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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

Bull. 23-46

REPORT OF

SACRAMENTO-SAN JOAQUIN
WATER SUPERVISION

FOR

1946

JUNE, 1947

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LIST OF PLATES

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 have made available a large amount of stream flow data for both the Sacramento and San Joaquin valleys.

The Modesto, Oakdale, and Turlock irrigation districts and the United States Bureau of Reclamation have assisted in observing and maintaining recording gates 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 1946.

ADVISORY COMMITTEE

PERMANENT COMMITTEE OF THE SACRAMENTO-SAN JOAQUIN RIVER PROBLEMS CONFERENCE

This Committe, 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
Wm. N. L. Hutchinson, Walnut Grove
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

T. B. Waddell — Principal Hydraulic Engineer

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

Irvin M. Ingerson
Senior Hydraulic Engineer

Field and Office Personnel

In charge of diversion measurements and computations:

Arthur M. Baker — Assistant Hydraulic Engineer

In charge of stream flow measurements and computations:

Carl A. Werner — Associate Hydraulic Engineer

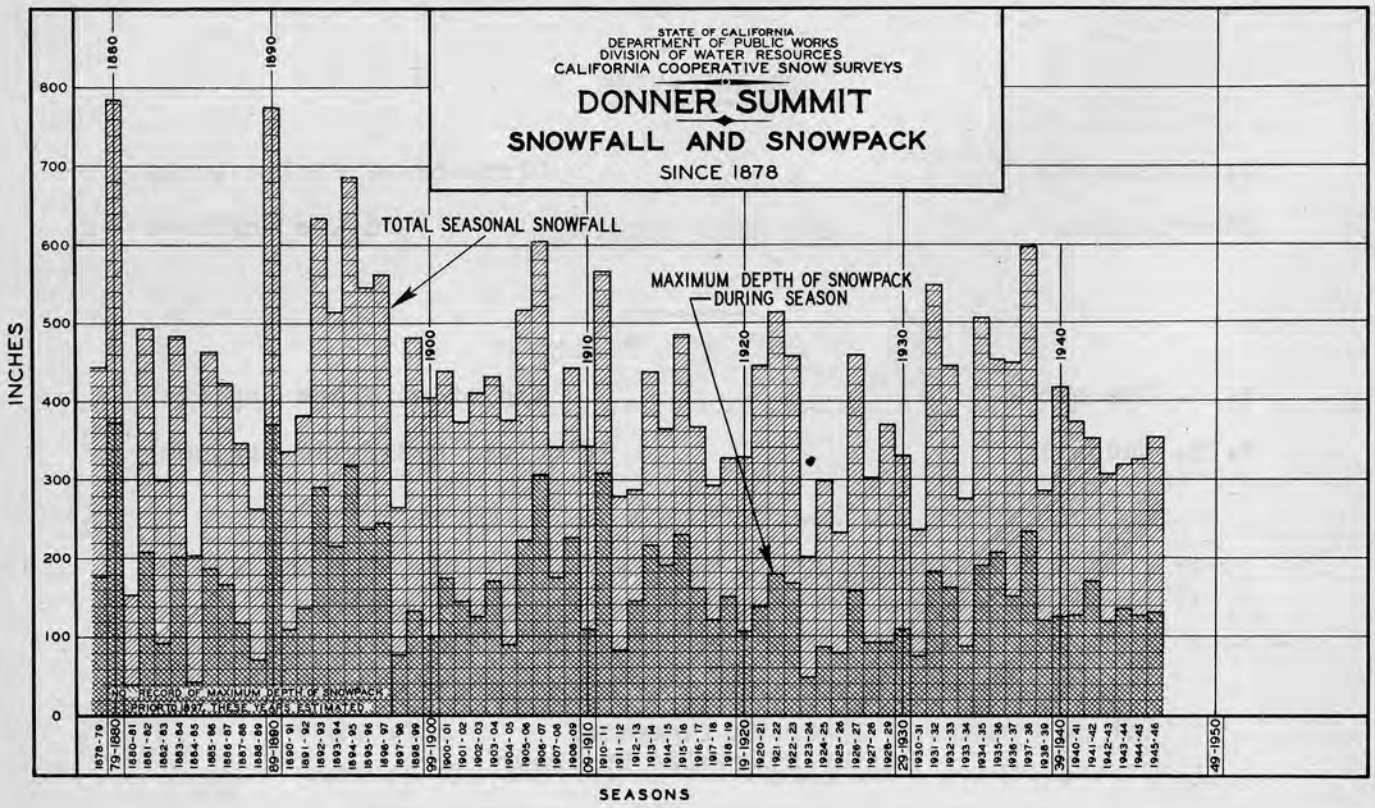
Field and office engineers:

Earl D. Stafford	Associate Hydraulic Engineer
Donald S. Hays	Assistant Hydraulic Engineer
C. H. Epperson	Sub-Foreman, F.C.C.& M.
C. T. Jeffryes	Delineator

Office Assistant:

Marie Morris — Senior Clerk

G. T. Gunston
Administrative Assistant



The intensity of the winters of today as compared with the winters of long ago is depicted in this bar diagram. The height of each bar indicates the total seasonal SNOWFALL on Donner Summit - an accumulative total of the amounts of new snow recorded daily. The lower crosshatched portion of each bar indicates the season's maximum SNOWPACK - the greatest depth of snow on the ground measured during the winter. The maximum SNOWPACK on the Donner Summit in 1946 was 81 per cent of the average for the period shown in the diagram.

REPORT OF
SACRAMENTO-SAN JOAQUIN WATER SUPERVISION
FOR 1946

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, return water flows 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 Fairoaks, 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 "upland" 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 1946 make 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 a return water supply, or both;

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

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

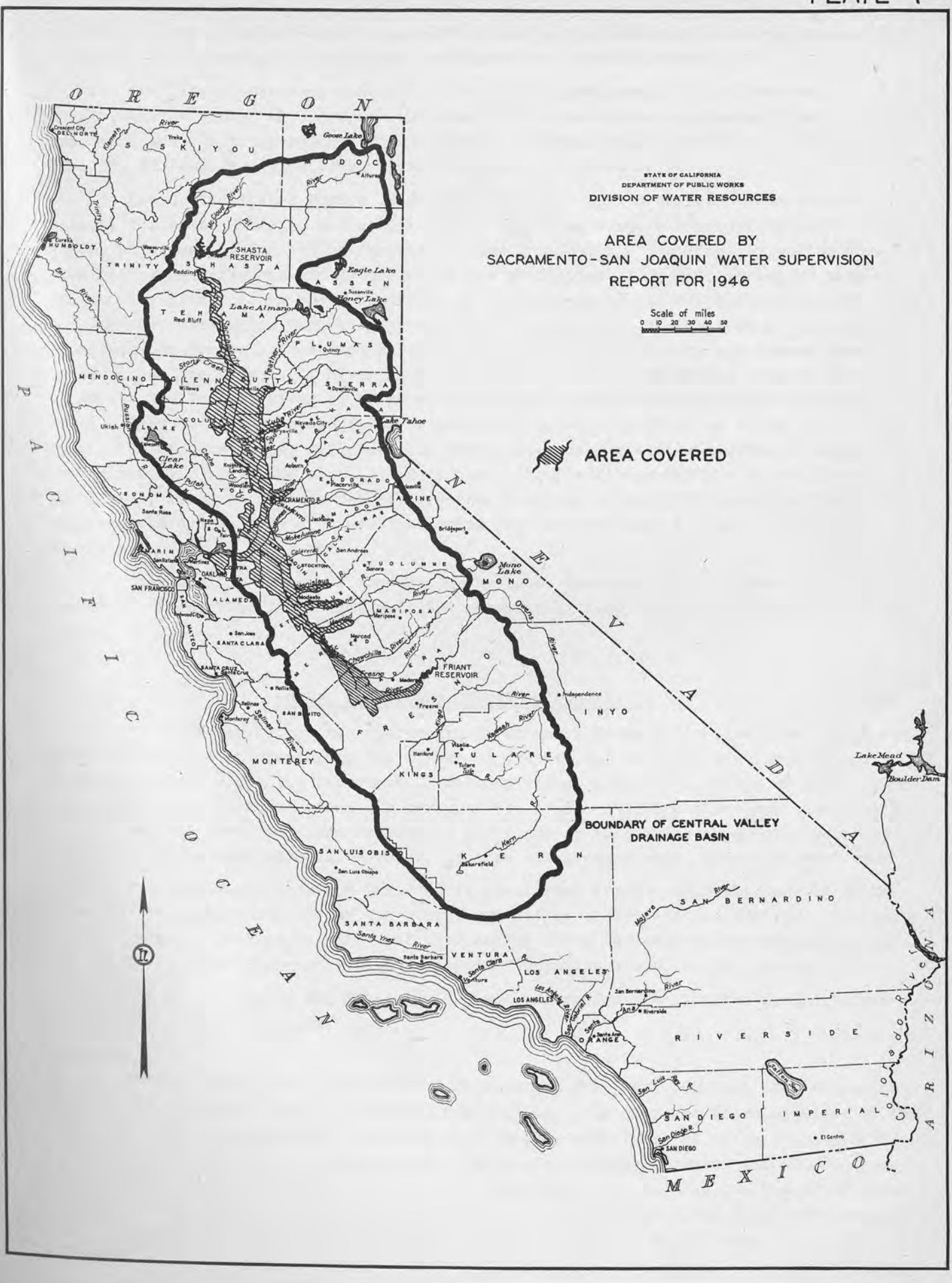
The office work comprises mainly the assembly, computation and analysis of hydrographic and other data collected during the field season for presentation in the annual report of Water Supervision. This report contains the basic records of water supply available to and the use of water by each user of water from the stream covered in the area. The computation of stream flow and return water involves the conversion of the daily records to figures showing the daily flows in second feet and monthly run-offs 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, its electric power consumption, and its efficiency. The results of the determinations are then compiled in comparison and summary tabulations 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.

Hydrographic Activities of Cooperating Agencies

The United States Geologic 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. The work is done by one of its engineers who works out of Sacramento, utilizing the office facilities of the Division of Water Resources. 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

PLATE 1


STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF WATER RESOURCES
AREA COVERED BY
SACRAMENTO - SAN JOAQUIN WATER SUPERVISION
REPORT FOR 1946
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
Lake Tahoe
Mono Lake
Lake Mead
Boulder Dam
Eagle Lake
Honey Lake
Lake Almanor
Clear Lake
Goose Lake
Salton Sea
SISKIYOU
MODOC
TRINITY
SHASTA
LASSEN
TEHAMA
PLUMAS
MENDOCINO
GLENN
BUTTE
SIERRA
LAKE
COLUSA
YUBA
NEVADA
PLACER
EL DORADO
ALPINE
SONOMA
NAPA
SOLANO
YOLO
SACRAMENTO
AMADOR
CALAVERAS
TUOLUMNE
MARIN
SAN FRANCISCO
CONTRA COSTA
ALAMEDA
STANISLAUS
MARIPOSA
MONO
SAN JOAQUIN
SAN MATEO
SANTA CLARA
MERCED
FRESNO
INYO
SANTA CRUZ
SAN BENITO
MONTEREY
KINGS
TULARE
KERN
SAN LUIS OBISPO
SANTA BARBARA
VENTURA
LOS ANGELES
SAN BERNARDINO
RIVERSIDE
ORANGE
SAN DIEGO
IMPERIAL
Crescent City
DEL NORTE
HUMBOLDT
Eureka
Redding
Red Bluff
Willows
Quincy
Susanville
Downieville
Nevada City
Auburn
Placerville
Jackson
Bridgeport
Ukiah
Santa Rosa
Napa
Oakland
Berkeley
San Rafael
Martinez
Stockton
Modesto
Merced
Mariposa
San Jose
Santa Cruz
Hollister
Salinas
Monterey
San Luis Obispo
Hanford
Visalia
Tulare
Bakersfield
Fresno
Madera
Independence
Santa Barbara
Ventura
Los Angeles
Santa Ana
Riverside
San Bernardino
San Diego
El Centro
Sacramento R.
Feather River
Yuba River
American R.
Cosumnes R.
Mokelumne R.
Calaveras R.
Stanislaus R.
Tuolumne R.
Merced R.
Chowchilla River
Fresno River
San Joaquin R.
Kings River
Kaweah River
Tule R.
Kern River
Owens River
Mojave River
Santa Ana River
San Gabriel R.
San Luis Rey R.
San Diego R.
Colorado River
Trinity River
Klamath River
Pit River
Mc Cloud River
Eel River
Russian River
Cache Creek
Putah Creek
Stony Creek
Los Angeles R.
Santa Clara River
Santa Ynez River
Salinas River
Arroyo Seco
Coyote Creek
San Andreas
Woodbridge
Oroville
Folsom
Knights Landing
Orland
Chico
Paradise
Susanville
Alturas
Weaverville
Lorella
Mt. Shasta
Lassen Peak
Mt. Diablo
Mt. Tamalpais
Mt. San Jacinto
Mt. Whitney
Death Valley
Owens Lake
Searles Lake
Mojave
Barstow
Victorville
San Bernardino
Riverside
Santa Ana
Pomona
Long Beach
Los Angeles
Hollywood
Santa Monica
Ventura
Santa Barbara
Lompoc
Santa Maria
San Luis Obispo
Paso Robles
Coalinga
Avenal
Taft
Maricopa
Wasco
Delano
Porterville
Lindsay
Exeter
Orosi
Reedley
Sanger
Selma
Kingsburg
Dinuba
Visalia
Tulare
Hanford
Lemoore
Corcoran
Kettleman City
Lemoore Naval Air Station
Los Banos
Gustine
Newman
Patterson
Crows Landing
Modesto
Turlock
Ceres
Riverbank
Oakdale
Escalon
Manteca
Tracy
Livermore
Pleasanton
Dublin
San Ramon
Walnut Creek
Concord
Martinez
Pittsburg
Antioch
Brentwood
Oakley
Byron
Discovery Bay
Rio Vista
Isleton
Courtland
Walnut Grove
Hood
Clarksburg
Elk Grove
Galt
Lodi
Stockton
Lathrop
Ripon
Manteca
Tracy
Livermore
Pleasanton
Dublin
San Ramon
Walnut Creek
Concord
Martinez
Pittsburg
Antioch
Brentwood
Oakley
Byron
Discovery Bay
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Galt
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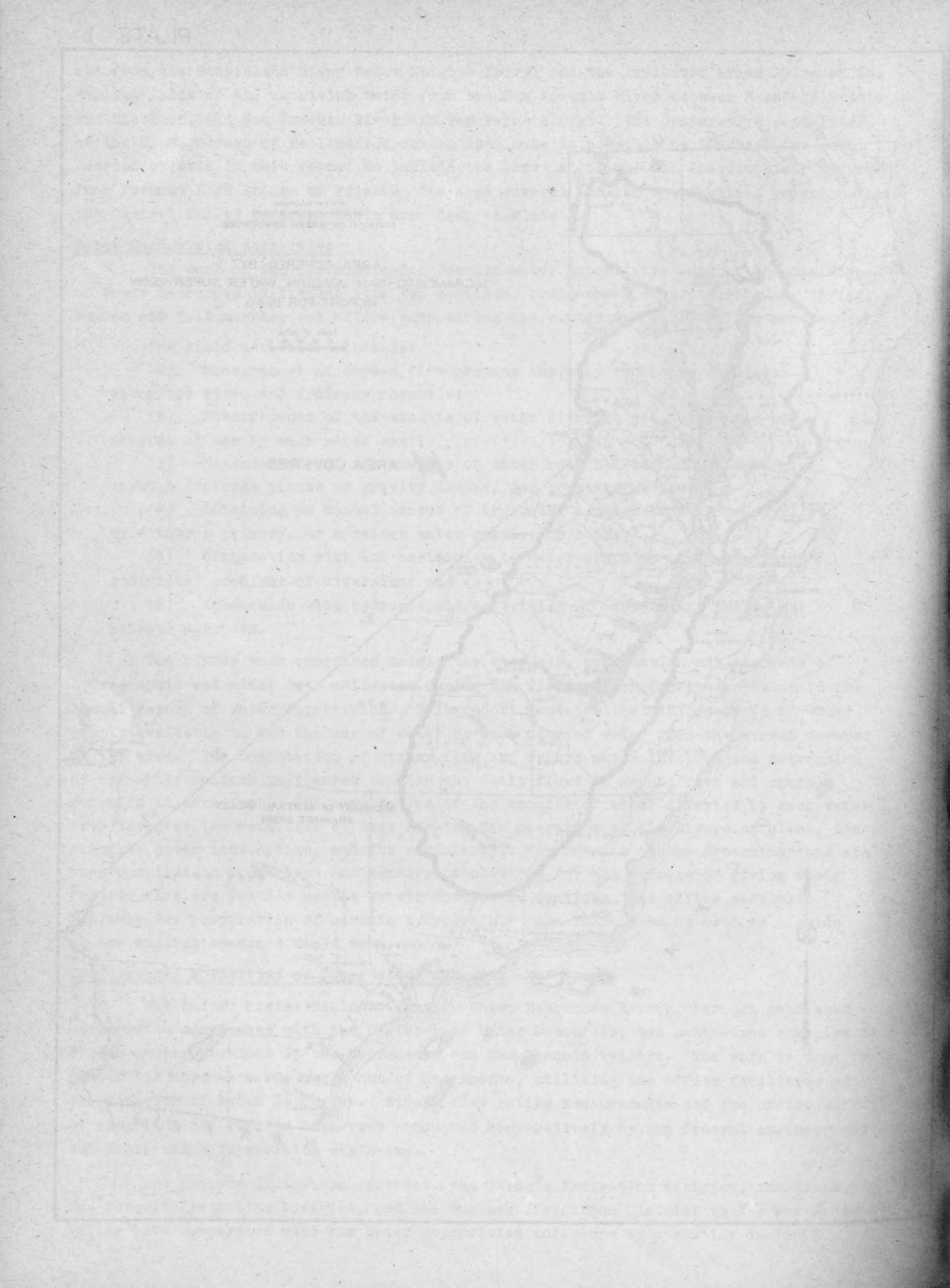
Stockton
Lathrop
Ripon



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, Tuolumne and Stanislaus rivers in the San Joaquin Valley.

The United States Bureau of Reclamation, through its offices at Sacramento, Colusa, Chico and Modesto, has cooperated by operating certain recorder equipped stream gaging stations, by furnishing records of flow from 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. The work of the State Water Supervision engineers was increased in the 1946 season in order to afford 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 during 1944, 1945 and 1946 changed substantially 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 1946 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, 500 feet high above low water level, located 13 miles upstream from Redding. The ultimate gross capacity of the reservoir with spillway gates installed 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 have not been installed and the present capacity of the reservoir to the fixed lip of the spillway is only 3,714,000 acre-feet. 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 down the Sacramento Valley in the channel of the Sacramento River.

Friant Reservoir, on the San Joaquin River, is created by a gravity concrete dam, 274 feet high above low water level, located at the base of the foothills about 20 miles northeast of Fresno. The ultimate gross capacity of the reservoir with spillway gates installed, is 520,000 acre-feet, of which a space of 404,000 acre-feet between the top of the spillway gates at elevation 578 feet 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 1946, however, the spillway gates on Friant Dam had not been installed so the capacity of Friant Reservoir available for the storage of water for irrigation was 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 1946 and no water was diverted therethrough.

Shasta Reservoir Operation - 1946

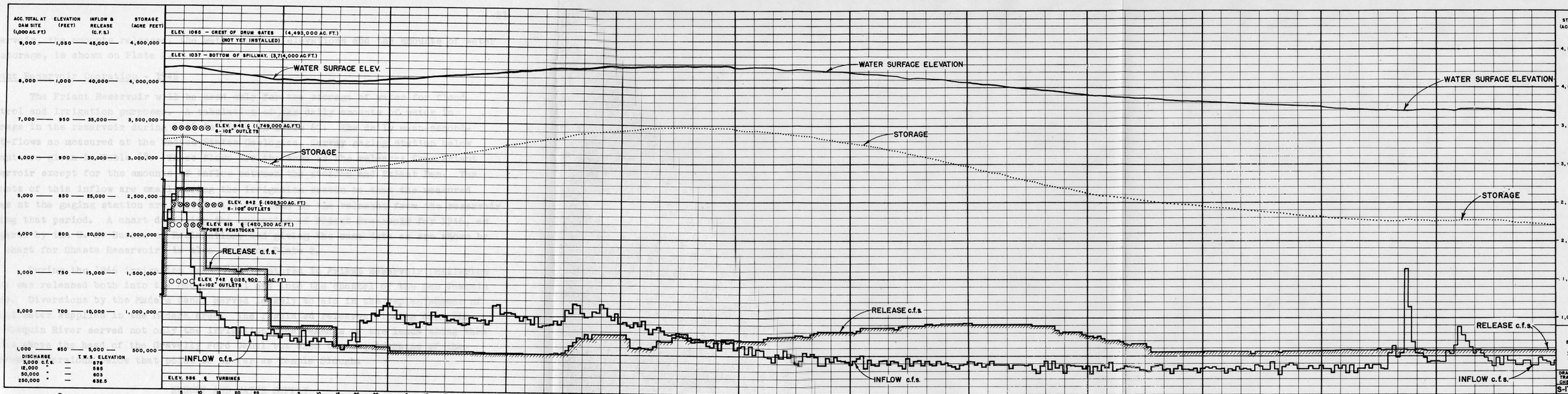
The Shasta Reservoir has been constructed as a multi-purpose project. It is designed to furnish water for (1) irrigation in the Sacramento and San Joaquin valleys, including the Sacramento-San Joaquin Delta area; (2) salinity control in the Delta by maintaining a flow in the lower Sacramento River sufficient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

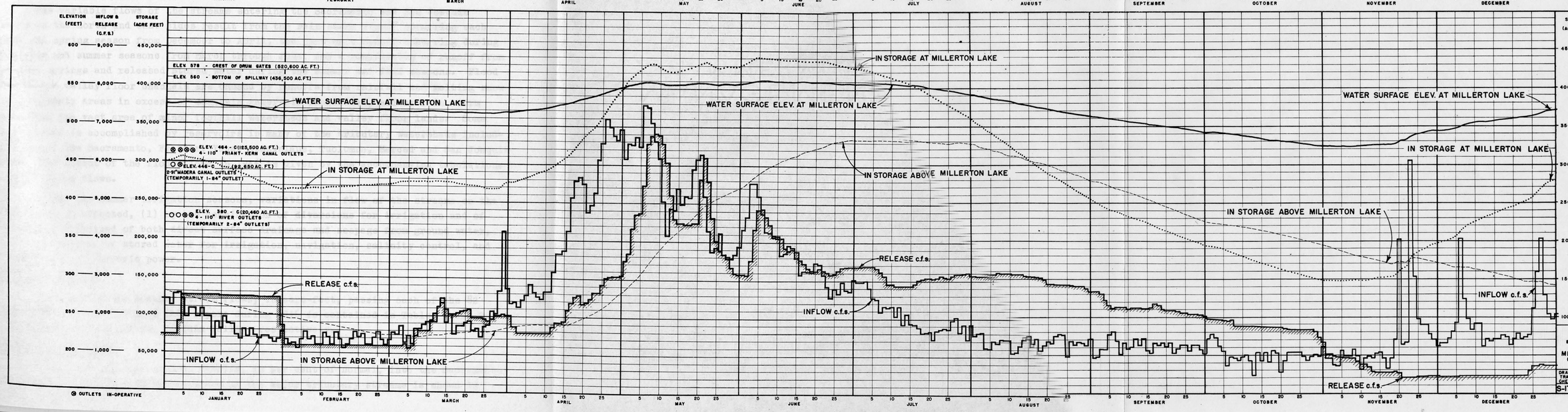
Although the storage of water in the reservoir commenced in the early part of the winter of 1943-1944, the ensuing season's subnormal runoff into it was not sufficient to completely fill the reservoir. However, the United States Bureau of Reclamation was able to release sufficient stored water throughout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

During 1945 and 1946 the quantity of water in storage in Shasta Reservoir was sufficient to afford releases to facilitate the diversions of natural flows by maintaining higher river levels along the Sacramento River, to sustain minimum navigation requirements of 5000 second feet passing Knights Landing, to supplement irrigation supplies in the Delta area below Sacramento, and to maintain a flow out of the Delta into the Suisun Bay sufficient to hold back the line of excess salinity concentration from the upper bays to a point at the mouth of the two rivers near Pittsburg and Collinsville.

