain and hay	Onions	Pasture	Potatoes	Seed	Tomatoes	Rice	Truck and vegetables	Total irrigated crop acreage	Idle lands in weeds below elev. 5.0 USGS	** Bare lands below elev. 5.0 USGS	Aquatic growths and Interior water surfaces	*+ Total water consuming acreage	Grain and hay above elev. 5.0 USGS	Pasture, idle and bare lands above elev. 5.0 USGS	+ Levees	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
Andrus Island-Reclamation Districts Nos. 317, 407, 556	537	212		300		1270	317	3065		69			1237		128	a7135	149	50	123	a7457			461	7823
Bacon Island-Reclamation District No. 2028		2270		208	770	530		370		25	1147					5320			200	5520			105	5625
Baird Ranch-Portion of Reclamation District No. 800		2525						360						25		2910	40		18	2968			32	3000
Bethel Tract-Reclamation District No. 1619		200				290		10		829						1329	1852		139	3320			84	3404
Bigger and Inman Ranch (Fox and Tuttle)		200						160		610						970				970			30	1000
Bishop Tract-Reclamation District No. 2042		725		150		210		260		706						2051			238	2289			61	2350
Bishop Highlands										370						370		5	259	634		359	7	1000
Black Point Spoil Area																						575		575
Boggs Tract-Reclamation District No. 404	323						5	520					131		50	1029	437	299	368	2133	150	300	71	2654
Bouldin Island-Reclamation District No. 756		2600		500	350	375		1445				23	250		23	b5566	183	60	84	b5893			136	6006
Brack Tract-Reclamation District No. 2033		520		526	88	130		1928		846	160					4198	227	50	104	4579			79	4658
Bradford Island-Reclamation District No. 2059		20				885		468		609						1982			20	2002			57	2059
Brannan Island-Reclamation District No. 2067	365					1406	179	4450		36					229	6665	61		220	6946			317	7263
Byron Tract-Portion of Reclamation District No. 800		1200				700		854		818						3572				3572			88	3660
Canal Ranch				382		422		2084		100		20	126			3134			147	3281			70	3351
Clifton Court Tract-Reclamation District No. 802		2648			25	125		410								3208	85			3293			69	3362
Collinsville Manor																					350	83		433
Coney Island		975														975			45	1020			40	1060
Contente	12							241								253	100			353		51	30	434
Deadhorse Island								95					100			195			6	201			20	221
Donlan Island-Reclamation District No. 274																			210	210			20	230
Drexler Tract		1800						1030		40			130			3000	110		18	3128			74	3202
Edinger Johnson Rec. Dist.-Includes Rec. Dist. No. 745	25		21	145		45	103	242		40			60			681			50	731	70	20	65	886
Ehrhardt Club								525								525	59		30	614			17	631
Elmwood Tract		390						335								725	55		5	785			32	817
Empire Tract		2872				18		588					85			3563			36	3599			79	3678
Fabian Tract	1764	3240	109	100		463		265		50			760			6751	173		136	7060			136	7196
Farmers Developed Land Co.(Portions of Rec. Dists.Nos. 2058,2062)	2742	4296	237			308	4	199		708			1122		385	10001			182	10183			107	10290
Fay Island								96								96				96			13	109
Fern Island																	100			100			23	123
Fink and Winler Ranch-Portion of Reclamation District No. 2062	12	125						200				46	115		45	543	100	22	36	701			59	760
Fox Ranch								175								175			3	178			5	183
Franks Tract										317						317			3001	3318			107	3425
Grand Island-Reclamation District No. 3	2840	392	457	658		1998	1060	5989		49			2498			15941	100	107	37	16185		55	774	17014
Hastings Tract-Reclamation District No. 2060		487		641		21		1989		997			399			4534	1921		374	6829			610	7439
Headreach Island																						110	26	136
Herring Tract-Portion of Reclamation District No. 2030	Considered as portion of McDonald Island, therefore, included in McDonald Island Tabulation.																							