A tabulation of the daily amounts of water in storage in Shasta Reservoir during 1946 is given in Table 12. The daily mean-second-foot-flows as measured below Shasta Dam at the United States Geological Survey station near Keswick are given in Table 13. 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 1946, as prepared by the U. S. Bureau of Reclamation, and giving the inflows to the

PLATE 2


ACC. TOTAL AT DAM SITE (1,000 AC. FT.)
ELEVATION (FEET)
INFLOW & RELEASE (C.F.S.)
STORAGE (ACRE FEET)
ELEV. 1065 – CREST OF DRUM GATES (4,493,000 AC. FT.) (NOT YET INSTALLED)
ELEV. 1037 – BOTTOM OF SPILLWAY. (3,714,000 AC.FT.)
WATER SURFACE ELEV.
WATER SURFACE ELEVATION
ELEV. 942 ℄ (1,749,000 AC.FT.) 6-108" OUTLETS
STORAGE
ELEV. 842 ℄ (608,300 AC. FT.) 8-108" OUTLETS
ELEV. 815 ℄ (420,300 AC. FT.) POWER PENSTOCKS
RELEASE c.f.s.
ELEV. 742 ℄ (125,900 AC. FT.) 4-102" OUTLETS
INFLOW c.f.s.
ELEV. 586 ℄ TURBINES
DISCHARGE
T. W. S. ELEVATION
3,000 c.f.s. — 578
12,000 " — 585
50,000 " — 603
250,000 " — 632.5
⊗ OUTLETS IN-OPERATIVE
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER
STORAGE (ACRE FEET)
INFLOW & RELEASE (C.F.S.)
ELEVATION (FEET)
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION REGION IV
BRANCH OF OPERATION AND MAINTENANCE
DIVISION OF IRRIGATION OPERATIONS
SHASTA LAKE OPERATIONS
CENTRAL VALLEY PROJECT
1946
DRAWN F.L.C. SUBMITTED
TRACED B.L.R. RECOMMENDED
CHECKED APPROVED
S-1795-A SACRAMENTO, CALIF.


ELEVATION (FEET)
INFLOW & RELEASE (C.F.S.)
STORAGE (ACRE FEET)
ELEV. 578 - CREST OF DRUM GATES (520,600 AC. FT.)
ELEV. 560 - BOTTOM OF SPILLWAY (436,500 AC.FT.)
WATER SURFACE ELEV. AT MILLERTON LAKE
IN STORAGE AT MILLERTON LAKE
ELEV. 464 - C (125,500 AC. FT.) 4-110" FRIANT-KERN CANAL OUTLETS
ELEV. 446 - C (92,650 AC. FT.) 2-91" MADERA CANAL OUTLETS (TEMPORARILY 1-84" OUTLET)
ELEV. 380 - C (20,460 AC. FT.) 4-110" RIVER OUTLETS (TEMPORARILY 2-84" OUTLETS)
RELEASE c.f.s.
INFLOW c.f.s.
IN STORAGE ABOVE MILLERTON LAKE
⊗ OUTLETS IN-OPERATIVE
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER
STORAGE (ACRE FEET)
INFLOW & RELEASE (C.F.S.)
ELEVATION (FEET)
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION REGION IV
BRANCH OF OPERATION AND MAINTENANCE
DIVISION OF IRRIGATION OPERATIONS
MILLERTON LAKE OPERATIONS
CENTRAL VALLEY PROJECT
1946
DRAWN F.L.C. SUBMITTED
TRACED B.L.R. RECOMMENDED
CHECKED APPROVED
S-1796-A SACRAMENTO, CALIF.

reservoir, the amounts released, the water surface elevations and the amounts of water in storage, is shown on Plate 2.

Friant Reservoir Operation - 1946

The Friant Reservoir will be used only for the storage of water for flood control and irrigation purposes. A tabulation of the daily amounts of water in storage in the reservoir during 1946 is given in Table 67. The daily mean-second-foot-flows as measured at the United States Geological Survey gaging station below Friant are given in Table 68. 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 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 1946, as prepared by the U. S. Bureau of Reclamation, and giving the same data as are shown by the chart for Shasta Reservoir, is also shown on Plate 2.

During the 1946 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 as far as 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 rain storm runoff occurring each winter and spring season 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 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 1946 is given by the accompanying tabulations of daily stream flows.

During the summer irrigation seasons, variations in flow of the streams on the valley floor are affected, (1) by the combination of diversions for irrigation and of return water comprised of 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.

1946 Runoff Summary

A summary of the monthly stream flows, in acre-feet, passing each of the 82 gaging stations considered in this report during 1946 is contained in Tables 1 and 2, for Sacramento Valley and San Joaquin Valley, respectively.

1946 Runoff Comparisons

A comparison of the natural runoffs, in per cent of normal, into the Sacramento Valley past the foothill gaging stations of the major tributary streams is shown in

Table 3, and a similar comparison is shown in Table 5 for the San Joaquin Valley tributary streams.

The 1946 natural runoff of the Sacramento River at Red Bluff is shown to have been 92 per cent of the mean annual for the 50-year period, 1889-1939.

The 1946 natural runoff for the San Joaquin Valley as measured at Vernalis, is shown to have been 92 per cent of the mean annual for the 50-year period 1889-1939.

The 1946 natural runoff in all major streams discharging into the Sacramento-San Joaquin Delta is shown to have been 92 per cent of the mean annual for the 50-year period 1889-1939.

The average minimum 10-day-flows which have occurred during the irrigation seasons for the past 23 years at a number of points on the Sacramento and San Joaquin valleys streams are shown in Tables 4 and 6. It is to be noted from Table 4 that in 1946 the date of minimum flow at the Keswick station on the Sacramento River occurred in April. Prior to 1944 the usual time of this occurrence was during July to September. This change in flow regimen is due to the operation of Shasta Reservoir whereby the naturally higher flows during the spring season are retained in storage and the lower flows in the summer season are augmented by releases from storage.

Comparisons of average water surface elevations and average flows at various points along the Sacramento River during the month of July for the subnormal year of 1939, and for the years 1943 and 1946, are given in Table 9. It is apparent from this comparison that the river water level elevations and flows during the 1946 season, a year of 92 per cent of normal runoff, would have been approximately the same as occurred in 1943, a year of nearly normal runoff, had not releases of stored water from Shasta Reservoir augmented the flows.

Primary Irrigation Supplies

The flows entering the valley floor during the summer season through the major streams are considered to be the primary water supply for irrigation. Another source of supply is the flows available for irrigation in the lower reaches of the streams resulting from the return of a substantial amount of the flows diverted upstream. The amounts of primary supplies available for irrigation in the Sacramento Valley are given in the flow tabulations for those gaging stations located at the edges of the valley floor, to wit, tables numbered 13, 44, 49, 50, 57 and 61.

In the San Joaquin Valley a different condition exists as regards the primary water supplies to the area covered by the recordation work of the Sacramento-San Joaquin Water Supervision. The water supplies for the irrigated areas lying within the irrigation districts diverting from the Stanislaus, Tuolumne, and Merced rivers are primary water supplies but their points of diversion are above the upstream gaging stations, the flows past which are tabulated in this report. The amounts of the diversions for those districts are given in Table 154, and are practically equal to the primary water supplies of the streams from which they divert.

Return Water Irrigation Supplies

In the Sacramento Valley the water supplies available for irrigation from waters returning to natural channels or to artificial drains are of equal importance to the primary supplies. All of these return waters 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 flow in Colusa Trough, the Back Borrow Pit, Knights Landing Ridge Cut, and Yolo By-Pass, varying monthly from 200 to 900

second-feet, is return water derived from diversions from the Sacramento River. A similar condition occurs for the flows in the borrow pits of Sutter By-Pass and in Sacramento Slough which result from both Sacramento River and Feather River diversions. Along the Feather River, during years of subnormal water supply, practically all of the primary water is diverted upstream to or at the Sutter-Butte diversion dam, yet return water flows accumulate below that point in amounts sufficient to afford a limited supply for all diversions.

In the San Joaquin River area, the entire water supply available for diversion during much of the summer season is return water derived from irrigation. This condition prevails along the valley floor reaches of the San Joaquin River below Temple Slough and its tributaries and branching channels. The exceptions to this condition are on the Tuolumne and Stanislaus rivers when irregular releases for power generation below upstream diversion points augment the return water flows. Thus, a flow approximating ten second feet in each stream at the edge of the valley floor or at Temple Slough is continuously augmented until an average minimum summer flow in the San Joaquin River at Vernalis of 1000 second feet is accumulated after deducting the amounts of intervening diversions.

The amounts of return water flows available for irrigation throughout the area are given in the stream flow tabulations in this report for the many return water gaging stations along the channels of the Sacramento and San Joaquin valley floors.

A detailed discussion of the specific amounts of return water flows and their relation to the amounts of diversion is presented in the following paragraphs covering "Use of Water for Irrigation."

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 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.

The 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 flow passing the stations.

Average water surface elevations for 15-day periods during 1946 at various points along the Sacramento River are given in Table 10 and similar elevations along the San Joaquin River are given in Table 11. Stream flow ratings for the stations along the Sacramento River for 1946 are given in Table 8.

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 that agency. This condition is particularly true with respect to some data furnished by the U. S. Geological Survey.

Stream Flow Bulletins

During 1946, stream flow bulletins were compiled from time to time and mailed to interested agencies and persons, listing the results of current-meter measurements made in the Sacramento and San Joaquin Valley by the Division of Water Resources and U. S. Geological Survey engineers.

Notes on Certain Gaging Stations

Records are obtained and published in this report for 82 gaging stations in the Sacramento and San Joaquin valleys. A brief description of each station is given at the bottom of the table showing the stream flows at that station and its location is shown on Plate 3 in the pocket at the back of this report. Notes on a few stations are believed desirable, however, for a better understanding of the records for those stations. These notes are as follows:

Sacramento River at Sacramento. The record of the flow of the Sacramento River at Sacramento for the periods of low flow, as given in this report, and as shown in previous reports, does not represent actual measurements at a station below the City of Sacramento municipal water supply intake. Because of tidal action during periods of low flow, a gaging station at this point is not maintained. The daily flow record as given has been computed for the period of low flow by using the record of flow at Verona and making due allowance for the measured inflow and diversions between that station and Sacramento. When the flow is above 30,000 cubic feet per second (staff gage reading of about 10.0 feet, or elevation 13.1 feet U.S.E.D. datum) the effect of the tidal action is lost and a direct ratio between gage height and flow may be used to determine the daily flow. In the computation of low flows it is not practicable, and no attempt has been made, to allow for the time required for the water to travel from Verona to Sacramento and to make the various deductions and additions enroute at the exact time that the water from Verona would have passed the respective points of inflow or diversion. During the summer period velocities between Verona and Sacramento are low and the water which passes Verona may require a day's time or more to travel the distance to Sacramento. Under these conditions the computed flow at Sacramento may differ somewhat from that which would have been found if the actual flow could have been measured, but the differences are small. Contributing to this difference also, there are accretions or losses which cannot be measured. In the upper sections of the river, the net amounts of invisible accretions and losses between two

points are susceptible of computation as the quantity required to complete the equation when the flows at the upper and lower points and all definite intermediate inflows and diversions are known. With no actual measurement of the flow at Sacramento, the invisible accretions or losses between Verona and Sacramento cannot be thus defined and hence they are unaccounted for in the computed flow at Sacramento. From the data presented subsequently, it appears that some return flow might be expected in the Verona-Sacramento section, but as indicated in the tabulation of return water (Table 150) no figure for it has been given (except for the measured drains - Table 149), because it could not be derived without a record of the actual flow at Sacramento.

Cottonwood Creek near Cottonwood. New record added in 1946. Cottonwood Creek in Tehama County is a tributary to the Sacramento River from the west side. The station was established as a U. S. Geological Survey station in October 1940 and is located 2 miles above the mouth. The flow at this station measures the contribution to Sacramento River. The 1946 records of daily mean flow are reported in Table 25.

Battle Creek near Cottonwood. New record added in 1946. Battle Creek in Tehama County is a tributary to the Sacramento River from the east side. This station was established as a U. S. Geological Survey station in October 1940 and is located six miles above the mouth. The flow at this station measures the contribution to Sacramento River. The 1946 records of daily mean flow are reported in Table 26.

Stony Creek near Hamilton City. New record added in 1946. Stony Creek in Glenn County is a tributary to the Sacramento River from the west side. The station was established as a U. S. Geological Survey station in January 1941 and is located 5 miles above the mouth. The flow at this station measures the contribution to the Sacramento River during flood flow periods and to the main canal of the Glenn-Colusa Irrigation District during the irrigation season. The 1946 records of daily mean flow are reported in Table 28.

Colusa Trough at College City. New record added in 1946. Colusa Basin Drain Canal is a rectified channel extending southward through the Colusa Basin conveying west side flood flows into the Yolo By-Pass via Knights Landing Ridge Cut and conveying summer irrigation drainage or return flows both into the Sacramento River through outfall gates at Knights Landing and into the Yolo By-Pass area via Knights Landing Ridge Cut. This drain is also named "Colusa Basin Drain," "Back Borrow Pit of Reclamation District No. 108" or "Drain Canal of Reclamation District No. 2047." This station is located at the bridge crossing due east of College City. It was established in October 1944 by the U. S. Bureau of Reclamation and the records of daily mean flow, furnished by that agency, for 1946 are reported in Table 35.

Cache Creek at Yolo. New record added in 1946. Cache Creek in Yolo County is a tributary to the Yolo By-Pass from the west side. The station was established as a U. S. Geological Survey station in January 1903 and is located one-half mile south of Yolo. The flow at this station measures the contribution to Yolo By-Pass. The 1946 records of daily mean flow are reported in Table 59.

Stanislaus River near mouth. Due to unratable conditions caused by a shifting channel control and the local pump operation, records of flow from the Bret Harte station could not be computed for the 1945 and early part of the 1946 seasons. On August 16, 1946 this station was relocated at a point 1.6 miles downstream from Bret Harte Pump and 4.3 miles above the mouth. The 1946 records of flow subsequent to August 16 are reported in Table 95 under the heading "Stanislaus River near mouth."

Sutter By-Pass - East Borrow Pit. This station on Willow Slough near Chandler served to measure the flows passing through the East Borrow Pit of the Sutter By-Pass differentiated from the flow in the West Borrow Pit. During 1946 irrigation operations in the Sutter By-Pass necessitated exchange of water between the two borrow pits, thereby nullifying the purpose of this station. Daily mean flows for this station for 1946 were not computed. The total outflow from the east and west borrow pits of Sutter By-Pass can be derived by subtracting the discharge of Reclamation District No. 1500 drainage pumps (Table 42) from the recorded flows of Sacramento Slough (Table 43).

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 heights are received at Sacramento 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 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.

Precipitation

In the great 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. Daily precipitation at twelve rainfall stations on the Sacramento Valley floor is given in Tables 96 to 107, inclusive.

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 a 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 served 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 1946 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; and along the San Joaquin River between Friant Dam and Durham Ferry Bridge (Vernalis).

This report contains records of a total of 834 points of diversion segregated as to various sources as follows: Sacramento River 285, Colusa Trough (above Colusa-Williams Highway crossing) 25, Back Borrow Pit (extension of Colusa Trough along back levees of Reclamation Districts 108 and 787) 26, Knights Landing Ridge Cut 11, Yolo By-Pass 10, Lower Butte Creek and Butte Slough 35, Sutter By-Pass and Sacramento Slough 39, Feather River 41, Yuba River 10, American River 32, Old San Joaquin River 17, Tom Paine Slough 8, San Joaquin River (below Vernalis gaging station) 58, San Joaquin River (between Vernalis gaging station and Fremont Ford Bridge) 19, San Joaquin River (between Fremont Ford Bridge and Friant Dam) 114; Fresno Slough and Fresno Slough By-Pass 9, Merced River 56, Tuolumne River 19, and Stanislaus River 23. The locations of these points of diversion are shown on Plate 3 in the pocket at the back of this report. This 1946 report does not list 40 points of diversion which were listed in previous reports but at which the pumping plants had been removed prior to 1946.

There have been added to this report for the 1946 season two tabulations of individual diversions by pumping plants or by gravity, to include all diversions from the San Joaquin River below Friant Dam. Table 129 gives the diversions along the main stem of the San Joaquin River between Fremont Ford and Friant and Table 130 gives the diversions from Fresno Slough and Fresno Slough By-Pass. 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 data in Tables 129 and 130 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.

All of the diversions, except 31 by gravity, are accomplished by pumping. The records of diversions 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 comsumption, 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 power input and water pumped is determined from rating 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 in 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 will be 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 1946 have been computed on a monthly basis only, and the breakdown into daily records was not made, except for that portion of the Sacramento River between Sacramento and Verona where the daily diversion quantities are required to compute the flow passing the gaging station at Sacramento. 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 115 to 133, inclusive.

A seasonal summary of water utilization during the past six years, 1939 to 1946, inclusive, from the Sacramento River and its tributaries and the San Joaquin River and its tributaries is shown in Table 108. This table presents an overall picture of the water utilization in these areas.

A summary of the 1946 diversions throughout the Sacramento-San Joaquin territory is shown in Table 109. A segregation is made to show the relative diversions from the various river sources. For each segregation the table shows also the acreage irrigated and the computed seasonal gross duty of water. Table 155 shows a comparison of the acreage of rice irrigated during the period 1924 to 1946 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. Table 146 summarizes the diversions and irrigated acreage between successive points on the Sacramento River. Table 110 shows a comparison of the Sacramento River irrigation diversions and gross duty of water for the years 1924 to 1946, inclusive. Tables 111, 112 and 113 show similar data for the Feather, Yuba and American rivers. In Table 114 there are shown the average monthly diversions in per cent of the seasonal for the streams in the Sacramento and San Joaquin valleys. A summary of the monthly diversions from the Sacramento Valley streams for the period of record prior to 1946 is given in Tables 134 to 137, inclusive. All data available since 1924 regarding monthly diversions, acreage irrigated, and gross duty of water for the San Joaquin valley streams and Delta upland channels are given in Tables 138 to 144, inclusive. Table 145 shows, for the Sacramento River only, the seasonal diversions and acreages irrigated for the period 1939-1946, inclusive, segregated to the different river sections.

Irrigated Acreage

Toward the end of the irrigating season in 1946, 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 data so obtained 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 are given in Tables 115 to 133, 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 1946 in the area covered by the Water Supervision work. Detailed acreage tabulations are found in Tables 108, 109, 129, 130 and 157.

Area	Irrigated Acreage	
Sacramento Valley Floor above Sacramento	370,200	
San Joaquin Valley Floor above Delta	460,600	
Total area served by measured diversions		830,800
Sacramento-San Joaquin Delta		
Cropped	336,000	
Water and native plants	113,000	
Total Delta		449,000
Grand Total		1,279,800

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

Drainage and Return Waters

Both in the Sacramento and San Joaquin valleys, the waters returning from irrigated lands to the various river and drainage channels are a source of water supply for the irrigation of other lands. This return water is of utmost importance along the San Joaquin River below Fremont Ford Bridge, and along its tributaries, since practically the entire stream flow in those reaches is made up of such return water.

In the Sacramento Valley, the flows of all well defined channels carrying irrigation waters returning to the Sacramento River are measured and recorded. Table 148 lists these channels in downstream order and gives the total flows as computed from measurements. The locations of the stations at which the return flows are measured and recorded are shown on Plate 3 in the pocket at the back of this report.

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

Of the water returned to the Sacramento River as shown in Table 148, practically all of that entering the river through Butte Slough is derived from Feather River diversions through the Western and Sutter-Butte canals. Of the return water entering the river through Sacramento Slough, the portion flowing from the East Borrow Pit of Sutter By-Pass is practically all of Feather River origin, and the portion from the West Borrow Pit is derived in part from the Feather River and in part from the Sacramento River as seepage and pumped drainage.

Relation of Sacramento River Return Water to Irrigation Diversions. Tables 149 and 150 show the Sacramento River return water flows for the period May to October, inclusive, 1946, and indicate the relation between the return and the diversions from which it was derived. Since it is the purpose of show, in Tables 149 and 150, the return water from Sacramento River diversions only, the inflows from Feather River through Butte Slough, Wadsworth Canal, Feather River at its mouth and the American River at its mouth have been excluded. In Table 149 there is shown the relation to the diversions of that return water which was measured at the well defined channels only. With the records available of the flows of the Sacramento River at Red Bluff, Butte City, Colusa, Wilkins Slough, Knights Landing, and Verona, and all diversions between those points, it is possible to approximate the total water returning to the river between those points, including not only the flows in the definite channels which were measured, but also all seepage and ground water return which can not be directly

measured. The figures shown for the return water from the Verona-Sacramento section do not include all accretions but only those contributed by the measured drains since, as explained on page 24, the total return in this section, including all accretions, is not susceptible of computation in the manner outlined because of the fact that no record of low water flow actually measured at Sacramento is available.

The data in Tables 149 and 150 show that seepage and ground water return for the period July-September, inclusive, which could not be directly measured amounted to 18 per cent; the direct return flows in definite channels 33 per cent and the total return flows 51 per cent of the diversions. The data in Table 150 show the return flows in the Sacramento River for the period May to October, inclusive, 1946. The return flow for the balance of the year has not been computed as the flows in the stream were large with much rainfall and local drainage making it impracticable with the data available to attempt to determine the return flows for the period not shown in the table.

In Table 151 the return flows and accretions for the entire Sacramento Valley have been determined for the period July through September for the years from 1936 to 1946, inclusive. In the computations for this table, only major inflows were taken into account and the inflows of minor creeks were not included because, during the months July through September their flow is negligible.

San Joaquin River Return Waters. As pointed out, the stream flows in the San Joaquin River and its tributaries, on the valley floor, are mainly return water flows during the summer and fall seasons. Measurements and records of all pumping diversions between stream gaging stations on each stream were obtained in 1946 as usual, so that the data necessary for the computations of total return water are complete. The records for the stream gaging stations are given in Tables 73 to 95, inclusive. The records of diversions along the San Joaquin Valley streams above Durham Ferry Bridge (Vernalis) are given in Tables 128 to 133, inclusive.

While it appears that some relation does exist between the seasonal water supply, the seasonal diversions and the return water from irrigation for the Sacramento Valley, in the case of the San Joaquin Valley the return water data apparently indicate no definite relation. This lack of relation may be due to the regulation which occurs in Lake McClure Reservoir on the Merced River, in Don Pedro Reservoir on the Tuolumne River and in Melones Reservoir on the Stanislaus River. It is to be noted that in some years the period used in the comparison of return flow and diversions make considerable difference in the percentage figures, and further, that for the period August-September only, the percentage is nearly always greater than when the July-September period is used. As there may be considerable lag between diversions and corresponding return flows, the figures in the last column of Table 147 were compiled to show the August-September return flow in per cent of the July-August diversions. These percentages still seem to bear no definite relation to the seasonal runoff percentages, but their variation from year to year is somewhat reduced and a more or less constant percentage of return flow is indicated.

The average percentage of the diversions occurring as return water, for the San Joaquin River, is shown to be considerably smaller than that for the Sacramento River (Table 147). This difference may probably be attributed to the fact that, whereas, due to basin topography, practically all drainage from Sacramento River diversions is quickly returned to the river, considerable of the return water in the San Joaquin Valley may never reach the river because of its percolation to underground water and recovery by drainage pumps in the lower areas of many of the irrigation districts for re-use through irrigation canals.

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 Valley in Tables 108 to 113, inclusive, and for the San Joaquin Valley in Tables 138 to 144, inclusive.

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 years.

Tables 156 and 157 in this report have been repeated from previous reports for ready conference. In Table 156 there is shown the unit consumptive use of water in the Sacramento-San Joaquin Delta. Table 157 shows the consumptive use of water in the Sacramento-San Joaquin Delta for the period 1924-1932, inclusive, and 1938.

In previous years, when the crop surveys were made, the total consumptive use of water has been segregated to show the use in each river delta. 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 1946 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 1946 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 would be taken at regular intervals at a sufficient number of stations throughout the Delta and upper bay region so that the advance and retreat of the salinity from early summer to late fall would be completely recorded. Plate 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 and 1946. 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 per cent of normal runoff during 1931, 170 per cent of normal runoff during 1938, 114 per cent 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 previous Water Supervision annual reports.

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 cooperation of the Fontana Farms Company, the City of Antioch Water Department, the U. S. Bureau of Reclamation, the Dow Chemical Company at Pittsburg and the City of San Francisco, miscellaneous samples were taken during the 1943 season and the results of the analyses are presented in the 1943 report of Water Supervision. In that same report there are tabulated a large number of complete analyses of water from the channels in 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 1946. The records of water samples taken during 1946 from 29 active sampling stations are given in Table 160.

Complete or Partial Analysis 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. These results are contained in Table 162 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. Although the records of the U. S. Bureau of Reclamation include results of complete or partial analysis at many points on streams in the Central Valley area, this annual report gives results only for a limited series of river points which are indicative of the trend and the source of salt concentrations as the river flows reach the Delta area.

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF WATER RESOURCES

SACRAMENTO-SAN JOAQUIN WATER SUPERVISION

LINES OF SALINITY ENCROACHMENT

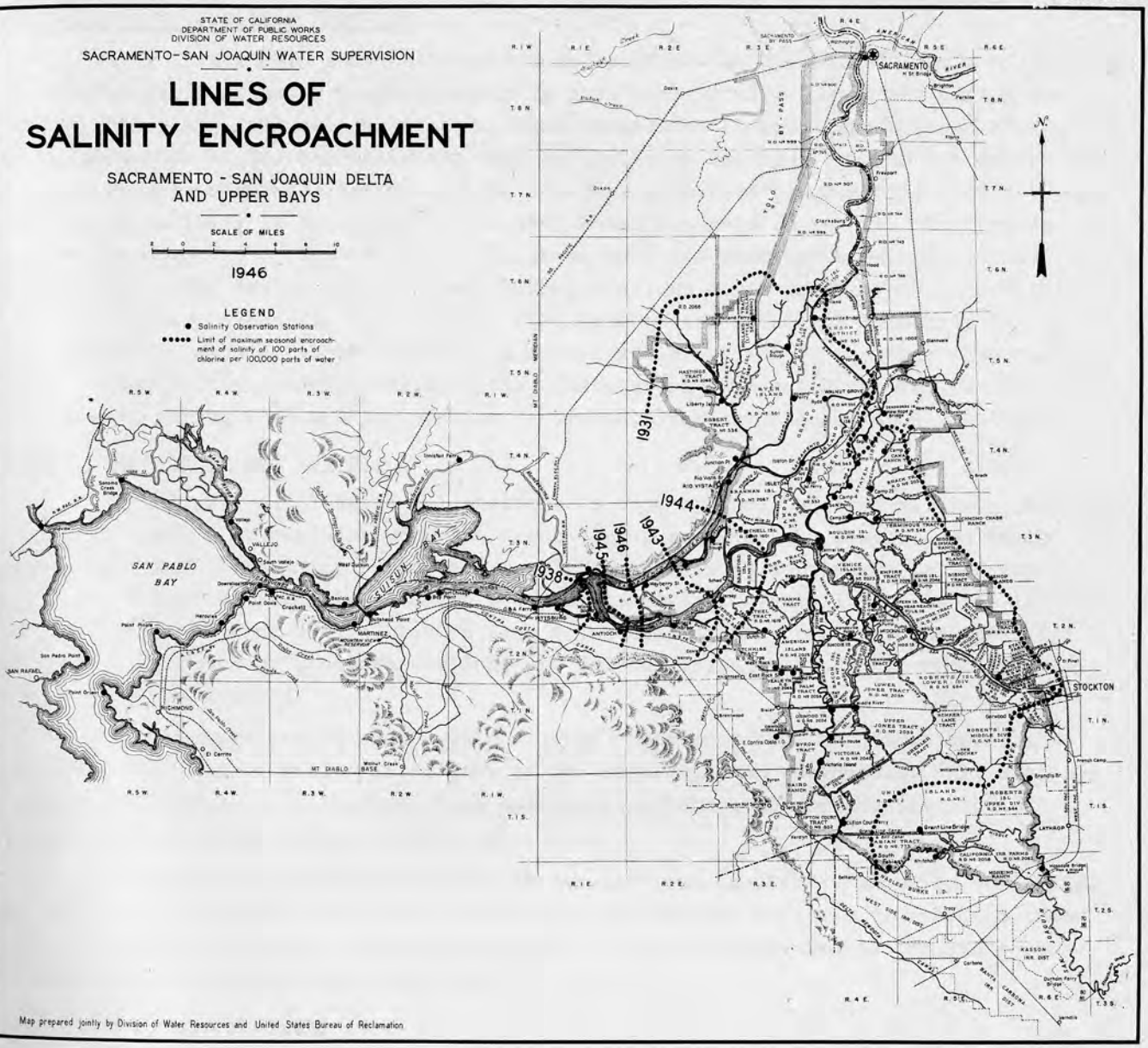
SACRAMENTO - SAN JOAQUIN DELTA AND UPPER BAYS

SCALE OF MILES

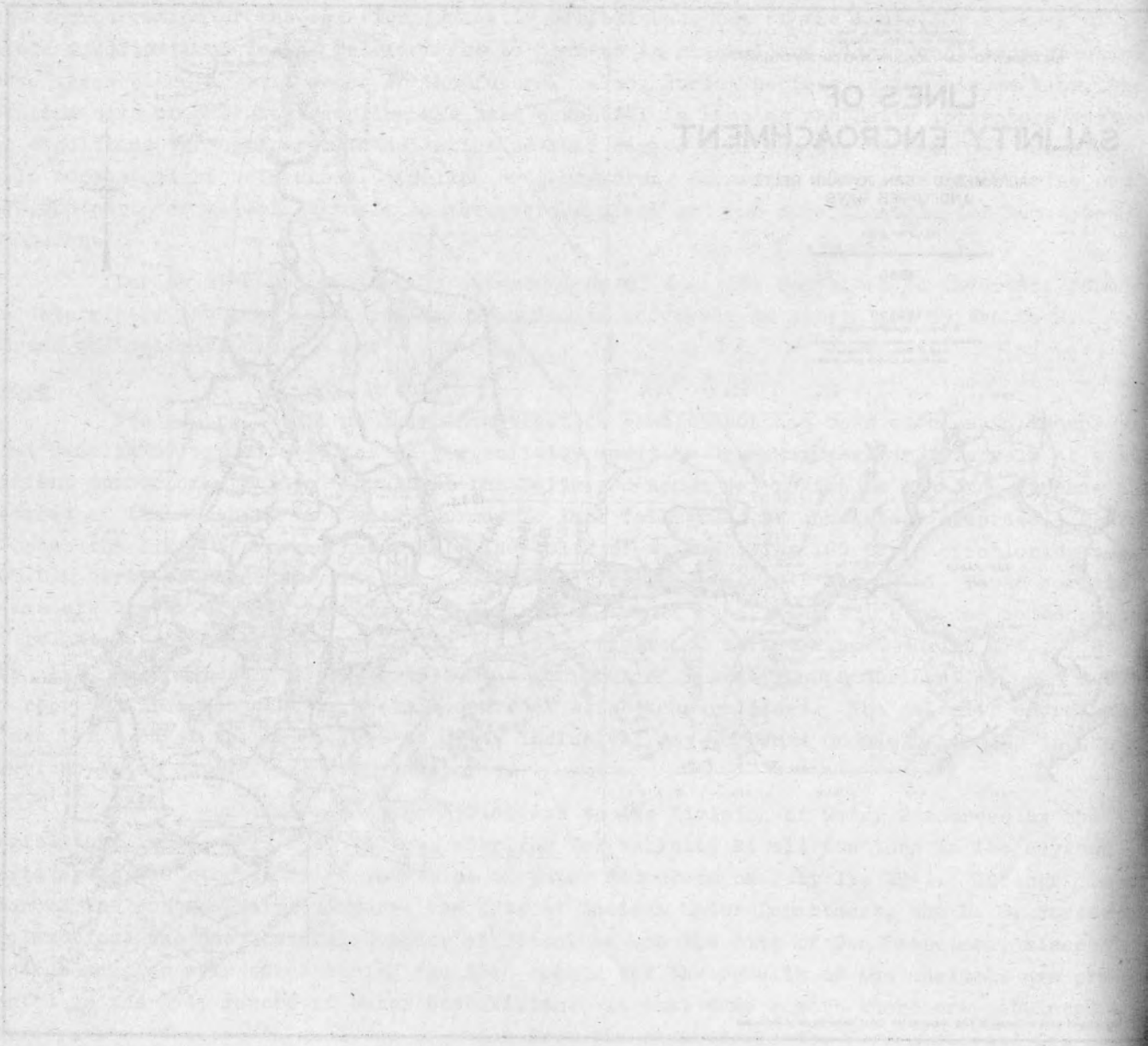
1946

LEGEND

- Salinity Observation Stations
- Limit of maximum seasonal encroachment of salinity of 100 parts of chlorine per 100,000 parts of water



Map prepared jointly by Division of Water Resources and United States Bureau of Reclamation



New Salinity Observation Stations

Early in the 1945 season it was recognized that the line of 100 parts of chlorine per 100,000 parts of water would probably be held much farther downstream during the ensuing summer and fall seasons than had been experienced in previous seasons because of the augmentation of the natural flows into the Delta by releases from Shasta Reservoir. To obtain a more accurate location of the 100 part line five new salinity stations were established in 1945, as described in the 1945 Water Supervision Report. To further observe the movement of the 100 part line seven more new stations were established during 1946. The designation of these newest stations are: San Pedro Point, Point Pinole, Hercules, Crockett, West Suisun, Port Chicago and Nichols. A description of the location of each of these stations is contained in Table 159, together with that for all other stations active during 1946. The station designated "Dowrelios" was discontinued during 1946 and the station at Crockett was established as a substitute.

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 159 gives the location and description of each active station from which samples were received during 1946. Location description of inactive stations are deleted in this report but reference is made to 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 1946 season.

The maximum salinity as recorded at the stations in 1946 is shown in Table 158. For comparative purposes, this table shows also the maximum salinity recorded at these stations in previous years beginning with 1936. 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 directly to the U. S. Bureau of Reclamation as received from the State Testing laboratory, but this report does not include those daily results. However, the regular four-day-interval results of observations for the two stations, West Suisun and Port Chicago, are included herein in Table 160 together with similar results for all other stations.

Salinity Bulletins

During 1946 a salinity bulletin was mailed each month to the many interested agencies and individuals giving the results of samples taken and analyzed at four-day intervals at all of the 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 161.

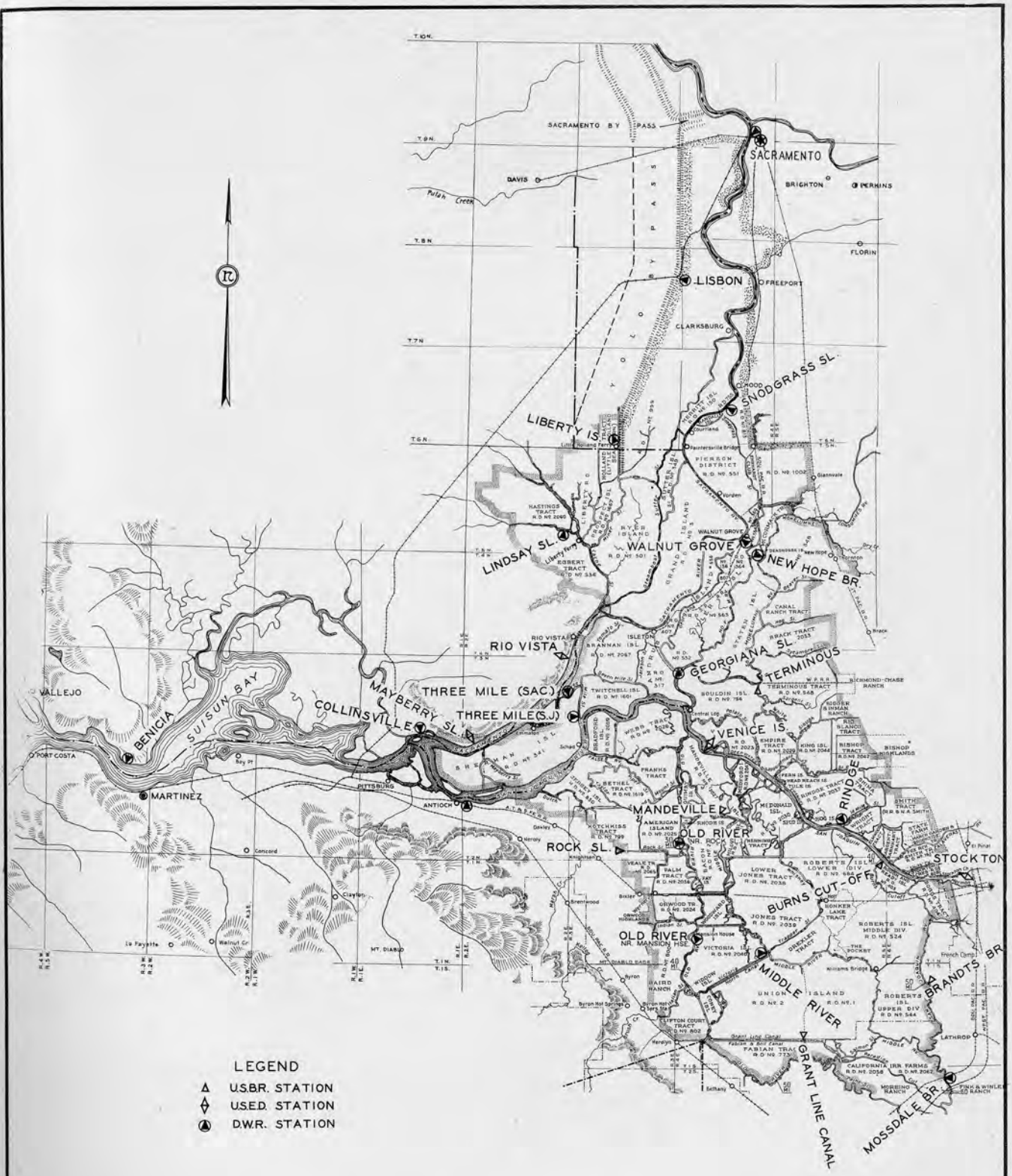
TIDE GAGES

In order to determine the behavior of the tides in the Sacramento-San Joaquin Delta and Upper San Francisco and Suisun bays, 28 recording tide gages are being operated, 18 by the Division of Water Resources, 4 by the U. S. Army Engineers, and 6 by the U. S. Bureau of Reclamation. These gages are strategically located throughout the area. The location and description of each station are given in Table 163 and the locations of the gages are shown on Plate 5. The table also shows the date the gage was installed. The gages have been operated continuously since their installation, with the exception of minor breaks in the record due to stoppages of gage clocks and other reasons. The gage at the San Joaquin River end of Three Mile Slough, however, was out of operation from September 1935 until July 1938.

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

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

During the fall of 1939 the United States Coast and Geodetic Survey ran a line of first order levels across the Sacramento-San Joaquin Delta and tide gages have been tied in elevation to that datum.



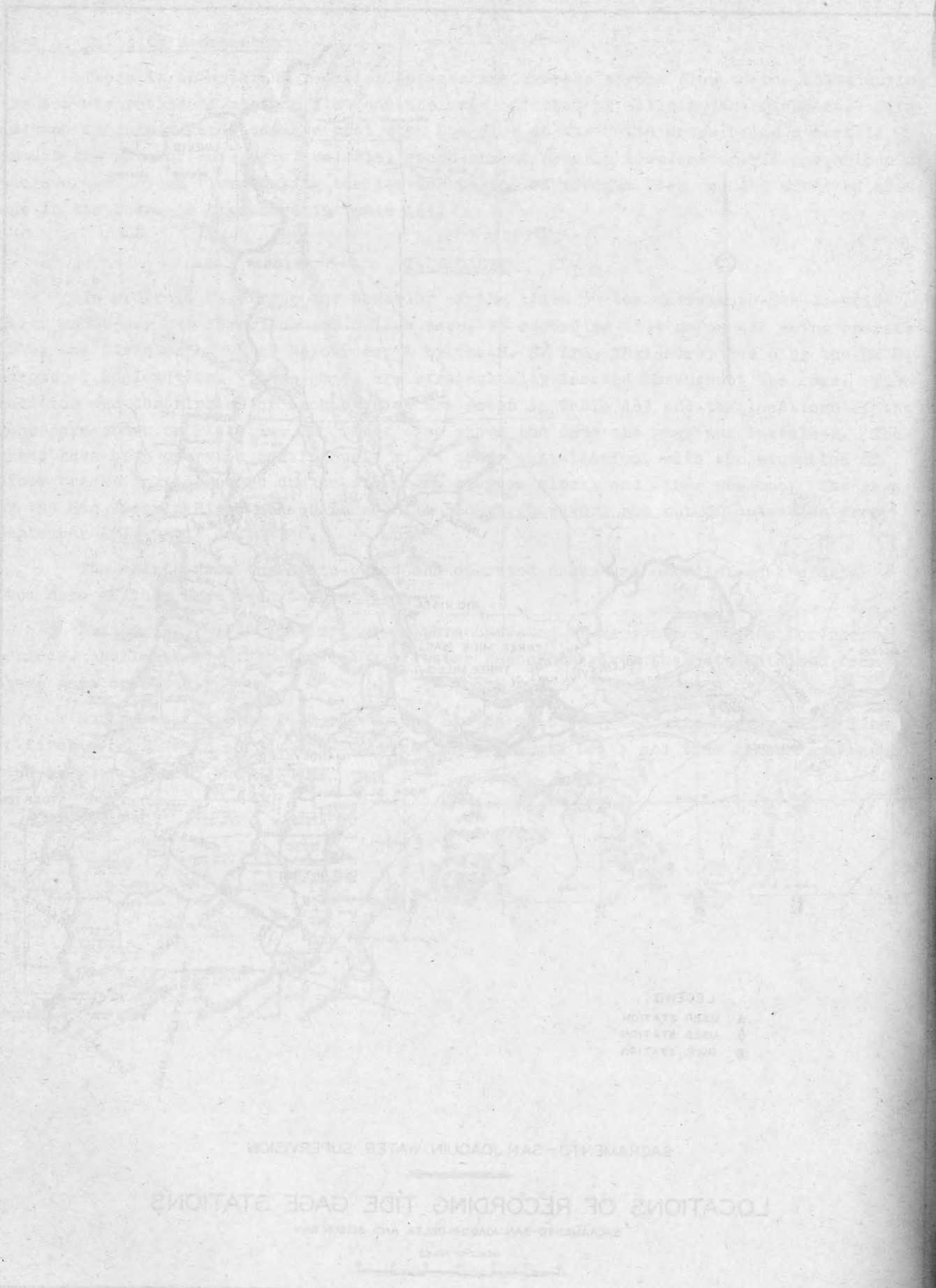
SACRAMENTO – SAN JOAQUIN WATER SUPERVISION