Hog Island																						77	24	101
Holland By-Pass Co.			215	85		448		1617					132			2497	263		60	2820			40	2860
Holland Tract-Reclamation District No. 2025	519	1526				50		843	30	888	64		168			4088			102	4190			85	4275
Honker Lake Tract		446		140		110		434		60		145	40			1375	425		18	1818			72	1890
Horseshoe Island		120														120				120	245	270	5	640
Hotchkiss Tract-Includes Reclamation District No. 799	85	125				195	35	1825		880			110			3255			63	3318		303	79	3700
Ida Island								40								40	10			50				50
Jersey Island-Reclamation District No. 830						29		1385		791		1078				3283			158	3441			117	3558
Jones Tract (Upper)-Reclamation District No. 2039		2819				640		2325								5784	315	55	92	6246			112	6358
Jones Tract (Lower)-Reclamation District No. 2038		75		300	402	225		4542								5544	55	60	87	5746			109	5855
Kimball Island																	65			65				65
King Island-Reclamation District No. 2044		1611			366			575			516					3068	41		76	3185			75	3260
Liberty Reclamation District		141	318	800		1877		520	67	210			1060		668	c5661	789		185	c6635			450	6750
Mandeville Island-Reclamation District No. 2027		1740	60	160	60			1000	40		750	242			30	4082	711	400	140	5333			135	5468
March Garden and Brookside Tract	47						13	255	39						43	397	52	79	30	558			12	570
McCormack-Williamson Tract				222		394		726					160			1502			9	1511			65	1576
McDonald Island-Portion of Reclamation District No. 2030		380		54	250	366		514	102	216	2019				323	4224	880	482	333	5919			209	6128
Medford Island-Reclamation District No. 2041		1100														1100			56	1156			47	1203
Merritt Island-Reclamation District No. 150	323	188	85	1314		115	135	1767				57	712		30	d4731	70		35	d4836			200	4986
Mildred Island-Reclamation District No. 2021		64						500			206					770	395		30	1195			52	1247
Moreing Ranch-Portions of Reclamation Districts Nos. 2058, 2062		360														360			43	403	1015		52	1470
Orwood Highlands		620				25	30	70		320						1065	21		49	1135				1135
Orwood Tract-Reclamation District No. 2024	140	1070		30	70	100		145	85	70	485					2195	57		80	2332			65	2397
Palm Tract-Reclamation District No. 2036		1300						450			400					2150	354			2504			60	2564
Pierson District No. 551	2135	152	25	1878		169	1100	1478		55					1280	8272	131	42	115	8560			410	8970
Pocket, The (Roberts Island)	50	100		100		15		160					85			510			10	520			33	553
Porter Estate																			2200	2200				2200
Prospect Island-Reclamation District No. 1667						1813		125					153		120	2211			101	2312			193	2505
Quimby Island								720								720	23		25	768			54	822
Randall Island-Reclamation District No. 755	52						351									403				403			14	417
Rhode Island																	80		5	85			5	90
Rio Blanco Tract		412								200						612				612			63	675
Rindge Tract-Reclamation District No. 2037		1611		934	215			3290					40		550	6640				6640			200	6840
Roberts Island (Lower Division)-Reclamation District No. 684		6228				1052	174	2151		256		65	110			10036			17	10053			142	10195
Roberts Island (Middle Division)-Reclamation District No. 524	643	4471	100	315		345		2942		921		60	828		65	10690			196	10886			114	11000
Roberts Island (Upper Division)-Reclamation District No. 544	2294	260		469		367	35	3376		162			220			7183	82		80	7345			130	7475
Rough and Ready Island-Reclamation District No. 403	U. S. Navy Annex																							
Ryer Island-Reclamation District No. 501	1440	192	769	1141		3198	45	3696					349		265	11095	258	217	320	11890			320	12210
Sargent-Barnhart Tract	30	461				317		20						260		1088			65	1153			25	1178