LOCATIONS OF RECORDING TIDE GAGE STATIONS

SACRAMENTO-SAN JOAQUIN DELTA AND SUISUN BAY

SCALE OF MILES

2 0 2 4 6 8 10



TABLES

TABLE 1

SUMMARY OF MONTHLY STREAM FLOW - 1946
PRINCIPAL SACRAMENTO VALLEY FLOOR STREAMS

Quantities in Acre-Feet

Name of Gaging Station	Daily Flow in Table No.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Total
Sacramento River														
at Keswick	13	1141000	389300	327300	373600	413600	445600	535600	527900	367100	353200	351500	361200	5586900
at Redding	14	1123300	388700	320800	356300	385100	420800	505300	506500	350000	338100	352400	368100	5415400
at Balls Ferry	15	1370400	454300	404500	425400	425200	426700	507200	501300	359000	352700	377900	412300	6016900
near Red Bluff	16	1569000	520900	472500	507600	493200	467000	532300	528400	369200	358000	400000	463800	6681900
at Vina Bridge	17	1817200	574600	551400	593400	552700	488700	537800	534700	385300	375200	431400	547900	7390300
at Hamilton City	18	1782100	586900	563000	536700	436100	368300	416900	413100	304600	322900	408600	538000	6677200
at Butte City	19	1944000	645300	602900	553100	458600	376600	417400	413100	325600	341500	437800	578500	7094400
at Colusa	20	1590000	639100	596700	549200	439000	360100	395300	389000	324900	341100	428400	581100	6633900
below Wilkins Slough	21	1238000	660300	634200	523200	371600	323700	329300	334000	324000	348200	421400	590700	6098600
at Knights Landing	22	1327000	689900	650300	558500	443400	355600	351900	366600	380200	377500	446000	616900	6563800
at Verona	23	2894000	1182000	1336000	1417000	1142000	549000	413100	434100	491300	496100	643800	940400	11938800
at Sacramento	24	3208000	1331000	1674000	1917000	1664000	717300	424300	416700	500100	534100	740600	1048000	14175100
Cottonwood Creek														
near Cottonwood	25	131800	29880	35760	40960	22070	9890	4010	2770	2930	4270	8670	21150	314200
Battle Creek														
near Cottonwood	26	36540	19900	23960	28430	33630	20080	14100	11570	11160	11910	15460	20640	247380
Moulton Weir														
from Sacramento River	27	7820	0	0	0	0	0	0	0	0	0	0	0	7800
Stony Creek														
near Hamilton City	28	Incomplete record		11260	14640	441	0	0	0	0	0	0	0	--
Colusa Weir														
from Sacramento River	29	311500	0	0	0	0	0	0	0	0	0	0	0	311500
Butte Slough														
to Sacramento River	30	0	20040	26960	22940	19460	28310	14880	16260	31960	12100	3640	43280	239800
Tisdale Weir														
from Sacramento River	31	333600	0	0	0	0	0	0	0	0	0	0	0	333600
R.D. No. 70 Drain														
to Sacramento River	32	2200	710	120	1800	1520	1820	1660	1690	1250	380	160	540	13800
R.D. No. 108 Drain														
to Sacramento River	33	7050	2360	1930	6440	24800	17500	19830	22900	18100	1520	1120	3910	127500
Colusa Trough														
at Highway 20	34	32250	6830	5750	18990	46630	36820	34940	43950	49650	16010	15850	20560	328200
at College City	35	67930	11610	6650	23250	47710	36980	33860	44010	54290	21220	19650	25770	392900
R.D. No. 108 Drain														
to Back Borrow Pit	36	No flow during 1946												
Knights Landing Ridge Cut														
from Colusa Basin Drain	37	68800	10900	5040	8910	4490	3790	4350	4450	3310	170	470	10300	125000
Colusa Basin Drain														
to Sacramento River	38	0	15470	9400	12210	34230	22100	17630	29140	53610	24580	22490	21850	262700
Sycamore Slough														
to Sacramento River	39	0	0	0	0	140	260	240	1980	750	0	0	0	3400

(Continued on next page)

TABLE 1 (CONT'D)

SUMMARY OF MONTHLY STREAM FLOW - 1946
PRINCIPAL SACRAMENTO VALLEY FLOOR STREAMS

Name of Gaging Station	Daily Flow in Table No.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Total
Butte Slough to Sutter By-Pass	40	715900	19360	9570	9120	7580	6450	7870	10660	2960	1590	9430	24560	825000
Wadsworth Canal to Sutter By-Pass	41	11970	4890	2630	3630	12040	10650	8860	10900	13280	8360	2290	4610	94100
R.D. 1500 Drain to Sacramento Slough	42	13570	4560	2460	4750	28920	25170	27050	29270	27580	3590	1620	5140	173700
Sacramento Slough to Sacramento River	43	overflow	54870	36150	35670	57320	47130	43280	52080	57730	16900	25180	41890	--
Feather River near Oroville	44	571500	266900	396600	559300	442000	182200	146100	140600	113900	97600	162900	160200	3239800
near Gridley	45	583500	267500	387700	481100	292200	45300	7950	14300	35300	64800	145200	164800	2489600
at Yuba City	46	718500	294900	388700	542600	332700	74500	15600	17100	45900	72400	134800	190100	2827800
below Shanghai Bend	47	1049000	474700	621800	860600	673700	166200	49000	35400	59000	87800	170000	259500	4506400
at Nicolaus	48	1183000	483300	691900	836000	679900	171900	38500	30040	53690	87650	176600	290200	4722700
Yuba River at Narrows Dam	49	214600	111400	197000	312300	344800	110700	45500	35550	28550	23490	24440	71740	1520100
at Marysville	51	311800	150100	231900	318000	341000	96010	31690	20770	16670	18740	30280	91060	1658000
Deer Creek near Smartville	50	18940	11270	15790	7580	2820	1690	390	270	280	1890	6880	9440	77200
Bear River near Wheatland	52	70970	48530	55260	32920	21290	8130	650	260	180	2490	6940	20810	268400
R.D. No. 1001 Drain into Cross Canal	53	1250	440	380	330	570	380	50	0	0	0	20	290	3700
Sacramento Weir from Sacramento River	54	9240	0	0	0	0	0	0	0	0	0	0	0	9200
R.D. No. 1000 Drain No. 3 Plant to Sacramento River	55	3730	2280	1290	740	1030	680	90	610	2830	920	240	530	15000
2nd Bannon to Sacramento River	56	1490	0	130	120	540	0	0	0	1430	1040	260	860	5900
American River at Fairoaks	57	306300	151200	342700	509000	534400	193000	46300	17830	22400	34300	95300	102700	2355400
at Sacramento - H St.	58	318900	147200	338400	516900	554300	201300	49380	18900	22280	39150	98650	108400	2413800
Cache Creek near Yolo	59	78100	10030	7930	3850	0	0	0	0	0	0	0	2420	102300
Yolo By-Pass near Woodland	60	922300	13800	8660	5970	3360	2740	2810	2820	4030	2550	750	6780	976600
Cosumnes River at Michigan Bar	61	56040	28140	64990	64940	36940	10670	2510	510	240	1610	10120	11630	288300
at McConnell	62	66120	29190	66030	66700	36690	10370	1640	100	0	690	9970	11820	299300
Dry Creek near Galt	63	12070	6690	10480	8230	1250	70	0	0	0	0	240	890	39900
Mokelumne River at Woodbridge	64	94990	35860	32950	53610	88260	38710	1700	1940	7310	13080	21120	36620	426200
Calaveras River at Jenny Lind	65	17960	8720	18830	16110	3890	1670	450	100	0	250	5990	5950	79900
Stockton Diverting Canal at Stockton	66	19910	8510	15050	15600	1750	150	0	0	0	0	1710	4440	67100

TABLE 2

SUMMARY OF MONTHLY STREAM FLOW - 1946
SAN JOAQUIN RIVER AND PRINCIPAL TRIBUTARIES
Quantities in Acre-Feet

Name of Gaging Stations	Daily Flow in Table No.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Total
San Joaquin River														
below Friant	68	143300	67080	111400	128800	283200	204100	172200	161400	113000	90330	32460	32420	1549700
at Whitehouse	70	147000	76600	109400	121900	252000	188000	158900	149400	106800	89300	36600	32400	1468300
near Mendota	72	165400	61570	19740	21520	166500	72910	25040	20110	16300	15420	16060	40400	641000
near Dos Palos	73	162700	64340	8940	5470	139200	60770	8310	40	320	670	7920	38720	497400
near El Nido	74	95900	39980	6860	5230	81240	37420	4610	30	30	100	3800	21160	296400
at Delta Bridge	75	69980	29750	6440	4180	54230	24390	5340	60	0	680	2670	16970	214700
at Fremont Ford	76	168100	95010	32310	38900	133900	79380	21570	12170	19710	13840	17660	62600	695200
Mud Slough Branches	77			Daily flows not computable for 1946										
near Newman	78	278100	178100	83280	93910	259800	128900	40810	28950	34340	26970	30470	81750	1265400
near Grayson	79	295400	196400	103700	104800	290600	161700	56150	44110	49050	42780	40930	92650	1478300
at Hetch Hetchy Crossing	80	451600	278000	171600	217500	557400	282700	79460	62060	74220	97570	131400	178800	2582300
near Vernalis	81	584800	330700	229600	357900	802900	344100	90110	75250	88260	111600	158100	220600	3393900
Cottonwood Creek														
near Friant	69	21	54	90	47	0	0	0	0	0	0	1	206	400
Fresno Slough By-Pass														
to San Joaquin River	71	17900	0	0	5380	18400	1900	0	0	0	0	8180	11400	63200
Merced River														
at Yosemite Valley Railroad Crossing	82	82120	76520	31380	60520	128100	38550	2160	2940	1510	750	570	1800	426900
at Cressey	83	77220	72120	34850	59550	135700	40980	7380	7450	6910	6130	6110	9610	464000
near Stevinson	84	79050	75770	43330	57910	139400	52480	17300	16820	15790	13310	10470	13540	535200
Merced River Slough														
near Hills Ferry Bridge	85	4700	3680	790	4400	18690	2670	0	0	0	0	0	0	34900
Tuolumne River														
at La Grange	86	123200	68400	36000	105400	264000	90000	1050	1470	800	31800	74900	67800	864800
at Roberts Ferry Bridge	87	127300	68650	42380	102900	269300	94150	4730	5320	4080	33670	69160	72090	893700
at Waterford Bridge	88	125600	74120	43020	103200	256400	98440	8530	7910	7510	39230	84500	75540	924000
at Modesto	89	144500	82440	56540	119400	289000	116100	22600	20100	18020	48150	90290	87210	1094500
at Tuolumne City	90	145500	85900	58020	118210	280800	117900	29450	27880	24350	50860	93460	86240	1118600
Dry Creek														
near Modesto	91	6200	3380	3670	4450	9450	4740	4530	4520	3610	3820	2300	2640	53300
Stanislaus River														
at Orange Blossom Bridge	92	140700	36300	54950	159800	220000	43310	2660	2500	1840	2270	13330	32210	709900
at Riverbank	93	142700	39000	55350	150600	214300	48620	6970	6330	5940	6760	18740	32460	727800
at Ripon Bridge	94	146900	50390	64930	155200	234300	61950	15500	13590	12540	11830	21400	38420	826900
near Mouth	95			Station reestablished August 16, 1946						13290	13070	20790	41640	--

TABLE 3

COMPARATIVE SACRAMENTO VALLEY WATER SUPPLY 1920 - 1946

Year	Runoff in per cent of Normal*				Minimum Daily Mean Flow in Second Feet (1)								Rice Acreage Served By Sacramento River & Tributaries
	Sacto-San Joaquin to Delta		Sacramento at Red Bluff		Sacramento River at			Feather River at		Yuba River at		American River at	
					Red Bluff	Colusa	Sacramento	Oroville	Nicolaus	Smartville (4)	Mouth	Fair Oaks	Sacramento
	40 Yr.	50 Yr.	40 Yr.	50 Yr.									
1920	50	52	45	48	3240	660	(2)540	905	(3)19	106		100	(2) 114	
1924	28	28	35	38	2810	1470	705	720	Zero	71		5	Zero	88500
1925	83	86	86	92	3240	1870	2760	1330	334	150		219	203	94700
1926	57	60	61	65	2980	1030	1330	1480	264	114		109	161	128600
1927	114	121	117	125	3580	1960	3420	1460	565	240		274	334	123300
1928	80	84	82	87	3400	1960	2510	1210	310	180		109	178	101100
1929	42	44	47	50	3060	1550	2300	1640	520	119		59	50	73700
1930	63	65	65	70	2980	1680	2350	1560	586	220		105	130	88000
1931	28	30	35	38	2480	820	-131	950	Zero	130	(2)22	30	28	126500
1932	74	78	54	58	2620	1530	1900	685	284	181		178	159	90700
1933	45	48	49	52	2620	1350	1340	1050	200	165		32	30	87400
1934	40	43	48	51	2400	1320	1050	1180	208	144	(2)45	77	75	91800
1935	86	91	80	86	2860	1780	2700	1470	690	250		178	185	78100
1936	91	96	76	81	2700	1540	2150	1560	603	266		356	415	104400
1937	75	80	64	68	2780	1370	1640	1420	230	219		234	230	109400
1938	160	170	157	168	3880	3000	4950	1690	772	295		455	439	94800
1939	41	43	47	50	2700	1320	556	1360	68	163	38	37	44	103800
1940	108	115	112	120	3220	2040	2430	1600	438	177	118	279	274	94200
1941	130	137	143	164	4180	2700	4020	1680	575	230	106	255	261	119800
1942	120	129	120	129	4010	2670	3560	1990	495	358	220	270	282	158100
1943	107	114	91	97	3610	2220	2460	1500	168	343	211	180	169	185400
1944	52	56	50	53	2010	2430	2650	1120	147	102	102	115	126	200000
1945	81	86	71	76	3990	4810	6210	1850	296	352	231	149	200	187000
1946	--	92	--	92	5540	5160	6160	1520	358	360	187	229	224	198100

(1) Minimum daily mean flow that occurred prior to September 30. For average minimum 10-day flow See Table 4.
(2) No continuous record. Lowest measured discharge.
(3) Lowest measured discharge at mouth of river, August 19.
(4) Subsequent to 1941 flow shown is minimum combined flow of Yuba River at Narrows Dam and Deer Creek near Smartville.

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

TABLE 4

AVERAGE MINIMUM 10-DAY FLOW FOR SACRAMENTO VALLEY STREAMS
FOR PERIOD MARCH 1 TO SEPTEMBER 30, 1924-1946

Year	SACRAMENTO RIVER															
	At Keswick*		Near Red Bluff		At Butte City		At Colusa		At Wilkins Slu		At Knights Ldg		At Verona		At Sacramento	
	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.
1924	No record		8/8	2840	7/21	1580	7/23	1540	No record prior to 1931		7/20	1060	No record		7/14	858
1925	No record		8/9	3400	9/1	2150	8/7	2030			8/8	1990	No record		8/7	2860
1926	8/8	2710	9/20	3030	8/10	1350	8/11	1060			8/1	1120	8/1	1620	7/28	1460
1927	8/20	3240	9/9	3680	8/20	2330	8/22	1990			8/20	2220	8/13	3420	8/23	3560
1928	9/6	3120	9/7	3490	8/19	2150	8/14	2000			8/15	1920	8/14	2760	8/15	2660
1929	9/1	2820	9/11	3060	8/19	1680	8/19	1570			8/20	1400	7/18	2440	7/18	2460
1930	9/1	2800	8/27	2980	8/20	1880	8/19	1690			8/20	1460	8/22	2640	8/5	2500
1931	8/22	2510	8/10	2550	7/28	1080	7/26	860	7/27	797	7/21	279	7/21	327	7/20	-80
1932	9/25	2570	9/7	2680	9/30	1530	8/27	1550	8/8	958	8/11	1030	8/11	1890	8/11	1980
1933	9/1	2580	8/24	2640	8/19	1370	8/23	1360	8/20	714	8/15	964	8/6	1470	8/21	1450
1934	9/21	2430	9/13	2480	8/20	1320	8/22	1330	8/19	658	8/6	773	8/10	1300	7/20	1150
1935	9/6	2780	9/6	2940	9/28	1820	8/27	1820	8/29	1180	8/10	1610	8/30	2980	8/12	2920
1936	9/30	2580	9/26	2880	8/18	1630	8/19	1580	8/18	1100	8/8	1370	8/20	2420	8/20	2540
1937	9/26	2640	8/25	2900	8/25	1450	8/27	1410	8/28	870	8/16	1120	8/16	1810	8/16	1720
1938	9/22	3680	9/19	3940	9/5	3060	8/23	3130	8/22	2690	8/10	2980	8/12	4920	8/12	5190
1939	8/25	2830	8/25	2850	8/10	1400	8/8	1370	8/5	683	7/30	785	8/5	1030	8/5	630
1940	8/29	3200	8/23	3410	8/25	2040	8/18	2140	8/18	1370	8/18	1670	8/12	2510	8/12	2550
1941	9/25	3950	9/10	4380	8/22	2830	8/24	2980	8/23	2270	8/23	2680	8/25	4010	8/24	4190
1942	9/25	3870	9/17	4140	8/22	2730	8/23	2860	8/24	1840	8/24	2390	8/23	3540	8/22	3740
1943	9/3	3610	9/4	3770	8/21	2380	8/22	2300	8/21	1550	8/17	1710	8/17	2650	8/17	2600
1944	3/23	840	3/31	2060	9/5	2380	4/16	2720	7/11	1620	7/11	1630	7/12	2830	8/13	2790
1945	4/3	2710	4/18	4630	6/15	5070	6/15	4980	5/3	3990	5/2	3940	7/6	5890	8/24	6560
1946	4/10	5240	9/23	5580	9/25	5220	9/24	5220	8/30	5050	7/11	5530	7/11	6420	8/7	6460

Year	FEATHER RIVER				YUBA RIVER				AMERICAN RIVER				MOKELUMNE RIVER		CALAVERAS RIVER	
	Near Oroville		At Nicolaus		At Smartville(1)		Near Marysville		At Fair Oaks		At Sacramento		At Woodbridge		At Jenny Lind	
	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.
1924	7/8	823	8/10	0	7/31	84	No continuous record prior to 1939		8/5	5	8/4	5	9/1	1	No record	
1925	9/3	1600	8/22	460	8/31	158			8/26	237	8/27	240	8/23	33	8/15	0
1926	7/1	1720	8/15	470	9/16	126			8/25	157	8/27	180	8/11	3	8/15	0
1927	9/20	1720	8/27	670	9/25	261			9/21	309	8/27	370	9/20	2	9/15	0
1928	9/20	1330	8/13	330	9/25	212			8/23	188	8/22	230	8/30	2	9/15	0
1929	7/8	1770	7/16	583	9/25	124			9/25	94	9/30	69	7/17	33	9/10	0
1930	7/16	1840	7/18	694	9/22	235			8/20	166	8/21	162	7/1	4	9/10	1
1931	9/23	1060	7/15	0	8/31	133	8/9**	22	8/15	53	8/17	43	9/25	3	9/10	0
1932	9/23	820	9/5	293	9/10	186			9/10	202	9/14	193	8/11	249	9/10	0
1933	9/20	1120	9/5	222	9/20	169			9/9	72	9/9	70	6/23	140	8/15	0
1934	9/12	1300	9/7	308	9/7	150	8/23	45	9/1	93	9/6	110	6/25	8	8/15	0
1935	9/12	1500	9/17	975	9/16	266			9/6	204	9/6	199	8/16	206	9/10	0
1936	9/9	1880	8/30	835	9/22	278			8/28	410	8/30	438	7/17	162	9/15	0
1937	9/9	1440	8/11	265	8/20	230			9/17	264	9/16	287	7/31	140	9/15	0
1938	9/7	2070	9/7	1020	9/8	324			9/20	462	9/16	448	9/10	212	9/15	2
1939	8/5	1380	8/6	87	9/25	182	8/15	42	9/9	47	8/8	49	4/25	44	9/10	0
1940	8/7	1650	8/10	490	8/17	280	9/1	120	8/26	340	8/26	330	8/16	122	9/15	0
1941	9/17	1820	8/23	640	9/12	260	9/14	120	9/17	320	9/19	340	7/20	146	9/25	1
1942	8/20	2090	8/21	562	9/23	399	9/23	235	9/25	270	9/25	302	7/29	139	8/27	1
1943	9/22	1530	9/8	198	9/6	1	9/10	223	9/25	209	9/25	201	8/27	210	8/20	0
1944	9/26	1525	8/22	163	9/22	267	8/24	116	9/4	151	9/4	149	7/28	40	7/18	0
1945	8/25	1990	8/31	379	9/5	503	9/6	312	8/31	227	9/6	253	9/14	64	8/23	0
1946	9/25	1740	8/9	379	9/25	389	9/25	202	8/27	260	8/30	260	7/27	24	9/17	0

NOTE: For minimum daily flow see Table 3.
* Prior to 1943 record is for station at Kennett.
** Single measurement only.
(1) Subsequent to 1941 figure shown is minimum combined flow of Yuba River at Narrows Dam and Deer Creek near Smartville

TABLE 5

COMPARATIVE SAN JOAQUIN VALLEY WATER SUPPLY 1920-1946

Year	Runoff in per cent of normal*				Minimum Daily Mean Flow in Second-Feet (1)										
	Sacramento and San Joaquin to Delta		San Joaquin at Vernalis		San Joaquin River			Merced River		Tuolumne River		Stanislaus River		Calaveras River at Jenny Lind	Moke-lumne River at Wood-Bridge	Cosumnes River at Michigan Bar
					near Vernalis	near Newman	at (3) Fremont Ford Br.	at Yosemite Val.R.R.	near Mouth (6)	at La Grange Br.(4)	at Tuolumne City	at Orange Blossom Bridge	near Mouth (5)			
	40Yr.	50Yr.	40Yr.	50Yr.												
1920	56	52	63	66	(2)450	62								0		1
1924	20	28	24	24	391	15	0	0	(2) 2	(2)29	(2) 245	(2) 14	(2) 95	0	1	0
1925	83	86	86	88	660	114	0	(2) 4	(2)73	(2)35	(2) 299	(2) 19	(2)161	0	3	6
1926	57	60	55	56	565	62	0	(2) 5	(2)53	(2)32	(2) 286	(2) 15	(2)116	0	3	0
1927	114	121	100	104	1290	305	0	(2) 12	(2)204	(2)204	(2) 391	(2) 29	(2)275	0	1	6
1928	80	84	67	70	840	205	0	6	53	38	292	31	194	0	2	2
1929	42	44	44	46	565	105	0	4	65	32	287	30	205	0	3	1
1930	63	65	50	53	645	170	0	7	92	60	344	32	216	0	3	1
1931	28	30	26	27	200	22	0	1	17	25	243	25	81	0	3	0
1932	74	78	101	106	965	251	0	27	165	37	348	35	223	0	150	1
1933	45	48	51	54	569	187	0	7	127	36	280	19	185	0	81	0
1934	40	43	35	37	315	62	(2) 5	7	36	26	270	20	104	0	6	0
1935	86	91	98	103	850	306	(2)97	46	206	34	345	28	199	0	84	2
1936	91	96	100	104	980	360	150	25	190	33	375	28	194	0	65	4
1937	75	80	100	105	950	333	115	12	211	3	355	17	212	0	106	2
1938	160	170	172	180	2030	702	280	66	335	8	460	22	270	1	143	14
1939	41	43	44	46	545	202	32	2	155	3	310	13	140	0	36	0
1940	108	115	101	105	996	340	99	7	200	3	365	17	217	0	71	1
1941	130	137	121	127	1300	412	187	18	238	19	300	13	252	0	55	5
1942	120	129	113	118	1450	472	200	16	242	14	520	20	210	1	64	17
1943	107	114	112	117	1420	405	157	18	207	22	490	18	205	0	133	12
1944	52	56	59	62	1091	331	104	10	211	31	350	17	135	0	54	2
1945	81	86	101	106	1420	695	415	6	251	0	400	28	(7)182	0	49	2
1946	--	92	--	92	1090	398	148	0	232	4	340	24	(7)172	0	24	2

* 40-year normal taken as 40-year mean (1889-1929) of natural runoff at foothill stations of major tributaries.
* 50-year normal taken as 50-year mean (1889-1939) of natural runoff at foothill stations of major tributaries.
(1) Minimum daily mean flow that occurred prior to September 30. For average minimum 10-day flow see Table 6.
(2) No continuous record. Lowest discharge measured.
(3) Prior to 1934 station maintained at Delta Bridge.
(4) Prior to 1937 station maintained at Roberts Ferry Bridge. Minimum flow at Roberts Ferry for 1937, 1938 and 1939 was 18, 20 and 34 cubic feet per second, respectively.
(5) Station at Hatmark abandoned September 30, 1940. New station established at Bret Harte pump September 30, 1940.
(6) Station Merced River near Mouth abandoned in 1944, and superseded by new station Merced River below Stevinson Drain maintained by United States Bureau of Reclamation and United States Geological Survey.
(7) Flow of Bret Harte not computed after 1944. Minimum flow shown is for Ripon Bridge. New station established 1.6 miles below Bret Harte Pump August 16, 1946.