Sherman Island-Reclamation District No. 341	90	570		100		2115		6423		150			59			9507			117	9624		313	368	10305
Shima Tract		1315								400						1715			60	1775			95	1870
Smith Tract		225				205		1049		300				195		1974				1974			51	2025
Spud Island																						80	23	103
State Farm	180					170	95	331		100					100	976				976		50		1026
Staten Island		1660		127	470	2691		2730					635			8313	421		180	8914			346	9260
Stockton Acres-Reclamation District No. 828																	630	5		635			40	675
Sutter Island-Reclamation District No. 349	123	403	62	192		307	547	687					49			2370	68		84	2522			192	2714
Terminous Tract-Reclamation District No. 548		1655	15	492	1115	1181		1732		3486	635		5		50	10366				10366			142	10508
Tule Island																						46	18	64
Twitchell Island-Reclamation District No. 1601		220		72		424		2290		360						3366			65	3431			200	3631
Tyler Island-Reclamation Districts Nos. 136,364,532,563,807	205			141		1610	238	5727		90		72	521			8604			81	8685			262	8947
Union Island-Reclamation Districts Nos. 1 and 2	2155	12911	270	60		1224	20	7809		355			510		39	e25353	150		95	e25598			284	25732
Veale Tract-Reclamation District No. 2065	110	929				70		100								1209	10		103	1322			41	1363
Venice Island-Reclamation District No. 2023		30				507		1625			909					3071	288		140	3499		90	247	3836
Victoria Island-Reclamation District No. 2040		6130				100		850								7080			127	7207			103	7310
Webb Tract-Reclamation District No. 2026				774		153		2949		538		303				4717	385		320	5422			100	5522
West Island																	158			158			22	180
Widdow Island								55								55				55			10	65
Woodward Island		285		65	40	445		450			220	260				1765	278	93	43	2179			66	2245
Wright Tract		371				14		645					170			1200		61	13	1274		25	59	1358
Reclamation District No. 50																			2590	2590		510	100	3200
Reclamation District No. 307-Lisbon	816	196	155	1874		63	43	1817					266		73	5303	192	220	104	5819		85	182	6086
Reclamation District No. 348	1057	2182	15	98		356	61	3051		1487			353			8660	278	50	80	9068		284	126	9478
Reclamation District No. 369-Locke							85	100		291						476			29	505		34	15	554
Reclamation District No. 535	330	43	85	290			5			181			157		135	1226	1590	1130	195	4141			54	4195
Reclamation District No. 536-Egbert	385	260		870		911		3651		170			200			6447	256		34	6737		2054	142	8933
Reclamation District No. 554-Walnut Grove	160						50	240								450	210	9	8	677			22	699
Reclamation District No. 673-Pocket	434	198	224	699		257	8	599		232			71		95	2817			70	2887		34	178	3099
Reclamation District No. 744	2	100		559		90	186	469								1406	97		45	1548			70	1618
Reclamation District No. 746-Bonnie Brae							90	15								105			4	109		15	11	135
Reclamation District No. 765-Glide	430	130		260				335								1155			45	1200			122	1322
Reclamation District No. 813	658			480		10	125	885		20			35			2213	164	20	84	2481			70	2551
Reclamation District No. 824-Freeport				80		30		295								405	17		6	428			35	463
Reclamation District No. 900-West Sacramento	3220	60		1210			f107					100		240	450	5387			420	5807	1621	3562	210	11200
Reclamation District No. 999	1459	1153	285	8677		477	30	3900	548			398	4199		2356	g23482	175		777	g24434		277	1600	26136
Reclamation District No. 1002	430		25	240		40	190	2080		3300						6305	100			6405		296	160	6861
Reclamation District No. 1614-Smith	112						20	150							355	637		820	10	1467		260	45	1772
Totals	28739	86295	h3357	28912	4221	i34671	5486	118883	911	23708	7511	2869	18410	720	j7887	k372580	16296	4336	16798	k410010	3451	10218	13483	436334