TABLE 6

AVERAGE MINIMUM 10-DAY FLOW FOR SAN JOAQUIN VALLEY STREAMS
FOR PERIOD MARCH 1 TO SEPTEMBER 30, 1924-1946

Year	SAN JOAQUIN RIVER											
	Below Friant*		At Fremont Ford Br.		Near Newman		At Grayson		At Hetch Hetchy Crossing		Near Vernalis	
	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.
1924	9/17	185			8/9	17					9/2	410
1925	9/23	596	No continuous		9/25	122	No continuous		No continuous		9/29	740
1926	9/16	578	record		9/19	77	record		record		8/21	590
1927	9/25	787	prior to		9/2	326	prior to		prior to		8/23	1300
1928	9/25	813	1937		8/20	234	1930		1936		8/22	870
1929	9/25	477			7/21	116					8/13	591
1930	9/25	678			7/20	184	8/8	230			8/4	740
1931	9/22	111			8/23	33	8/26	24			7/20	211
1932	9/21	1040			9/5	267	9/7	410			9/6	1020
1933	9/21	1090			8/15	196	8/15	270			8/14	607
1934	9/14	360			9/3	706	8/12	123			8/14	347
1935	9/25	1210			8/27	333	9/11	449			8/13	922
1936	9/24	1200	8/18	161	8/12	387	8/17	557	8/16	835	8/11	1040
1937	9/22	1130	8/21	122	8/23	364	9/24	517	8/23	744	8/23	1022
1938	9/21	1200	9/25	306	9/24	725	9/14	941	8/26	1800	8/27	2130
1939	*9/20	727	8/10	36	8/20	219	7/25	235	7/26	443	7/25	610
1940	9/23	896	8/23	101	8/20	345	8/24	520	8/13	875	8/10	1070
1941	9/11	1220	9/12	220	9/25	470	9/15	720	9/15	1360	9/14	1480
1942	9/23	1260	9/22	211	8/30	481	9/19	688	9/14	1245	8/20	1520
1943	9/24	1000	9/3	168	9/1	422	8/16	605	8/4	1216	8/4	1480
1944	3/6	584	8/10	115	9/12	377	8/9	515	8/9	702	8/9	1033
1945	3/13	1530	9/13	446	9/13	738	8/5	1010	8/5	1370	8/1	1530
1946	2/9	1200	8/11	165	8/22	449	8/11	676	8/11	922	8/5	1160

Year	STANISLAUS RIVER										MERCED RIVER							
	At Orange Blossom Br.		At Riverbank		At Ripon Br.		At Bret Harte		At Hatmark Ranch		At Yosemite Valley R.R.		At Cressey Br.		Near Livingston		Near Mouth**	
	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.
1924															8/1	26		
1925	No record		No record		No record		No record		No record		No record		No record		No record		No record	
1926	prior		prior		prior		prior		prior		prior		prior		9/24	53	prior	
1927	to 1930		to 1940		to 1940		to 1941		to 1930		to 1930		to 1941		8/28	121	to 1930	
1928															8/15	118		
1929															9/25	89		
1930	9/15	32							8/11	241	9/25	3			6/9	97	8/16	126
1931	9/15	25							8/17	96	9/18	1			9/20	55	8/23	258
1932	9/25	35							8/11	241	8/6	18			8/7	140	8/8	190
1933	9/22	19							9/5	215	9/25	11			8/21	121	8/13	141
1934	9/20	20							8/15	137	9/25	2			9/3	82	8/18	68
1935	9/1	28							9/22	230	9/9	48			9/22	159	9/16	220
1936	8/25	28							9/26	230	8/8	37			8/10	178	9/24	216
1937	9/21	17							9/10	226	9/25	21			9/20	199	8/16	228
1938	9/11	20					Station		9/16	280	8/10	76			9/12	258	9/18	342
1939	9/11	14					Established		8/20	144	9/21	7			8/8	124	8/8	174
1940	9/24	19	9/25	98	9/24	212	10/1/40		8/13	248	9/14	7			9/16	160	9/17	218
1941	9/15	18	9/25	86	9/15	209	9/22	262	Station		7/21	24	9/15	108	9/10	164	9/14	257
1942	9/26	22	9/21	99	8/15	207	8/20	232	Discontinued		9/24	18	9/18	104	9/18	175	9/19	250
1943	9/20	23	9/25	76	9/18	217	9/8	228	9/30/40		9/15	21	8/10	67	8/10	164	8/30	237
1944	9/26	4	8/15	0	9/17	179	8/14	158			9/26	18	8/26	2	Station		9/10	220
1945	9/26	29	8/19	114	8/28	207		(1)			9/8	34	7/17	95	Discon-		9/10	272
1946	9/25	26	9/25	92	9/25	188		(1)			7/6	1	8/29	97	tinued in 1944		9/7	246

NOTE: For minimum daily mean flow see Table 5.
(1) Flow not computed for Bret Harte after 1944. See Ripon Bridge.
* Prior to 1939 record is for station "Near Friant."
** See Note 6, Table 5.

(Continued on next page)

TABLE 6 (CONT'D)

AVERAGE MINIMUM 10-DAY FLOW FOR SAN JOAQUIN VALLEY STREAMS
FOR PERIOD MARCH 1 TO SEPTEMBER 30, 1924-1946

Year	TUOLUMNE RIVER										DRY CREEK	
	At La Grange Br.		At Roberts Ferry Br.		At Hickman Br.		At Modesto Br.		At Tuolumne City		Near Modesto	
	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.	Date	c.f.s.
1924												
1925	No record		No record		No record		No record		No record		No record	
1926	prior to 1937		prior to 1930		prior to 1932		prior to 1940		prior to 1930		prior to 1930	
1927												
1928												
1929												
1930			8/1	78					8/3	366	7/7	41
1931			9/25	25					7/28	249	9/16	19
1932			8/27	40	8/26	105			8/28	358	8/18	50
1933			8/19	37	8/11	102			8/3	310	7/18	41
1934			9/7	28	7/1	94			9/17	284	9/25	38
1935			8/31	35	9/6	100			8/10	370	8/15	48
1936			8/28	36	8/14	123			9/13	385	9/30	62
1937	8/15	3	8/17	19	8/21	123			8/15	363	9/18	51
1938	8/21	10	8/20	29	8/24	155			8/25	468	7/31	69
1939	6/10	3	6/15	36	4/20	138			6/18	326	9/4	38
1940	8/3	4	7/21	40	7/25	110	8/14	290	8/7	380	9/9	45
1941	8/5	137	8/6	190	8/6	211	9/13	480	9/13	595	7/25	55
1942	8/5	76	8/5	127	8/6	240	8/7	577	8/6	565	8/28	58
1943	7/1	55	7/13	65	7/15	230	7/15	392	7/15	538	9/20	44
1944	7/7	26	7/8	43	9/22	114	8/12	293	8/12	345	8/18	49
1945	7/25	17	7/27	65	8/20	144	8/1	319	8/25	452	7/28	57
1946	9/18	8	9/16	61	9/10	122	9/25	266	9/25	360	1/28	38

NOTE: For minimum daily mean flow see Table 5.

TABLE 7

COMPARISONS BETWEEN 40 AND 50 YEAR MEAN FULL NATURAL FLOWS*

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

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

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

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

TABLE 8

SACRAMENTO RIVER STREAM GAGING STATIONS
RELATION OF GAGE HEIGHTS TO FLOW FOR 1946 SEASON

Station	*Gage Height, U.S.E.D. Elevation of Water Surface for Rated Flows of:									
	1000 c.f.s.	2000 c.f.s.	3000 c.f.s.	4000 c.f.s.	5000 c.f.s.	6000 c.f.s.	7000 c.f.s.	8000 c.f.s.	9000 c.f.s.	10000 c.f.s.
Sacramento	Flows under 10,000 c.f.s. have no appreciable effect on average gage heights due to tidal action. Tidal effect lost at elevation 13.0 for flows of 30,000 c.f.s.									
Verona					10.9	11.5	12.2	12.7	13.3	13.8
Knights Landing (1)					15.0	16.6	18.1	--	--	--
Wilkins Slough				24.7	26.1	27.5	28.9	30.4	31.9	33.3
Colusa				39.3	40.3	41.3	42.3	43.2	44.2	45.3
Butte City					70.5	71.1	71.6	72.2	72.7	73.2
Red Bluff (Iron Canyon)		252.8	253.5	254.1	254.6	255.0	255.4	255.8	256.1	256.5
Keswick (2)	484.2	485.7	486.9	488.1	489.1	490.0	490.8	491.6	492.3	493.0

* Elevations may vary on account of channel changes due to scour or fill.
(1) Affected by backwater from Feather River flows. Relation as given is for average backwater conditions applicable only from July 1 to September 30.
(2) When flashboards in place in Anderson-Cottonwood Irrigation District dam, subtract 0.8 feet from observed gage height before applying rating. Zero of gage = 479.8 ft. U.S.G.S.

TABLE 9

SACRAMENTO RIVER STREAM GAGING STATIONS
COMPARATIVE WATER SURFACE ELEVATIONS AND FLOWS FOR MONTH OF JULY

Station	Elevation of Zero of Staff Gage U.S.E.D.	July 1939		July 1943		*July 1946	
		Av. W.L. U.S.E.D.	Av. Flow c.f.s.	Av. W.L. U.S.E.D.	Av. Flow c.f.s.	Av. W.L. U.S.E.D.	Av. Flow c.f.s.
Sacramento	3.1	5.3	980	6.7	4860	6.5	6900
Verona	0.0	7.6	1280	9.8	4130	12.0	6720
Knights Landing	(1) 0.0	9.4	997	13.0	2540	16.3	5720
Wilkins Slough	0.0	19.0	920	22.3	2510	26.6	5360
Colusa	(2) 0.0	36.5	1660	38.8	3300	41.7	6430
Butte City	0.0	68.9	1620	70.6	3450	71.5	6790
Red Bluff (Iron Canyon)	(3)253.2	253.0	(4)3150	253.8	4600	256.1	8660
Keswick	(3)479.8	487.1	3144	489.0	4300	492.3	8710

* Controlled releases from Shasta Reservoir commenced in 1944.
(1) Weather Bureau gage 0° = 7.6 U.S.E.D.
(2) Weather Bureau gage 0° = 40.4 U.S.E.D.
(3) Elevations are given to U.S.G.S. datum.
(4) Average flow during August = 2926 c.f.s.

TABLE 10

AVERAGE WATER SURFACE ELEVATIONS AT VARIOUS POINTS ON SACRAMENTO RIVER
FOR SEMI-MONTHLY PERIODS - MARCH TO OCTOBER - 1946
ELEVATIONS ARE U.S.E.D. DATUM

Station	Miles above Sacramento	Month and Period																00 Staff Gage U.S.E.D. Datum
		March		April		May		June		July		August		September		October		
		1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-31	1-15	16-30	1-15	16-31	
Sacramento	0	12.6	12.9	13.5	14.9	13.9	11.5	8.8	6.9	6.6	6.4	6.3	6.3	6.3	6.8	6.6	6.3	3.10
Conaway Ranch	12.0	NR	NR	16.4	18.1	16.9	14.7	11.9	9.7	9.0	9.1	9.0	9.1	9.3	10.1	NR	NR	0.0
Central M.W. Co.	16.0	NR	NR	18.3	19.4	18.3	15.9	13.0	10.9	NR	NR	10.3	10.6	10.9	11.5	NR	NR	-0.5
Verona	19.6	19.7	19.7	20.6	21.1	19.4	17.3	14.4	12.3	11.8	12.0	12.0	2.2	12.5	13.0	12.8	12.5	-0.06
Knights Landing	34.0	23.7	23.3	24.1	23.4	21.8	20.7	18.1	16.4	16.1	16.5	16.6	16.7	17.0	17.5	17.1	16.9	0.0
State Ranch Bend	40.6	NR	NR	24.1	24.4	NR	NR	19.6	18.1	17.8	18.2	18.3	18.5	NR	18.2	18.6	19.5	0.0
Rough and Ready	44.0	27.0	26.3	26.9	25.4	23.3	22.8	20.6	19.2	18.9	19.6	19.5	19.5	19.5	20.3	20.0	19.8	0.0
Wilkins Slough	62.9	33.1	32.7	33.0	30.8	28.7	28.6	27.3	26.6	26.4	26.8	26.9	16.7	26.4	27.1	27.1	27.0	0.0
R.D. 70 Drain	68.8	36.4	35.2	35.4	33.0	31.2	30.9	29.8	29.2	29.0	29.6	29.6	29.3	28.8	29.3	29.3	29.3	0.0
Meridian	79.8	40.8	39.6	39.8	38.5	36.9	36.7	36.0	35.5	35.4	35.8	35.6	35.2	34.6	34.6	34.5	34.5	0.0
Colusa	89.4	45.5	44.5	44.8	44.0	42.5	42.3	41.5	41.3	41.4	41.9	41.9	41.5	40.6	40.5	40.5	40.7	0.0
Butte City	115.8	73.3	72.8	73.0	72.7	71.9	71.8	71.4	71.2	71.4	71.6	71.5	71.4	70.9	70.7	70.7	70.8	0.0
Ord Ferry	130.8	99.7	99.4	99.5	99.4	98.8	98.5	98.2	98.1	98.1	98.3	98.2	98.0	97.5	97.3	97.4	97.5	0.0
Hamilton City Bridge (1)	150.0	129.8	129.5	129.6	129.6	128.8	128.8	128.5	128.5	128.6	128.9	128.8	128.6	128.2	128.0	128.1	128.2	100.0
Vina Bridge (1)	166.5	168.3	168.2	168.3	168.8	168.2	168.1	167.8	167.9	168.0	168.2	168.2	167.9	167.4	166.9	166.9	167.0	100.0
Red Bluff	193.4	245.6	245.3	245.7	246.0	245.6	245.6	245.4	245.5	245.7	245.9	245.9	245.7	244.9	244.5	244.4	244.5	240.6
Iron Canyon	198.6	255.7	255.6	255.8	256.1	255.7	255.8	255.7	255.8	255.9	256.2	256.1	255.9	255.4	254.9	255.0	255.0	253.2*
Balls Ferry (1)	224.5	362.0	362.0	362.0	362.5	362.1	362.2	362.2	362.3	362.6	362.8	362.7	362.5	362.0	361.5	361.6	361.7	359.0
Redding (1)	242.0	457.3	457.3	457.3	457.8	457.6	457.8	457.9	458.1	458.3	458.6	458.5	458.3	457.3	457.4	457.4	457.4	403.0

* U.S.G.S. datum.
(1) U. S. Bureau of Reclamation recorder station.

TABLE 11

AVERAGE WATER SURFACE ELEVATIONS AT VARIOUS POINTS ON SAN JOAQUIN VALLEY STREAMS
FOR SEMI-MONTHLY PERIODS - MARCH TO OCTOBER - 1946
DATUM REFERENCE AS SHOWN

Station	Miles above Mouth	Month and Period																Datum of 00 Staff Gage
		March		April		May		June		July		August		September		October		
		1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-31	1-15	16-30	1-15	16-31	
San Joaquin River																		
at Mossdale	58.9	7.6	6.7	8.0	9.0	13.0	13.2	11.3	7.3	6.7	6.2	6.3	6.0	6.0	6.1	5.8	5.6	5.4 E.D.
at Vernalis	76.7	18.7	18.1	19.5	21.4	25.7	25.6	23.2	17.8	16.5	15.9	15.6	15.7	15.9	15.8	16.1	16.2	8.4 E.D.
at Hetch Hetchy	82.0	22.9	21.6	23.1	24.4	29.1	29.2	27.0	21.5	20.4	19.6	19.3	19.6	20.0	20.2	20.4	20.6	0.0 E.D.
at Grayson	96.1	31.4	29.8	31.2	30.2	36.1	36.6	34.8	30.2	29.1	28.0	27.8	28.0	28.3	28.2	28.4	27.5	0.0 E.D.
at Patterson	104.4	40.4	39.0	40.1	39.2	43.9	44.1	42.7	39.2	38.4	37.4	37.3	37.4	37.6	37.5	37.7	36.9	0.0 E.D.
at Crows Ldg. Br.	113.0	47.0	45.5	46.6	46.0	50.5	50.6	49.2	45.9	45.0	44.2	44.0	44.0	44.2	44.1	44.1	43.4	42.2 E.D.
at Newman	123.7	56.1	54.6	55.9	55.7	59.6	59.6	58.3	55.0	54.2	53.4	53.3	53.3	53.6	53.5	53.5	52.8	51.0 E.D.
at Fremont Ford	129.5	61.6	61.0	62.5	60.8	64.8	66.0	64.9	62.0	61.2	60.0	59.8	60.0	60.6	60.4	60.4	59.7	0.0 E.D.
Merced River																		
at Stevinson Dr.	64.9	61.7	59.7	60.6	61.5	65.6	63.8	62.9	59.7	59.1	58.8	58.9	58.7	58.5	58.7	58.6	58.0	56.1 G.S.
at Cressey Bridge	5.8	4.6	2.4	3.5	5.1	8.0	6.5	5.4	1.9	1.5	1.4	1.6	1.4	1.4	1.6	1.5	1.2	(1)
at Yos. Val. R.R.	3.6	4.1	3.0	3.6	4.5	5.4	5.0	4.5	2.4	2.2	2.6	2.7	2.4	2.3	2.5	2.3	2.2	(1)
Tuolumne River																		
at Tuolumne City	3.4	30.4	29.3	30.6	33.0	36.0	36.8	34.7	29.1	28.7	28.6	28.5	28.5	28.5	28.3	28.9	30.0	0.0 E.D.
at Modesto	15.8	39.6	38.1	40.4	42.9	46.1	46.6	44.4	38.0	37.5	37.4	35.3	37.2	37.2	37.0	37.9	39.2	0.0 G.S.
at Hickman Bridge	31.7	75.8	74.8	75.7	77.7	79.3	79.3	78.3	74.3	74.1	74.1	74.0	74.0	74.0	74.0	74.7	75.6	0.0 G.S.
at Roberts Ferry Bridge	39.9	113.2	113.3	113.3	114.8	116.2	116.0	115.1	111.6	111.6	111.5	111.5	111.6	111.4	111.5	112.2	113.1	3.6 E.D.
at La Grange Br.	50.4	168.7	167.6	169.0	171.1	172.4	172.2	171.1	166.3	166.3	166.4	166.4	166.4	166.3	166.3	167.3	168.6	0.0 G.S.*
Stanislaus River																		
at Bret Herte	5.9	23.6	23.8	25.4	29.2	30.8	29.0	26.3	22.9	22.2	22.0	21.7	21.9	NR	21.6	21.7	21.6	0.0 G.S.
at Ripon	16.0	40.6	42.6	43.5	50.1	52.2	48.8	44.5	39.6	38.6	38.3	38.1	38.0	38.0	37.8	37.7	37.8	0.0 G.S.
at Riverbank	35.6	76.2	78.0	78.4	83.8	84.7	81.6	78.7	74.0	73.5	73.4	73.4	73.3	73.4	73.3	73.3	73.5	0.0 G.S.*
at Orange Blossom Bridge	44.7	128.1	129.4	129.5	134.1	134.6	132.2	129.7	126.9	126.7	126.7	126.7	126.7	126.6	126.6	126.6	126.6	125.0 G.S.*

* Assumed.
(1) Datum not established. Elevations shown above are mean gage heights for the period.

TABLE 12

DAILY CONTENT OF SHASTA RESERVOIR IN ACRE-FEET - 1946

Date	Figure given is amount in storage at end of day											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3252000	2918000	2958000	3225000	3426000	3450000	3263000	2950000	2623000	2446000	2304000	2255000
2	3255000	2916000	2968000	3235000	3429000	3446000	3255000	2939000	2615000	2442000	2299000	2252000
3	3259000	2913000	2976000	3244000	3434000	3444000	3247000	2928000	2606000	2438000	2293000	2252000
4	3273000	2910000	2985000	3252000	3440000	3440000	3236000	2916000	2599000	2433000	2289000	2253000
5	3279000	2906000	2992000	3261000	3445000	3437000	3227000	2905000	2592000	2428000	2284000	2255000
6	3273000	2905000	2999000	3269000	3451000	3434000	3217000	2895000	2586000	2422000	2280000	2265000
7	3262000	2902000	3006000	3276000	3455000	3429000	3207000	2884000	2578000	2417000	2274000	2269000
8	3242000	2898000	3012000	3286000	3458000	3423000	3198000	2873000	2570000	2412000	2270000	2272000
9	3217000	2895000	3019000	3293000	3462000	3416000	3189000	2862000	2563000	2408000	2264000	2273000
10	3190000	2891000	3026000	3300000	3465000	3411000	3179000	2851000	2557000	2403000	2259000	2272000
11	3172000	2888000	3033000	3307000	3467000	3405000	3170000	2839000	2551000	2398000	2254000	2272000
12	3161000	2884000	3043000	3314000	3468000	3401000	3161000	2828000	2545000	2393000	2250000	2271000
13	3150000	2880000	3054000	3322000	3469000	3395000	3150000	2817000	2539000	2388000	2245000	2269000
14	3139000	2875000	3063000	3329000	3469000	3390000	3138000	2806000	2532000	2384000	2241000	2266000
15	3127000	2875000	3077000	3337000	3468000	3383000	3129000	2795000	2525000	2380000	2237000	2262000
16	3114000	2874000	3080000	3347000	3467000	3375000	3118000	2784000	2519000	2375000	2232000	2260000
17	3099000	2874000	3088000	3355000	3466000	3368000	3108000	2772000	2515000	2370000	2227000	2256000
18	3084000	2875000	3096000	3364000	3466000	3363000	3098000	2759000	2511000	2367000	2227000	2254000
19	3069000	2878000	3103000	3371000	3465000	3357000	3087000	2748000	2506000	2362000	2234000	2251000
20	3052000	2880000	3110000	3378000	3464000	3351000	3077000	2738000	2501000	2356000	2232000	2248000
21	3037000	2888000	3117000	3382000	3463000	3344000	3066000	2726000	2496000	2352000	2231000	2244000
22	3020000	2894000	3126000	3387000	3463000	3335000	3055000	2716000	2490000	2349000	2253000	2240000
23	3003000	2900000	3135000	3392000	3462000	3326000	3045000	2706000	2485000	2346000	2269000	2237000
24	2987000	2908000	3143000	3397000	3460000	3319000	3034000	2697000	2481000	2342000	2271000	2234000
25	2970000	2916000	3151000	3404000	3459000	3311000	3024000	2686000	2476000	2337000	2270000	2230000
26	2953000	2925000	3158000	3410000	3459000	3304000	3015000	2677000	2471000	2332000	2269000	2226000
27	2935000	2936000	3166000	3414000	3459000	3296000	3004000	2668000	2466000	2327000	2267000	2224000
28	2926000	2947000	3178000	3417000	3458000	3288000	2992000	2659000	2461000	2323000	2264000	2221000
29	2925000		3191000	3422000	3457000	3280000	2981000	2650000	2455000	2318000	2261000	2218000
30	2923000		3203000	3424000	3454000	3271000	2970000	2641000	2450000	2313000	2258000	2214000
31	2920000		3214000		3452000		2960000	2633000		2309000		2211000
Monthly Change Ac.Ft.	-330000	+27000	+267000	+210000	+28000	-181000	-311000	-327000	-183000	-141000	-51000	-47000

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

TABLE 13

FLOW OF SACRAMENTO RIVER AT KESWICK - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	21000	8020	5500	5340	7730	6910	7940	8900	7400	5600	5900	5840
2	22000	8020	5370	5330	7350	6910	8120	8890	7380	5610	5900	5840
3	25300	8020	5360	5320	6030	6930	8410	8890	7390	5630	5920	5940
4	28300	8020	5360	5300	5910	6900	8450	8900	7190	5600	5900	5940
5	27700	8030	5370	5280	5910	6910	8450	8900	6820	5630	5880	5960
6	27000	8120	5360	5280	5870	6910	8430	8900	6820	5620	5860	6570
7	27200	8060	5330	5280	5840	7100	8410	8890	6820	5630	5840	5920
8	26900	8050	5320	5280	5850	7430	8430	8870	6790	5620	5840	5880
9	26900	8030	5320	5260	5920	7400	8450	8860	6680	5460	5820	5860
10	26800	8030	5320	5240	6680	7420	8450	8860	6290	5560	5810	5840
11	22000	8030	5320	5230	6600	7390	8450	8850	6270	5710	5810	5850
12	16200	8030	5330	5210	6590	7390	8380	8830	6270	5790	5810	5850
13	16200	8020	5390	5210	6600	7390	8680	8830	6280	5500	5860	5850
14	16100	8020	5320	5210	7020	7400	8900	8850	6270	5790	5860	5820
15	16100	6260	5300	5230	7620	7380	8920	8860	6270	5810	5850	5810
16	16100	5960	5300	5520	7580	7480	8930	8860	6150	5840	5800	5810
17	16100	5940	5300	6210	7470	7430	8940	8860	5530	5850	5870	5810
18	16000	5970	5300	6520	6830	7420	8940	8830	5540	5850	5940	5820
19	16100	5980	5300	7230	6860	7420	8940	8870	5550	5850	6380	5820
20	15900	5970	5310	7130	6840	7610	8970	8890	5540	5550	5910	5820
21	16100	6060	5290	7810	6840	7920	8970	8900	5540	5850	5900	5820
22	16000	6000	5280	7280	6830	7940	9000	8900	5550	5870	6420	5820
23	16100	5970	5280	7710	6840	7960	9000	8300	5560	5860	6200	5820
24	16100	5960	5280	7700	6840	7980	9000	7920	5580	5850	5870	5850
25	16000	5930	5290	7700	6860	7980	9000	7920	5610	5870	5860	5850
26	16100	5940	5280	7700	6930	7920	8970	7920	5600	5850	5840	5850
27	16100	5920	5280	7700	6830	7940	8900	7920	5600	5870	5840	5850
28	12600	5930	5280	7730	6830	7950	8900	7910	5600	5880	5840	5860
29	8220		5280	7730	6840	7960	8900	7940	5600	5880	5840	5850
30	8020		5330	7710	6860	7960	8900	7740	5590	5900	5840	5850
31	8020		5360		6900		8920	7390		5900		5860
Mean	18560	7010	5323	6279	6726	7488	8711	8585	6169	5745	5907	5875
Runoff in Ac. Ft.	1141000	389300	327300	373600	413600	445600	535600	527900	367100	353200	351500	361200

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.

TABLE 14

FLOW OF SACRAMENTO RIVER AT REDDING*- 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	21690	7950	5550	5270	7170	6430	7430	8550	7040	5360	5620	5880
2	22696	8010	5410	5300	6867	6480	7590	8550	7040	5430	5720	5900
3	24648	7950	5360	5250	5362	6510	7980	8530	7040	5460	5720	6030
4	27545	7950	5360	5250	5390	6460	7950	8530	6880	5410	5898	6110
5	26860	7920	5360	5210	5460	6460	7920	8530	6480	5460	5950	6060
6	26380	8040	5360	5210	5410	6540	7900	8550	6510	5460	5900	6860
7	26460	7980	5180	5180	5410	6700	7900	8550	6510	5480	5850	6080
8	26220	7950	5180	5210	5390	7010	7900	8530	6510	5430	5820	6030
9	26140	7950	5180	5210	5447	6990	7920	8500	6430	5320	5820	6010
10	26100	7920	5180	5140	6240	7010	7900	8530	6010	5430	5820	5980
11	22243	7900	5180	5070	6190	7040	7870	8530	5980	5360	5820	5930
12	16150	7900	5210	5030	6140	6990	7810	8500	5980	5460	5850	5950
13	16080	8010	5180	5030	6160	7010	8090	8550	6010	5140	5900	5950
14	15900	8060	5180	5030	6487	7010	8410	8550	5980	5340	5880	5930
15	15940	6398	5180	5030	7170	7010	8410	8530	5950	5500	5850	5930
16	15830	5980	5160	5166	7140	7090	8410	8530	5930	5530	5850	5900
17	15760	5950	5160	5820	7080	7040	8410	8550	5270	5550	5880	5880
18	15720	5980	5180	6071	6370	6990	8440	8470	5270	5550	5980	5900
19	15830	6010	5160	6874	6370	6990	8410	8530	5270	5550	6495	5900
20	15510	5980	5210	6620	6400	7120	8410	8500	5270	5250	5930	5930
21	15720	6140	5160	7250	6370	7480	8440	8550	5250	5550	5950	5950
22	15720	6030	5160	6632	6400	7480	8440	8550	5270	5670	6472	5950
23	15650	6010	5160	7200	6400	7530	8470	7957	5300	5670	6314	5930
24	15690	6010	5140	7220	6370	7560	8500	7510	5300	5650	5930	5950
25	15650	5980	5160	7220	6400	7560	8530	7530	5340	5700	5900	5950
26	15650	6010	5120	7200	6480	7530	8580	7530	5320	5670	5900	5980
27	15610	5980	5160	7220	6430	7530	8550	7560	5320	5670	5900	5930
28	13005	6030	5160	7250	6400	7560	8550	7530	5320	5670	5900	5930
29	8090		5140	7220	6400	7530	8550	7530	5320	5650	5900	5950
30	7920		5210	7250	6430	7530	8550	7460	5340	5580	5930	5930
31	7920		5230		6400		8550	7040		5530		5980
Mean	18269	6999	5217	5988	6262	7072	8218	8237	5881	5499	5922	5986
Runoff in Ac. Ft.	1123329	388722	320772	356302	385063	420839	505336	506461	349969	338147	352367	368078

* Station is at Highway 44 and is below Anderson-Cottonwood diversion dam. It is located at Mile 243.0 above Sacramento.

NOTE: This station is maintained, operated, and records compiled by the U. S. Bureau of Reclamation.

TABLE 15

FLOW OF SACRAMENTO RIVER AT BALL'S FERRY - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	25850	8680	7310	7300	8010	6810	7550	8500	7040	5570	6010	6220
2	32087	8830	6940	7040	7890	6790	7600	8450	7010	5570	6050	6190
3	40490	9190	6810	6940	6360	6760	7980	8420	7010	5610	6030	6630
4	44680	8930	6610	6790	6320	6690	7980	8450	6940	5630	6130	9000
5	38260	8780	6590	6660	6370	6690	8010	8420	6520	5630	6130	8270
6	33340	8910	6520	6560	6300	6710	7980	8420	6520	5650	6130	10190
7	33040	9450	6420	6520	6260	6760	7980	8450	6490	5680	6090	7700
8	31570	9000	6370	6540	6190	7140	7980	8420	6520	5700	6050	7850
9	30540	8880	6370	6490	6170	7090	7960	8420	6470	5590	6070	7140
10	30040	8850	6400	6350	6830	7120	7960	8420	6130	5650	6070	6710
11	26940	8750	6490	6190	6860	7120	7960	8420	6050	5650	6070	6540
12	18740	8730	6350	6170	6790	7090	7880	8420	6070	5700	6090	6470
13	18500	8630	7470	6170	6790	7120	8030	8400	6070	5540	6090	6400
14	18220	8600	6760	6190	6930	7120	8450	8420	6090	5660	6110	6350
15	18030	7480	6520	6170	7620	7120	8420	8420	6110	5740	6090	6300
16	17790	6860	6470	6170	7620	7250	8420	8400	6110	5760	6050	6280
17	17740	6790	6400	6910	7570	7170	8420	8400	5630	5760	6110	6260
18	17600	6790	6470	6990	6960	7120	8450	8370	5560	5760	6190	6260
19	17470	6810	6440	7910	6940	7070	8420	8420	5540	5760	7340	6240
20	17330	7010	6420	7640	6910	7090	8420	8420	5540	5590	6610	6240
21	17330	8730	6440	8160	6860	7470	8450	8420	5540	5740	6320	6240
22	17280	7990	6350	7670	6910	7500	8450	8420	5540	5850	6920	6220
23	17280	7470	6400	8060	7040	7550	8480	8070	5540	5890	9290	6220
24	17190	7510	6320	8110	6960	7570	8450	7450	5540	5890	6760	6240
25	17190	7990	6280	8140	6940	7570	8500	7450	5570	5870	6420	6240
26	17100	7450	6220	8160	7270	7520	8630	7500	5560	5890	6320	6260
27	17060	7830	6220	8160	7140	7500	8630	7500	5560	5870	6260	6280
28	15630	8140	6260	8110	6990	7520	8600	7470	5570	5870	6240	6240
29	9080		6890	8140	6890	7520	8580	7500	5570	5890	6240	6240
30	8780		7200	8060	6860	7550	8550	7450	5560	5910	6220	6220
31	8700		7220		6840		8530	7040		5930		6240
Mean	22286	8181	6579	7149	6916	7170	8248	8153	6032	5735	6350	6706
Runoff in Ac. Ft.	1370355	454341	404495	425401	425243	426651	507181	501290	358954	352666	377857	412330

NOTE: This station is maintained and operated, and records compiled by U. S. Bureau of Reclamation. It is located at Mile 224.5 above Sacramento.

TABLE 16

FLOW OF SACRAMENTO RIVER NEAR RED BLUFF - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	29300	10000	9040	9320	9210	7640	8020	8930	7350	5640	6150	6470
2	33500	10100	8320	8810	9150	7590	7940	8900	7350	5730	6220	6440
3	50100	10600	8080	8510	7940	7560	8350	8900	7350	5800	6170	7190
4	53900	10400	7860	8210	7460	7510	8400	8900	7380	5800	6240	13000
5	51500	10100	7730	8050	7480	7480	8430	8900	6930	5770	6320	11200
6	40900	10100	7590	7940	7510	7510	8430	8870	6850	5770	6320	13700
7	38600	10900	7480	7890	7400	7510	8460	8870	6820	5770	6270	10200
8	37000	10300	7400	7940	7350	7890	8460	8870	6820	5800	6200	9230
9	34800	10100	7380	7860	7350	7830	8370	8870	6800	5640	6200	8400
10	33600	10000	7400	7640	7920	7830	8350	8870	6420	5730	6200	7620
11	32300	9950	7640	7380	8050	7830	8320	8900	6240	5730	6200	7290
12	21600	9840	7400	7320	8000	7830	8270	8870	6220	5730	6220	7080
13	20400	9780	8400	7380	7940	7810	8350	8870	6240	5640	6220	7010
14	20100	9720	8080	7460	7890	7780	8810	8870	6270	5540	6240	6900
15	19800	8950	7640	7400	8660	7780	8840	8870	6300	5800	6240	6850
16	19500	7830	7510	7400	8700	7860	8840	8870	6340	5820	6200	6750
17	19200	7730	7430	8240	8650	7920	8840	8840	5840	5800	6240	6720
18	19000	7700	7480	8510	8180	7750	8840	8840	5610	5820	6400	6640
19	18900	7750	7460	9400	8020	7640	8810	8900	5570	5820	7620	6620
20	18800	8000	7460	9150	8000	7620	8790	8840	5570	5770	7590	6600
21	18500	9330	7480	9350	7940	8050	8810	8840	5570	5680	6770	6570
22	18600	9550	7380	9290	8000	8130	8810	8840	5540	5980	7290	6520
23	18500	8670	7460	9120	8100	8210	8870	8650	5540	6030	11800	6500
24	18400	8480	7290	9430	8050	8210	8870	7890	5570	6000	8180	6500
25	18300	9320	7240	9520	7920	8210	8900	7830	5610	5980	7140	6520
26	18200	8670	7160	9600	8270	8130	9070	7830	5610	5980	6800	6540
27	18200	8760	7140	9550	8350	8080	9090	7860	5590	5960	6640	6570
28	18000	10000	7210	9460	8000	8100	9070	7860	5590	5960	6570	6600
29	11400		7920	9430	7830	8100	9040	7890	5640	5980	6520	6540
30	10200		8270	9350	7730	8080	8980	7890	5610	5980	6500	6520
31	10000		8870		7640		8950	7460		6030		6520
Mean	25520	9380	7684	8530	8022	7849	8657	8593	6205	5822	6722	7542
Rupoff in Ac. Ft.	1569000	520900	472500	507600	493200	467000	532300	528400	369200	358000	400000	463800

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 damsite, Mile 198.6 above Sacramento.

TABLE 17

FLOW OF SACRAMENTO RIVER AT VINA BRIDGE - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	31180	11100	10970	11190	10620	8380	8330	9080	7360	5850	6290	6840
2	35160	11100	9900	10590	10470	8330	8200	9050	7440	5910	6440	6780
3	61110	11610	9470	9950	9830	8250	8430	9050	7470	5990	6350	7200
4	57020	11610	9130	9550	8900	8090	8640	9030	7490	6010	6370	18520
5	70640	11130	8920	9340	8920	7960	8640	8980	7290	5970	6460	17670
6	50210	10980	8850	9160	8900	7910	8590	8950	7080	5990	6460	20680
7	43980	11620	8740	9130	8770	7940	8560	9000	7050	6030	6370	15220
8	43030	11420	8690	9130	8640	8140	8560	9000	7050	6050	6310	11350
9	39310	10980	8740	9000	8560	8220	8480	8950	7080	6030	6310	10320
10	37530	10830	8790	8820	8750	8220	8430	8920	6880	5950	6290	8980
11	36240	10710	8980	8590	9160	8170	8430	8950	6620	6050	6290	8230
12	28010	10560	8850	8480	9000	8140	8350	8980	6550	6010	6350	7910
13	24060	10470	9290	8590	8950	8120	8330	8950	6550	6010	6330	7700
14	23400	10410	10020	8790	8850	8090	8640	8950	6550	5850	6400	7570
15	22750	10180	9130	8850	9200	8120	8900	8980	6550	6090	6400	7440
16	22380	8850	8900	8980	9520	8140	8900	9000	6590	6070	6420	7290
17	21970	8590	8720	9540	9470	8250	8920	8980	6370	6070	6370	7230
18	21720	8510	8720	10270	9280	8040	8920	8920	5950	6090	6530	7210
19	21520	8530	8740	10790	8870	7990	8870	9000	5890	6110	7700	7130
20	21470	8770	8640	11040	8850	7960	8870	8950	5880	6180	8720	7100
21	20940	9240	8640	10530	8740	8170	8900	8950	5860	5990	7290	7100
22	20980	11490	8560	10920	8690	8380	8900	8920	5830	6220	8460	7050
23	20780	9870	8460	10310	8740	8430	8920	8920	5830	6310	16830	7000
24	20700	9520	8400	10950	8660	8510	8950	8160	5860	6310	10480	7030
25	20650	10270	8250	11190	8510	8510	8950	7880	5860	6290	8020	7050
26	20570	9930	8120	11350	8690	8480	9030	7940	5880	6260	7390	7080
27	20490	9760	8170	11260	9130	8380	9160	7880	5850	6260	7130	7130
28	20330	11660	8330	11100	8740	8350	9130	7860	5850	6290	6980	7230
29	15050		8940	10980	8510	8350	9110	7880	5880	6260	6880	7130
30	11680		9630	10800	8400	8350	9080	7910	5860	6330	6860	7050
31	11290		10320		8350		9030	7600		6330		7030
Mean	29553	10346	8968	9972	8989	8212	8747	8696	6475	6102	7249	8911
Rupoff in Ac. Ft.	1817184	574620	551433	593404	552742	488675	537826	534692	385295	375199	431372	547942

NOTE: This station is maintained and operated and records compiled by U. S. Bureau of Reclamation. It is located at Mile 166.5 above Sacramento.

TABLE 18

FLOW OF SACRAMENTO RIVER AT HAMILTON CITY (GIANELLA BRIDGE) - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	29700	11450	11330	11140	8820	6350	6280	6900	5630	4950	5610	6950
2	35000	11450	10300	10700	8690	6350	6070	7000	5610	5010	5990	6850
3	55000	11790	9760	10050	8380	6300	6170	6980	5590	5090	6220	7000
4	52000	11910	9450	9680	7160	6170	6510	6980	5560	5110	6200	15040
5	71900	11480	9240	9400	7030	6020	6560	6980	5800	5090	6330	15860
6	51700	11260	9110	9240	7000	5940	6540	7000	5130	5070	6220	18950
7	43300	11630	9010	9140	7030	5940	6510	6980	5170	5130	5730	16250
8	42480	11770	8950	9140	6820	6040	6480	6930	5260	5130	5780	11300
9	39100	11290	8980	8930	6720	6330	6460	7000	5260	5130	5780	10360
10	37490	11140	9030	8590	6720	6280	6480	6950	5220	5030	5710	9080
11	36000	11040	9160	8170	7110	6220	6480	6980	4930	5070	5610	8380
12	30000	10860	9140	7940	6930	6150	6430	6950	4970	5090	5630	8020
13	23840	10670	9180	7990	6870	6120	6380	6980	5050	5110	5660	7780
14	23040	10640	10340	8070	6800	6090	6610	6950	5240	4930	5680	7650
15	22380	10580	9450	7940	6980	6090	6950	6950	5240	5110	5830	7520
16	21890	9300	9190	7840	7520	6150	7510	6980	5260	5190	5910	7390
17	21450	8980	9010	8020	7500	6220	6930	7030	5280	5220	5940	7320
18	21100	8800	8900	8720	7420	6020	7000	7000	4970	5220	6070	7210
19	20840	8820	9010	9010	6980	5910	6950	6980	4860	5260	6710	7160
20	20670	8720	8900	9440	6950	5860	6900	6980	4860	5280	8430	7130
21	20190	9290	8880	8990	6850	5990	6900	6900	4880	5150	7150	7110
22	20190	11620	8800	9210	6770	6300	7030	6900	4820	5420	7010	7080
23	20030	10420	8720	8620	6850	6350	7420	6870	4820	5560	14700	7030
24	19990	10420	8670	9060	6720	6460	7000	6380	4860	5610	11740	7060
25	19830	9860	8540	9290	6560	6480	6900	5940	4860	5560	8380	7080
26	19720	9630	8280	9450	6740	6350	7110	5940	4880	5560	7550	7080
27	19600	9790	8040	9370	7290	6300	7240	5940	4860	5540	7260	7130
28	19480	11270	8120	9270	6930	6300	7260	5990	4840	5510	7110	7210
29	16540		8510	9190	6740	6300	7110	6020	4910	5560	7080	7130
30	12330		9490	8980	6540	6300	7080	5990	4970	5590	7000	7080
31	11690		10330		6430		6950	5940		5490		7060
Mean	28983	10567	9155	9019	7092	6189	6781	6719	5120	5251	6867	8750
Runoff in Ac. Ft.	1782115	586878	562957	536695	436072	368296	416932	413143	304640	322854	408641	538024

NOTE: This station is maintained and operated and records compiled by U. S. Bureau of Reclamation. It is located at Mile 150.0 above Sacramento.

TABLE 19

FLOW OF SACRAMENTO RIVER AT BUTTE CITY - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	35800	13000	12400	11000	8860	6770	6390	6920	6050	5220	6150	7300
2	37700	12700	11600	11300	8730	6580	6370	6860	5960	5310	6280	7230
3	44200	12700	10900	10600	8630	6620	6280	6880	5940	5350	6720	7360
4	59800	12900	10600	10200	7850	6810	6620	6810	5900	5360	6740	11600
5	73800	12600	10300	9940	7490	6810	6710	6830	6080	5350	6790	17300
6	76300	12400	10100	9720	7400	6730	6690	6810	5630	5330	6930	20000
7	54400	12400	9900	9580	7400	6690	6680	6810	5580	5350	6460	20200
8	47900	12800	9780	9490	7260	6560	6660	6770	5600	5360	6280	13900
9	44100	12400	9720	9410	7150	6480	6560	6810	5630	5400	6280	12000
10	40700	12200	9680	9110	7040	6450	6560	6810	5600	5270	6280	10500
11	38600	12100	9700	8880	7260	6410	6480	6810	5360	5310	6150	9490
12	35600	12000	9780	8500	7340	6350	6450	6850	5310	5330	6170	8890
13	27200	11800	9620	8480	7230	6300	6390	6830	5350	5330	6170	8530
14	25100	11700	10400	8520	7190	6250	6450	6860	5450	5290	6210	8290
15	24100	11600	10200	8480	7170	6140	6850	6860	5530	5180	6300	8070
16	23400	11000	9820	8290	7640	6120	7260	6900	5540	5360	6300	7930
17	22400	10300	9620	8350	7720	6100	6980	6920	5560	5400	6460	7830
18	21800	10100	9490	8730	7700	6170	6960	6940	5400	5380	6500	7710
19	21300	10000	9510	8970	7420	6080	6940	6860	5270	5470	6770	7690
20	21000	9960	9470	9470	7360	5960	6860	6940	5260	5490	8460	7590
21	20600	10300	9430	9300	7210	5890	6810	6920	5270	5470	8070	7550
22	20200	11600	9390	9280	7190	6100	6830	6960	5200	5450	7500	7480
23	20100	11600	9280	9050	7190	6230	7300	6960	5180	5800	12000	7460
24	19900	10900	9240	8960	7230	6210	6960	6770	5240	6100	14200	7430
25	19700	10800	9070	9180	7150	6260	6900	6230	5220	6100	9850	7430
26	19600	11300	8940	9300	7150	6320	7000	6210	5240	6060	8410	7460
27	19400	10900	8670	9370	7420	6280	7110	6210	5220	6060	7880	7480
28	19200	11300	8630	9240	7570	6160	7170	6210	5170	6060	7640	7570
29	18400		8800	9140	7210	6070	7130	6210	5180	6080	7410	7550
30	14500		9520	9010	7070	5990	7090	6230	5260	6130	7360	7410
31	13400		10400		6960		7000	6260		6020		7410
Mean	31619	11620	9805	9295	7458	6330	6788	6718	5473	5554	7357	9408
Runoff in Ac. Ft.	1944000	645300	602900	553100	458600	376600	417400	413100	325600	341500	437800	578500

NOTE: Station is maintained jointly by Division of Water Resources and the Water Resources Branch of the U. S. Geological Survey. Station is near Butte City Ferry and is at Mile 115.8 above Sacramento.