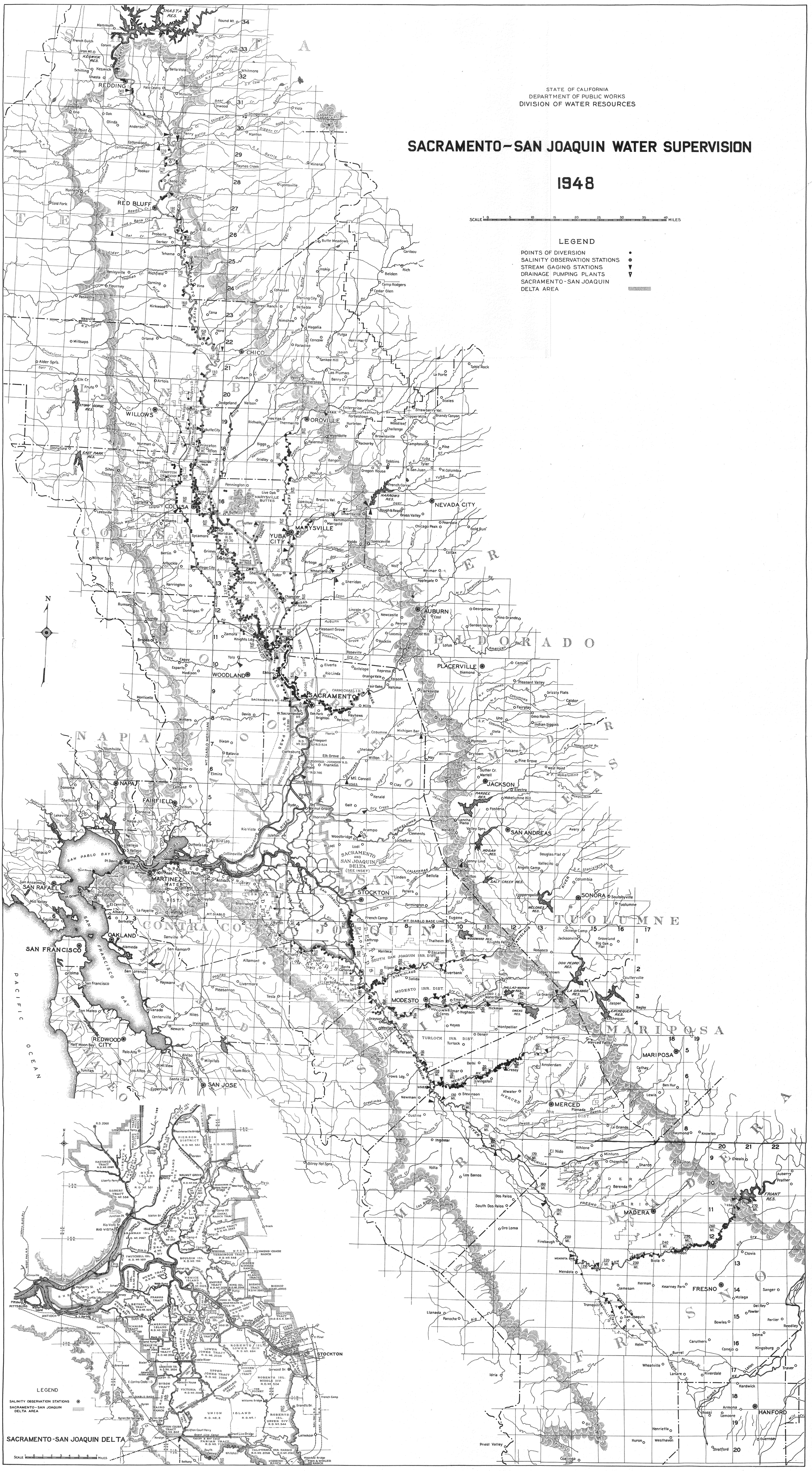
* All acreages below elevation 5.0 U.S.G.S. datum are considered as irrigated or consuming water.
** Includes roads, camp areas, interior levees, etc.
\+ The total levee area includes water consuming acreages estimated at 4,400 acres willows and 4,600 acres weeds which should be included in column 21. No survey was made to segregate these items to the individual islands or tracts.
++ These figures represent gross areas, i.e., entire area inside surrounding water channels.
a Includes 95 acres double cropped to corn.
b Includes 23 acres double cropped to carrots.
c Includes 335 acres double cropped to corn.
d Includes 50 acres double cropped to beans.
e Includes 150 acres double cropped to beans.
f Includes 22 acres of hops.
g Includes 175 acres double cropped to beans.
h Includes 200 acres of double crop.
i Includes 605 acres of double crop.
j Includes 23 acres of double crop.
k Includes 828 acres of double crop.

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF WATER RESOURCES

SACRAMENTO–SAN JOAQUIN WATER SUPERVISION

1948

SCALE 1 0 5 10 15 20 25 30 35 40 MILES

LEGEND

- POINTS OF DIVERSION
- SALINITY OBSERVATION STATIONS
- STREAM GAGING STATIONS
- DRAINAGE PUMPING PLANTS
- SACRAMENTO-SAN JOAQUIN DELTA AREA