TABLE 20

FLOW OF SACRAMENTO RIVER AT COLUSA - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	31200	13200	12000	11200	8680	6580	5350	6550	5930	5290	6000	7380
2	30400	12800	12100	11600	8500	6540	5860	6520	5770	5320	6070	7290
3	31100	12500	11200	11100	8390	6520	5760	6560	5810	5430	6420	7280
4	33400	12700	10700	10500	7980	6470	5880	6530	5870	5450	6520	8300
5	34000	12600	10300	10000	7200	6320	6130	6560	5900	5440	6540	14900
6	35300	12400	10100	9750	7010	6200	6180	6510	5890	5380	6640	17200
7	33800	12200	9850	9620	6950	6080	6170	6520	5540	5370	6590	19900
8	32600	12300	9770	9520	6910	6070	6180	6480	5520	5400	6250	17200
9	32100	12400	9620	9400	6710	6140	6170	6440	5510	5380	6200	13200
10	31400	12200	9560	9220	6610	6280	6160	6410	5520	5370	6200	11500
11	31000	11900	9520	8990	6600	6220	6120	6390	5490	5280	6140	10300
12	30500	11800	9580	8590	6910	6200	6130	6410	5300	5290	6070	9510
13	28400	11600	9530	8290	6830	6120	6120	6380	5300	5310	6080	8980
14	26000	11500	9850	8390	6810	6060	6080	6400	5370	5330	6110	8670
15	24700	11400	10400	8400	6660	6030	6330	6420	5510	5200	6130	8420
16	23900	11300	9850	8220	6950	6010	6620	6440	5580	5290	6240	8250
17	23300	10600	9600	8060	7330	6000	7020	6470	5590	5370	6260	8050
18	22800	10100	9420	8110	7350	5990	6660	6480	5580	5390	6340	7890
19	22400	9810	9380	8590	7340	5860	6740	6450	5320	5420	6420	7790
20	22100	9880	9370	8980	7070	5850	6720	6460	5270	5460	7310	7710
21	21800	9810	9260	9310	6970	5600	6730	6470	5260	5490	8170	7670
22	21400	10600	9240	9030	6880	5580	6760	6490	5250	5400	7420	7630
23	21300	11800	9120	9110	6820	5830	7060	6480	5190	5680	8610	7580
24	21200	11100	9060	8610	6930	5900	6960	6480	5200	6040	13700	7540
25	21100	10700	8950	8890	6920	5930	6700	6020	5160	6060	11600	7560
26	20900	11100	8840	9050	6870	5890	6540	5760	5210	6060	9020	7540
27	20800	11000	8630	9220	6970	5840	6710	5700	5240	6040	8130	7550
28	20600	10900	8430	9200	7360	5800	6790	5700	5210	6010	7770	7570
29	20400		8410	9050	7170	5810	6780	5800	5210	6000	7570	7600
30	17500		9100	8870	6900	5830	6730	5890	5300	6020	7440	7550
31	14300		10100		6740		6640	5960		6000		7470
Mean	25861	11507	9705	9229	7139	6052	6428	6327	5460	5547	7199	9451
Runoff in Ac. Ft.	1590000	639100	596700	549200	439000	360100	395300	389000	324900	341100	428400	581100

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 Colusa Bridge and is at Mile 89.4 above Sacramento.

TABLE 21

FLOW OF SACRAMENTO RIVER BELOW WILKINS SLOUGH - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	21500	13900	11900	11100	7590	6090	5240	5600	5170	5710	5750	7490
2	21300	13200	12500	11700	7390	5980	5180	5540	5080	5710	5860	7360
3	21300	12900	12000	11800	7190	5930	5100	5520	5060	5780	6030	7300
4	21600	12800	11500	11300	7000	5800	5050	5540	5120	5840	6320	7530
5	21600	13000	11100	10900	6380	5700	5270	5530	5190	5860	6370	11500
6	21800	12700	10800	10400	5980	5570	5350	5530	5380	5830	6440	15000
7	21700	12500	10600	10100	5810	5430	5350	5520	5240	5760	6470	17300
8	21500	12600	10400	9740	5790	5350	5320	5490	5110	5750	6170	17300
9	21400	12800	10200	9470	5590	5380	5290	5460	5140	5740	6030	14400
10	21300	12500	10100	9320	5390	5550	5240	5460	5230	5720	6030	12500
11	21300	12300	10100	9080	5220	5570	5140	5460	5280	5610	5990	11500
12	21200	12200	10100	8720	5430	5540	5110	5480	5200	5570	5910	10600
13	21000	12100	10200	8370	5450	5480	5100	5480	5180	5470	5910	9980
14	20700	11900	10200	8170	5390	5480	4990	5460	5260	5470	5940	9540
15	20500	11800	10900	8080	5320	5490	5070	5500	5470	5390	5960	9220
16	20300	11700	10700	7790	5440	5480	5340	5520	5670	5370	6060	8980
17	20200	11100	10400	7440	5850	5470	5710	5520	5800	5470	6110	8740
18	20000	10600	10100	7360	6010	5450	5520	5570	5900	5480	6190	8500
19	19900	10300	10000	7590	6070	5380	5450	5590	5820	5490	6320	8310
20	19900	10200	9990	7880	5870	5210	5430	5550	5710	5540	6680	8170
21	19800	10200	9940	8110	5930	5080	5390	5600	5690	5570	7970	8110
22	19700	10500	9920	7850	5750	4950	5360	5610	5720	5510	7950	8020
23	19600	11700	9840	7650	5800	5100	5330	5610	5690	5600	7790	7940
24	19600	11800	9750	7360	5850	5240	5670	5650	5600	5770	11400	7870
25	19600	11300	9680	7360	5960	5260	5430	5550	5540	5840	12300	7850
26	19500	11400	9500	7610	5930	5320	5350	5100	5540	5830	10100	7820
27	19500	11600	9300	7990	6110	5280	5490	4950	5600	5810	8810	7800
28	19400	11300	9100	7940	6500	5230	5650	4910	5670	5770	8150	7820
29	18100		9100	7880	6680	5190	5730	4970	5650	5750	7820	7820
30	15400		9400	7710	6440	5240	5710	5060	5650	5760	7630	7820
31	13900		10400		6220		5670	5080		5770		7720
Mean	20132	11889	10314	8792	6043	5441	5356	5433	5445	5663	7082	9607
Runoff in Ac. Ft.	1238000	660300	634200	523200	371600	323700	329300	334000	324000	348200	421400	590700

NOTE: Station is maintained jointly by the Division of Water Resources and the Water Resources Branch of the U. S. Geological Survey. Station is located at Mile 62.9 above Sacramento, 0.3 of a mile below Wilkins Slough pumping plant of Reclamation District 108.

TABLE 22

FLOW OF SACRAMENTO RIVER AT KNIGHTS LANDING - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	22000	14700	11800	11000	8270	7190	5560	6040	5980	6320	6120	7980
2	22100	14000	12700	11800	8250	6980	5570	5960	5980	6320	6290	7660
3	22000	13500	12600	12300	8020	6860	5470	5810	6000	6360	6460	7620
4	22300	13200	12000	12300	7800	6590	5460	5910	6030	6290	6820	7750
5	22500	13200	11600	12000	7160	6510	5560	5930	6070	6370	6880	9980
6	22800	13300	11300	11500	6620	6220	5690	5930	6290	6290	6880	13900
7	22700	12900	11100	11000	6350	6100	5730	5870	6230	6230	6970	16600
8	22300	12600	10800	10700	6380	5890	5630	5890	6100	6300	6690	18100
9	22000	13100	10600	10300	6320	5940	5600	5860	6130	6380	6500	15500
10	22100	13200	10600	10200	6270	5980	5580	5930	6220	6340	6450	13900
11	22200	12800	10400	10100	6100	6170	5520	5940	6240	6240	6440	12900
12	22100	12700	10400	9770	6400	6000	5500	5970	6270	6130	6380	11700
13	22100	12800	10400	9290	6420	6030	5460	6000	6420	5950	6370	10900
14	21600	12500	9780	8850	6450	5920	5310	5880	6530	5850	6410	10500
15	21600	12500	10800	8640	6540	6040	5400	6020	6710	5880	6490	9970
16	21100	12400	10900	8400	6690	6020	5580	6030	6970	5820	6570	9670
17	21200	12100	10700	7900	7310	6030	6020	6040	7090	5920	6570	9300
18	21300	11400	10500	7410	7560	5920	6020	6030	7110	5900	6690	9120
19	21400	10900	10500	7520	7520	5870	5790	6110	6930	5910	6850	8770
20	21200	10800	10300	7940	7300	5510	5770	6110	6780	5980	6580	8640
21	21200	10700	10100	8430	7450	5450	5740	6190	6710	6000	7850	8590
22	21500	10700	10200	8620	7200	5310	5680	6230	6650	6040	8670	8380
23	21500	11700	10300	8380	7380	5330	5700	6230	6550	6000	8270	8240
24	21600	12400	10200	7930	7370	5680	5970	6290	6340	6190	8890	8290
25	21500	12000	10200	7730	7600	5560	5860	6320	6160	6270	12500	8110
26	21500	11700	10100	7990	7560	5680	5670	5820	6100	6310	11400	8180
27	21500	12100	9800	8330	7480	5680	5800	5640	6210	6220	10100	8190
28	21300	11900	9540	8530	7950	5710	6060	5630	6370	6200	9070	8210
29	21600		9100	8460	8300	5530	6290	5670	6260	6070	8490	8080
30	20400		8720	8270	7970	5560	6230	5760	6260	6160	8200	8200
31	17000		9800		7580		6220	5810		6090		8070
Mean	21587	12421	10575	9386	7212	5975	5724	5963	6390	6140	7495	10032
Runoff in Ac. Ft.	1327000	689900	650300	558500	443400	355600	351900	366600	380200	377500	446000	616900

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 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 23

FLOW OF SACRAMENTO RIVER AT VERONA - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	60900	25400	23100	28900	24600	14200	6940	7170	7620	8300	8120	11200
2	59700	23500	24100	28100	23500	13200	6950	7000	7430	8320	7990	11000
3	58700	23000	23600	27200	22700	12600	6830	6860	7330	8510	7990	10800
4	58300	23100	22700	26100	22300	12600	6660	6770	7400	8630	8290	11000
5	58300	22900	21700	25300	21900	12600	6740	6740	7540	8590	8320	14500
6	58700	22400	21000	24900	21200	12100	6800	6720	7780	8640	8360	23500
7	59200	22300	20300	24300	21100	11400	6680	6700	7890	8560	8390	30400
8	58700	23600	19800	23800	21300	10800	6620	6680	7680	8370	8220	31400
9	57800	23200	19600	22900	21000	10200	6520	6700	7590	8390	7960	27500
10	56900	22300	19600	22400	19400	9960	6660	6760	7680	8460	7840	23700
11	56100	21600	19800	21600	18800	9870	6520	6780	7800	8290	7760	20800
12	55200	21500	20200	20500	18200	9530	6380	6880	7910	8070	7680	18600
13	54500	20900	20800	20100	17900	9150	6300	6900	8070	7890	7680	16900
14	53500	20400	24100	20100	17500	8880	6110	6880	8340	7780	7890	15600
15	51900	19900	24900	20200	17200	8700	6110	6900	8560	7780	8040	14600
16	49800	19800	23600	20500	16800	8640	6300	6940	8710	7640	8120	13900
17	47100	19500	22300	21000	16800	8560	6710	7080	8900	7700	8240	13300
18	44400	18600	21400	21900	16800	8220	6900	7200	9170	7920	8300	12800
19	42200	18200	20600	23300	17500	8020	6720	7240	9290	7990	8510	12400
20	40400	18000	20800	24300	18700	7720	6700	7320	9100	7880	12200	12000
21	38800	18100	21700	24900	19200	7510	6600	7440	9140	7840	16400	11900
22	37400	19200	21800	24300	18800	7200	6600	7590	9100	7760	14200	11700
23	36300	21400	21300	23400	17300	6890	6620	7650	8860	7800	13300	11500
24	35400	21600	20600	23200	15700	6940	6840	7670	8680	7920	20400	11400
25	34800	21200	20100	23700	14800	6920	6830	7680	8490	8040	22400	11500
26	34200	21400	19500	24700	14400	6900	6660	7400	8360	8020	18800	11700
27	33800	21400	19300	26100	16000	6920	6760	7120	8370	7840	15600	11700
28	33200	21300	19400	26100	17300	6920	7140	7000	8410	7730	13600	11900
29	32600		21000	25500	16400	6830	7350	6940	8300	7700	12400	12000
30	31500		25800	24900	15700	6800	7360	7060	8180	7800	11600	11600
31	28600		29000		14800		7350	7090		7960		11300
Mean	47060	21275	21726	23807	18570	9226	6718	7060	8256	8068	10820	15290
Runoff in Ac. Ft.	2894000	1182000	1336000	1417000	1142000	549000	413100	434100	491300	496100	643800	940400

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.

TABLE 24

FLOW OF SACRAMENTO RIVER AT SACRAMENTO - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	72200	27800	29200	36600	35100	19600	7740	6920	7450	8660	8720	12600
2	69300	25900	29000	34700	34200	18500	7770	6740	7280	8710	8640	12300
3	67400	25700	28100	33100	33900	18400	7640	6590	7230	9160	8640	12000
4	66600	25800	26900	31700	34100	18400	7360	6470	7380	9340	8930	12400
5	67500	25500	25400	30800	33700	18300	7290	6430	7510	9360	8960	16500
6	68900	24800	24400	30400	33800	17000	7270	6400	7750	9230	8980	28000
7	67400	24800	23700	29600	33700	14600	7100	6400	7850	9200	8890	34600
8	66000	26400	23500	28800	33000	14600	6970	6360	7680	9030	8780	34200
9	64100	25700	23700	27900	31700	13900	6830	6360	7540	9020	8460	29900
10	62800	24700	24100	27300	29600	13300	6940	6470	7700	9080	8290	25800
11	61600	24000	24700	26500	28000	13000	6730	6560	7850	8840	8130	22800
12	60200	23900	24800	25900	26900	12300	6520	6580	7980	8620	8060	20300
13	59200	23200	27700	26600	26500	11800	6430	6610	8300	8450	8150	18600
14	58000	22700	32500	27000	25500	11500	6250	6610	8510	8310	8420	17100
15	56200	22100	31100	27300	24600	11200	6160	6540	8720	8330	8500	16100
16	53900	22100	29100	28800	24300	11000	6340	6650	8990	8190	8610	15300
17	51000	21700	27300	30900	25000	10700	6790	6830	9150	8400	8640	14700
18	48100	20700	26500	33000	25600	10200	6970	6870	9470	8650	8630	14100
19	45800	20300	25900	35100	26800	9800	6750	6950	9590	8660	9160	13700
20	43800	20300	26300	35600	27500	9380	6700	7000	9370	8530	20600	13200
21	42000	20500	27500	34600	28000	9210	6600	7130	9390	8540	19900	13200
22	40500	22900	27200	33400	25600	8920	6570	7350	9420	8490	16200	12900
23	39200	24900	26400	33200	22900	9830	6550	7400	9200	8450	18200	12700
24	38200	24900	25400	34500	20700	8400	6750	7410	8930	8530	28500	12600
25	37600	24500	24600	36400	19700	8220	6720	7470	8810	8730	25900	12800
26	37100	24500	23900	37800	20300	8080	6580	7100	8580	8700	21000	13200
27	36600	24300	24100	37900	23500	8110	6730	6830	8750	8490	17400	13400
28	35900	26200	24800	37500	22800	7980	7170	6700	8750	8340	15200	13900
29	35300		29900	37300	21500	7710	7300	6700	8530	8280	13900	13800
30	34100		37400	36500	20600	7680	7190	6840	8480	8420	13000	13100
31	31100		38900		19800		7190	6810		8560		12800
Mean	52200	24000	27200	32200	27100	12100	6900	6780	8400	8690	12400	17100
Runoff in Ac. Ft.	3208000	1331000	1674000	1917000	1664000	717300	424300	416700	500100	534100	740600	1048000

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 54 and 60.) The flows of this table are based on flows at Verona, making due allowance for draft and measured inflow. Daily mean flows are not computed on the basis of the gaging station at Sacramento during periods of low flow because of tidal action.

TABLE 25

FLOW OF COTTONWOOD CREEK NEAR COTTONWOOD - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3610	614	786	1150	452	259	94	57	44	57	101	117
2	3360	614	723	998	432	249	88	52	44	66	70	110
3	3600	614	681	838	426	244	91	54	43	66	52	127
4	10800	588	647	772	426	234	80	50	44	70	48	1790
5	7030	543	614	744	426	217	78	46	46	66	46	1040
6	4640	556	602	744	420	217	78	44	48	54	44	1070
7	4030	621	595	758	406	209	76	44	52	55	44	786
8	3460	556	595	751	452	196	68	41	57	59	43	582
9	2860	530	608	716	504	188	61	43	50	63	41	476
10	2450	517	628	674	465	181	61	41	52	55	43	393
11	2080	504	628	647	400	181	61	46	52	55	43	335
12	1690	478	602	647	370	181	59	50	50	55	41	301
13	1460	465	634	688	346	181	68	46	52	57	41	278
14	1290	452	628	667	340	173	68	50	48	57	41	256
15	1170	452	582	660	312	177	73	48	46	55	40	238
16	1070	452	569	695	318	177	70	43	46	55	40	224
17	1010	446	543	744	312	165	63	41	44	57	40	212
18	950	439	530	765	306	144	55	40	44	63	40	200
19	905	446	510	744	318	134	52	37	41	68	141	192
20	875	504	517	688	318	134	46	37	57	78	264	184
21	815	510	498	634	318	134	44	37	55	83	154	176
22	800	556	484	608	340	127	46	40	54	78	140	168
23	793	543	465	582	334	120	44	37	55	86	1200	164
24	772	536	452	556	301	117	46	41	55	80	543	160
25	765	556	446	569	290	114	48	43	52	83	295	160
26	751	556	432	569	329	107	61	44	48	88	205	168
27	730	588	439	543	346	107	70	48	50	88	169	164
28	702	830	465	524	295	114	73	55	50	88	144	152
29	681		504	498	279	107	73	48	48	88	130	152
30	654		628	478	279	98	70	46	50	94	127	148
31	628		996		269		59	46		86		140
Mean	2143	538	582	688	359	166	65.3	45	49.2	69.5	146	344
Runoff in Ac. Ft.	131800	29880	35760	40960	22070	9890	4010	2770	2930	4270	8670	21150

NOTE: Station maintained and operated by Water Resources Branch of the U. S. Geological Survey.

TABLE 26

FLOW OF BATTLE CREEK NEAR COTTONWOOD - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	855	361	427	404	576	431	271	199	182	187	197	219
2	1240	382	400	408	580	427	266	199	185	199	192	229
3	1240	400	385	393	610	411	268	192	185	199	185	541
4	1220	382	364	382	625	400	266	197	185	199	197	937
5	948	371	368	378	610	382	263	197	185	192	199	979
6	790	358	361	382	620	385	254	197	182	194	197	838
7	784	358	371	382	610	375	254	194	189	192	199	484
8	712	354	368	382	585	361	248	189	189	197	199	423
9	640	344	364	396	576	358	248	189	192	197	204	337
10	625	344	375	378	585	354	240	187	194	202	187	292
11	580	337	375	375	585	354	238	187	189	189	199	274
12	558	324	371	382	562	351	238	189	187	185	187	260
13	554	337	459	419	572	331	232	185	187	180	189	254
14	536	331	423	427	540	331	229	187	187	185	194	248
15	497	324	400	415	544	337	229	187	187	187	206	246
16	472	321	389	463	518	331	227	189	199	185	189	240
17	455	314	389	497	527	318	219	187	197	182	197	238
18	451	324	408	536	554	311	224	187	192	185	222	227
19	447	328	396	554	567	311	212	185	194	187	474	224
20	439	324	393	536	562	311	212	187	192	189	364	229
21	427	354	385	523	562	308	209	185	185	187	257	229
22	419	361	382	506	523	308	204	185	187	202	480	222
23	415	344	378	531	501	311	199	182	180	222	881	229
24	411	351	371	567	476	311	202	185	182	202	358	227
25	423	411	368	625	463	302	204	180	185	197	271	229
26	400	368	368	635	544	286	214	185	185	194	254	248
27	393	439	375	620	572	289	219	182	185	199	232	274
28	389	489	393	615	476	286	212	185	185	197	229	268
29	375		419	625	463	280	206	185	185	199	227	263
30	368		435	595	439	274	199	185	187	194	227	260
31	361		419		427		204	185		202		238
Mean	594	358	390	478	547	338	229	188	188	194	260	336
Runoff in Ac. Ft.	36540	19900	23960	28430	33630	20080	14100	11570	11160	11910	15460	20640

NOTE: Station maintained and operated by Water Resources Branch of the U. S. Geological Survey.

TABLE 27

FLOW OVER MOULTON WEIR FROM SACRAMENTO RIVER TO BUTTE BASIN - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1												
2												
3	0											
4	80											
5	710											
6	3030											
7	120	NO FLOW OVER WEIR DURING 1946 EXCEPT FOR 4 DAYS IN JANUARY AS SHOWN										
8	0											
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
31												
Mean	127	0	0	0	0	0	0	0	0	0	0	0
Runoff in Ac. Ft.	7820	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.

TABLE 28

FLOW OF STONY CREEK NEAR HAMILTON CITY - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2430		565	423	20							
2	1940		387	490	13							
3	1800		340	468	4.9							
4	1700		360	446	13							
5	1600		360	441	65							
6	1550		306	454	4.2							
7	1500		218	468	2							
8	1480		194	477	4.9			NO FLOW - JUNE TO DECEMBER				
9	1460		155	459	0							
10	1450		127	423	0							
11	Station moved		116	374	0							
12	3 miles down-		114	324	0							
13	stream. No		120	274	0							
14	record Jan. 11		152	243	0							
15	to Feb. 19		140	178	9.4							
16			124	133	0							
17			104	122	0							
18			103	112	0							
19			92	110	0							
20		150	104	112	0							
21		162	122	118	0							
22		168	118	110	0							
23		168	138	88	3							
24		162	118	99	0							
25		160	116	114	0							
26		170	110	99	20							
27		170	95	78	34							
28		411	81	58	27							
29			124	52	2							
30			188	35	0							
31			285		0							
Mean			183	246	7.17	0	0	0	0	0	0	0
Runoff in Ac. Ft.			11260	14640	441	0	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 Irr. Dist. to transport water from their main canal across Stony Creek. Earth fill was in place from March to November 1946.

TABLE 29

FLOW OVER COLUSA WEIR FROM SACRAMENTO RIVER TO BUTTE BASIN - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3000											
2	2800											
3	5200											
4	23000											
5	31000											
6	40500											
7	19500											
8	9000					NO FLOW OVER WEIR IN 1946 EXCEPT DURING 13 DAYS						
9	8500					IN JANUARY AS SHOWN						
10	6000											
11	5000											
12	3500											
13	60											
14	0											
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
31												
Mean	5070	0	0	0	0	0	0	0	0	0	0	0
Runoff in Ac. Ft.	311500	0	0	0	0	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.

TABLE 30

FLOW OF BUTTE SLOUGH TO SACRAMENTO RIVER - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1		294	294	441	144	763	368	277	375	523	0	275
2		294	294	378	170	716	368	277	406	509	0	174
3		399	399	560	255	712	365	269	554	509	0	173
4		140	490	553	186	670	352	252	494	495	0	118
5		294	560	623	122	659	334	272	481	509	0	0
6		294	623	672	89	608	323	281	501	488	0	0
7		294	560	623	89	569	271	261	496	410	0	0
8		140	399	609	89	534	274	252	462	386	0	0
9	N	140	490	630	89	484	273	253	462	348	0	0
10	O	399	490	644	89	478	247	254	475	323	0	1435
11		294	560	610	61	417	204	260	500	323	0	1421
12	F	294	294	551	101	485	267	274	522	349	0	1365
13	L	294	140	435	148	429	219	268	523	592	0	1309
14	O	294	140	381	175	440	200	258	503	336	0	1218
15	W	294	399	351	146	438	193	265	557	0	0	1141
16		399	399	350	135	445	187	267	590	0	0	1064
17		560	490	303	204	449	187	244	602	0	0	1113
18		735	140	266	268	446	190	243	607	0	0	966
19		490	560	237	317	413	190	250	619	0	0	917
20		490	560	254	347	367	190	258	649	0	0	868
21		399	490	219	395	392	193	254	659	0	209	840
22		294	490	267	304	343	193	254	646	0	251	791
23		399	490	273	463	375	170	264	634	0	64	742
24		490	560	229	514	345	179	282	536	0	0	742
25		399	490	135	547	366	164	285	517	0	0	756
26		399	490	83	584	381	208	279	530	0	198	766
27		490	560	193	636	384	213	269	545	0	293	749
28		399	399	304	709	384	242	256	569	0	209	742
29			560	220	769	417	238	256	555	0	305	721
30			294	174	820	363	243	259	545	0	307	714
31			490		846		259	307		0		700
Mean	0	361	439	386	316	476	242	265	537	197	61	704
Runoff in Ac. Ft.	0	20040	26960	22940	19460	28310	14880	16260	31960	12100	3640	43280

NOTE: This station is operated by Division of Water Resources with cooperation by U. S. Bureau of Reclamation. This is the discharge to the Sacramento River at Mile 84 Left and is measured at and regulated by the gravity culverts at the mouth of the slough. This flow, together with that shown in Tables 34 and 35 is, during the summer months, made up almost entirely of return water from lands irrigated by Feather River diversions. Discharge from the Sacramento River to Butte Basin over Moulton and Colusa weirs is shown in Tables 27 and 29.

TABLE 31

FLOW OVER TISDALE WEIR FROM SACRAMENTO RIVER TO SUTTER BY-PASS - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	11000											
2	8000											
3	8000											
4	9800											
5	11000											
6	15600											
7	12500	NO FLOW OVER WEIR IN 1946 EXCEPT FOR 29 DAYS										
8	11000	IN JANUARY AS SHOWN										
9	11000											
10	9800											
11	9800											
12	8600											
13	8000											
14	6100											
15	5000											
16	3800											
17	3100											
18	3800											
19	2200											
20	1800											
21	1500											
22	1300											
23	1000											
24	1000											
25	900											
26	900											
27	650											
28	650											
29	370											
30	0											
31	0											
Mean	5420	0	0	0	0	0	0	0	0	0	0	0
Runoff in Ac. Ft.	333600	0	0	0	0	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.
Flow over Tisdale Weir in second feet for December 1945 not shown in 1945 report is as follows: December 22 - 100, 23 - 7300, 24 - 8600, 25 - 8600, 26 - 9800, 27 - 9800, 28 - 9800, 29 - 16800, 30 - 19100, 31 - 17600.

TABLE 32

FLOW OF RECLAMATION DISTRICT 70 DRAIN - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0	9	5	7	22	31	29	30	25	7	5	0
2	64	15	6	21	20	34	26	24	28	5	5	0
3	52	0	0	28	0	32	22	22	23	5	5	6
4	48	15	9	21	17	33	28	27	27	5	4	0
5	64	20	5	24	21	34	21	27	27	7	3	0
6	64	18	4	24	21	35	23	28	35	9	3	29
7	64	15	4	28	22	36	27	27	33	8	3	24
8	64	19	7	28	31	36	29	28	37	8	3	17
9	57	19	3	21	37	33	31	29	37	6	3	15
10	32	7	0	24	15	33	28	30	38	5	4	18
11	32	18	6	35	20	37	28	29	31	5	4	13
12	55	16	6	35	22	35	28	30	27	7	3	12
13	44	13	0	40	20	36	30	30	16	8	3	10
14	32	11	6	61	14	31	28	27	22	9	3	6
15	32	12	0	40	17	37	29	28	25	7	3	9
16	32	12	0	17	18	30	22	31	26	7	3	13
17	32	6	0	5	21	30	27	27	25	7	2	9
18	32	14	0	0	21	28	26	33	23	7	2	7
19	32	13	0	22	21	30	26	25	17	7	2	7
20	32	13	0	22	35	26	26	22	18	5	2	6
21	32	12	0	43	32	27	23	22	14	5	0	11
22	32	13	0	62	25	27	27	30	0	5	0	0
23	28	12	0	22	31	22	27	24	12	5	7	10
24	23	0	0	23	40	22	27	27	12	5	2	8
25	20	13	0	23	31	23	27	26	3	5	2	0
26	16	16	0	22	35	27	27	27	8	5	0	7
27	17	16	0	19	35	30	30	27	12	5	2	10
28	19	10	0	51	33	26	29	27	12	5	0	9
29	20		0	82	30	26	29	26	10	5	2	5
30	20		0	56	30	29	28	32	9	5	2	6
31	20		0		27		30	32		5		5
Mean	36	13	2	30	25	31	27	28	21	6	3	9
Runoff in Ac. Ft.	2204	708	121	1797	1515	1817	1662	1694	1254	375	163	539

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 33

FLOW OF RECLAMATION DISTRICT 108 DRAIN AT ROUGH AND READY BEND - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	176	0	41	0	309	399	240	379	414	66	0	0
2	178	89	61	61	308	381	347	380	414	58	0	0
3	179	82	54	0	306	345	243	333	401	43	0	65
4	190	61	0	0	295	280	353	375	398	58	66	0
5	189	68	0	0	308	318	302	333	397	0	0	93
6	274	54	55	69	308	236	300	333	427	0	0	136
7	171	61	62	0	336	319	311	334	333	88	0	181
8	171	0	0	76	357	237	295	335	416	0	0	150
9	153	75	0	0	357	293	354	336	381	73	58	114
10	106	69	77	77	354	235	353	378	405	0	0	116
11	90	0	0	56	364	346	288	366	403	0	0	101
12	73	55	42	63	471	238	332	373	411	73	0	79
13	120	83	55	71	343	349	328	333	394	0	0	0
14	142	0	48	71	368	239	225	375	387	0	0	127
15	80	69	0	78	395	351	332	365	412	62	0	0
16	68	0	41	92	397	297	234	401	382	0	66	116
17	143	90	0	93	452	349	334	378	346	48	0	0
18	55	35	55	100	496	239	333	385	317	0	0	113
19	56	0	55	178	510	331	333	386	285	28	73	0
20	112	91	42	169	479	211	331	420	257	0	0	0
21	93	0	0	174	455	332	330	444	261	0	86	135
22	93	77	55	167	451	320	270	436	239	44	0	0
23	81	0	0	169	447	209	332	438	189	0	0	0
24	50	90	0	142	451	327	331	435	211	0	0	139
25	93	0	0	169	458	223	331	458	189	0	89	0
26	44	0	42	205	463	324	333	401	87	44	0	107
27	81	41	70	169	453	225	353	407	132	0	64	0
28	82	0	0	303	453	324	354	400	117	0	0	100
29	76		63	224	452	220	404	400	58	0	0	0
30	82		0	273	452	324	407	397	81	81	65	99
31	52		55		431		383	21		0		0
Mean	115	43	31	108	403	294	323	372	305	25	19	64
Runoff in Ac. Ft.	7050	2360	1930	6440	24800	17500	19830	22900	18100	1520	1120	3910

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. See Table 36.

TABLE 34

FLOW OF COLUSA TROUGH AT COLUSA-WILLIAMS HIGHWAY* - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2175	145	84	240	600	792	563	629	856	416	222	156
2	1768	148	84	214	498	780	565	609	870	453	276	151
3	1443	148	84	242	463	747	594	631	870	334	246	158
4	1224	143	84	377	441	710	627	609	876	316	181	299
5	1117	136	84	376	458	671	588	600	912	328	167	582
6	1024	134	84	310	492	642	524	623	1001	304	141	917
7	813	130	84	250	487	646	516	627	975	306	134	968
8	652	126	84	270	485	614	534	634	928	286	134	851
9	559	125	84	253	513	631	550	632	912	276	179	665
10	465	126	84	243	554	650	557	652	924	254	190	545
11	383	130	84	347	535	642	534	654	994	269	204	489
12	347	139	84	331	593	665	532	650	1064	243	244	446
13	308	134	84	381	625	686	518	650	1139	227	284	409
14	293	126	84	394	698	667	530	674	1108	243	322	366
15	270	125	84	314	799	699	516	691	1087	253	296	328
16	249	126	84	295	870	659	532	714	1104	267	321	283
17	236	124	84	304	926	621	537	735	1085	281	296	254
18	242	124	84	303	902	597	548	743	1006	251	304	230
19	238	124	84	348	877	557	565	747	921	226	337	213
20	252	125	84	326	834	524	575	774	766	227	365	199
21	270	128	84	354	807	495	586	796	714	255	313	193
22	249	130	84	360	862	492	584	788	688	266	312	186
23	234	129	84	317	962	495	577	794	612	251	397	177
24	221	84	84	310	982	514	543	800	552	243	385	169
25	211	84	84	339	969	527	519	810	544	187	321	173
26	199	84	84	324	1068	563	581	788	544	173	296	174
27	184	84	84	303	1191	572	625	776	516	178	332	168
28	171	84	84	336	1176	559	652	808	510	197	329	159
29	162		134	360	1091	572	634	830	473	197	277	156
30	153		189	451	927	572	657	848	479	162	184	152
31	149		226		824		652	844		201		148
Mean	525	123	94	319	758	619	568	715	834	260	266	334
Runoff in Ac. Ft.	32254	6833	5754	18986	46630	36816	34939	43954	49647	16011	15846	20557

* 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.

TABLE 35

FLOW OF COLUSA TROUGH (BACK BORROW PIT) NEAR COLLEGE CITY - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3020	505	119	489	680	826	580	620	900	562	246	204
2	2965	454	144	525	643	810	600	592	945	497	335	185
3	2753	358	159	540	528	805	585	610	940	472	324	188
4	2511	320	124	600	463	780	630	600	940	443	251	264
5	2154	315	101	600	466	735	600	585	965	463	204	577
6	1895	341	92	525	489	685	545	600	995	435	235	946
7	1736	249	92	428	497	665	489	615	1040	430	260	1156
8	1477	244	97	393	531	645	515	615	995	419	273	995
9	1302	276	103	349	545	645	540	615	985	386	228	890
10	1134	251	103	303	590	655	550	615	960	362	224	775
11	920	189	103	360	575	675	525	645	1018	351	218	705
12	821	189	92	387	620	665	500	655	1099	303	260	616
13	766	174	97	389	635	685	489	650	1170	270	287	535
14	720	154	94	439	695	660	500	665	1180	287	351	478
15	695	144	88	391	772	685	492	695	1170	308	330	432
16	665	144	94	364	855	685	497	705	1180	330	351	386
17	640	134	99	299	910	600	505	735	1170	362	338	341
18	625	127	86	293	930	560	505	740	1140	368	349	311
19	620	124	84	340	880	500	535	760	1173	346	370	289
20	590	129	82	320	870	446	540	780	914	327	419	268
21	625	129	82	325	840	435	550	810	825	324	408	254
22	615	139	78	322	885	432	555	830	780	346	403	249
23	625	137	74	315	955	454	565	805	720	345	457	235
24	610	132	74	295	987	494	560	815	645	341	505	230
25	547	124	68	343	1000	525	505	820	630	289	478	224
26	545	119	64	357	1030	570	528	825	620	243	415	230
27	560	129	64	311	1110	580	627	790	600	221	403	230
28	555	122	58	305	1150	595	640	825	600	210	373	213
29	545		83	360	1085	590	645	840	580	216	357	202
30	501		282	456	979	555	630	860	590	204	257	199
31	510		371		859		645	870		230		185
Mean	1105	209	108	391	776	621	551	716	912	345	330	419
Runoff in Ac. Ft.	67930	11600	6650	23250	47700	36980	33860	44010	54290	21220	19660	25770

NOTE: This station is maintained, operated and records computed by U. S. Bureau of Reclamation. Station is located at College City Bridge on Back Borrow Pit at Mile 22.7.

TABLE 36

FLOW OF RECLAMATION DISTRICT 108 DRAIN ON BACK BORROW PIT - 1946

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 DURING 1946							
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
31												
Mean												
Runoff in Ac. Ft.												

NOTE: This drain at Mile 20.2 Left on Back Borrow Pit supplements the main drainage plant of Reclamation District 108 on the Sacramento River at Rough and Ready Bend. See Table 33.

TABLE 37

FLOW OF KNIGHTS LANDING RIDGE CUT - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2700*	650	120	506	89	66	74	65	77	20	0	0
2	4500*	528	181	622	83	60	81	65	87	17	0	0
3	4700*	409	252	608	71	63	79	69	87	13	0	0
4	4080*	360	190	520	57	61	72	73	70	11	0	0
5	3370*	353	115	412	52	58	70	73	77	10	0	0
6	1040*	307	84	300	50	58	69	76	77	8	0	162
7	570*	332	63	218	64	62	61	73	80	4	0	1030
8	0*	310	46	152	71	61	56	76	79	4	0	1470
9	0*	324	39	39	73	59	69	75	67	0	0	1390
10	0*	276	36	35	68	63	73	73	66	0	0	700
11	0*	212	35	25	74	70	70	76	67	0	0	280
12	0*	176	36	19	75	66	68	74	78	0	0	91
13	0*	157	44	14	82	67	62	70	82	0	0	38
14	600*	123	20	23	84	70	69	66	75	0	0	19
15	740*	101	76	53	88	71	72	71	73	0	0	8
16	875	93	105	68	87	74	75	73	73	0	0	5
17	840	76	93	68	76	70	77	75	72	0	0	0
18	820	46	66	63	79	64	70	76	65	0	0	0
19	811	31	50	65	74	56	64	80	63	0	0	0
20	798	28	45	65	70	50	66	78	46	0	0	0
21	794	26	51	62	66	46	69	76	34	0	0	0
22	802	32	56	62	66	44	72	78	29	0	0	0
23	798	55	51	60	73	56	72	70	21	0	0	0
24	784	90	42	57	80	61	75	70	19	0	18	0
25	794	103	34	60	82	71	73	76	19	0	134	0
26	734	96	27	71	82	76	71	77	22	0	71	0
27	734	107	21	71	82	76	79	66	22	0	14	0
28	714	106	18	56	83	73	78	65	21	0	0	0
29	710		20	53	74	69	74	68	20	0	0	0
30	702		66	64	62	68	65	70	19	0	0	0
31	674		458		50		69	73		0		0
Mean	1120	197	82	150	73	64	71	72	56	3	8	168
Runoff in Ac. Ft.	68800	10900	5040	8910	4490	3790	4350	4450	3310	172	470	10300

* Flows affected by backwater from Yolo By-Pass.

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. Daily mean flows for the period April to October are estimates based on current-meter measurements. Station has been operated cooperatively since 1941 by the Division of Water Resources and the U. S. Geological Survey.

TABLE 38

FLOW OF COLUSA BASIN DRAINAGE TO SACRAMENTO RIVER AT KNIGHTS LANDING - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1		0	0	0	245	718	290	359	843	629	206	778
2		495	0	0	395	668	328	337	897	584	259	716
3		495	0	0	380	668	362	311	897	539	262	691
4		495	550	350	300	668	371	310	765	509	291	716
5		495	525	495	230	668	366	308	776	499	250	0
6		0	500	495	195	398	358	325	810	469	215	0
7	N	0	480	495	200	398	303	325	850	444	197	0
8	O	0	460	350	230	398	228	328	890	507	195	0
9		350	240	630	245	398	269	343	856	547	152	0
10		350	235	600	215	353	285	346	851	547	195	800
11		495	235	500	255	398	276	359	856	650	203	790
12	F	300	0	400	255	398	264	373	930	508	224	673
13	L	550	0	370	315	398	182	377	1120	397	252	590
14	O	285	0	150	325	423	190	355	1270	343	302	530
15	W	520	0	70	420	423	202	381	1260	330	344	422
16		510	0	120	620	423	214	412	1270	328	348	348
17		495	510	120	700	436	259	438	1270	348	364	348
18		450	260	90	780	408	276	443	1210	380	332	289
19		230	250	120	750	316	248	468	1190	375	376	276
20		225	0	120	700	261	255	495	1060	355	458	248
21		225	0	90	700	261	268	513	949	330	335	238
22		0	0	90	700	116	282	590	892	330	502	282
23		0	250	90	750	136	282	616	796	370	691	310
24		0	245	90	800	116	293	616	716	352	0	276
25		280	0	70	835	161	288	638	644	330	0	300
26		275	0	65	860	199	279	683	645	297	910	246
27		0	0	75	935	247	307	656	645	250	856	276
28		280	0	20	1070	247	332	646	635	228	828	204
29			0	20	1100	221	364	731	630	220	921	207
30			0	70	970	221	336	796	605	215	870	218
31			0		780		330	813		184		247
Mean	0	279	153	205	557	371	287	474	901	400	378	355
Runoff in Ac. Ft.	0	15470	9400	12210	34230	22100	17630	29140	53610	24580	22490	21850

NOTE: This station is operated by Division of Water Resources. This is the drainage from Colusa Basin passing down the Back Borrow Pit of Reclamation Districts108 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 39 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 37. Total flow to Sacramento River is sum of Tables 38 and 39.

TABLE 39

FLOW OF SYCAMORE SLOUGH INTO COLUSA BASIN DRAIN - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					0	3	3	25	32			
2					0	3	3	25	32			
3					0	4	3	25	30			
4					1	4	3	25	30			
5					2	4	3	25	25			
6					3	5	2	28	25			
7					3	5	2	28	25	F	F	N
8	N	N	N	N	3	5	2	28	20	L	L	O
9	O	O	O	O	3	5	2	28	20	O	O	
10					3	5	2	28	20	W	W	
11					3	5	1	30	15			
12	O	O	O	O	3	5	1	30	15	N	N	O
13	U	U	U	U	3	5	1	32	15	E	E	U
14	T	T	T	T	3	5	1	32	10	G	G	T
15	F	F	F	F	3	5	1	32	10	L	L	F
16	O	O	O	O	3	5	0	34	10	I	I	L
17	W	W	W	W	3	5	0	34	5	B	B	O
18					2	5	0	36	5	L	L	W
19					1	5	0	36	5	E	E	
20					1	5	0	38	5			
21					1	4	3	38	5			
22					1	4	3	38	4			
23					1	4	3	38	4			
24					2	4	4	38	3			
25					3	4	4	38	2			
26					3	4	4	36	2			
27					3	4	8	36	1			
28					3	4	10	36	1			
29					3	4	12	34	1			
30					3	4	14	34	1			
31					3		20	34				
Mean	0	0	0	0	2	4	4	32	13	0	0	0
Runoff in Ac. Ft.	0	0	0	0	137	264	244	1980	750	0	0	0

NOTE: Flow and leakage estimated from observations and measurements made during 1946. This water is discharged below Outfall Gates and is not included in the flow shown in Table 38.

TABLE 40

FLOW OF BUTTE SLOUGH TO SUTTER BY-PASS - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	39300	695	329	217	96	105	118	158	167	25	45	155
2	24600	560	304	271	141	105	125	158	118	22	45	198
3	19500	500	280	277	114	105	110	154	79	21	45	185
4	18400	500	240	240	96	114	101	171	54	20	55	212
5	22900	500	231	212	96	114	103	180	55	16	75	397
6	39300	460	204	186	114	96	93	152	53	13	85	646
7	41200	425	195	170	123	88	104	147	45	12	125	855
8	38100	440	159	159	123	96	115	144	40	11	170	1200
9	22700	455	157	158	105	105	113	171	42	9	147	1510
10	18800	410	148	144	96	96	103	176	47	9	125	1360
11	15900	380	142	132	114	96	134	185	58	6	135	895
12	12500	355	145	114	132	105	122	179	54	5	135	740
13	10200	332	141	116	132	105	117	164	49	36	158	612
14	7280	317	142	134	123	105	115	159	48	38	158	508
15	5290	304	188	128	123	114	126	193	48	19	170	420
16	3990	295	171	106	132	123	136	167	39	8	180	354
17	3140	238	149	131	141	123	147	157	37	7	180	288
18	2480	195	133	131	132	114	148	177	37	19	170	237
19	2040	175	125	131	132	114	142	179	37	25	180	200
20	1720	168	125	135	141	123	128	196	37	28	215	188
21	1480	173	121	143	141	123	126	193	40	30	215	167
22	1360	199	80	136	132	132	129	184	40	32	105	145
23	1240	308	116	132	132	114	126	196	37	37	115	129
24	1160	290	114	118	132	105	115	200	32	41	280	118
25	1070	262	111	124	132	114	128	184	32	50	345	112
26	1000	273	99	129	132	105	152	179	32	51	305	107
27	960	285	87	154	132	105	163	162	33	45	250	101
28	900	266	74	134	141	105	163	154	35	40	205	96
29	850		72	119	114	96	146	154	33	41	180	90
30	805		90	118	114	105	153	190	33	42	158	81
31	775		153		114		166	213		43		75
Mean	11640	349	156	153	123	108	128	173	50	26	159	399
Runoff in Ac. Ft.	715900	19360	9570	9120	7580	6450	7870	10660	2960	1590	9430	24560

NOTE: This is discharge from Butte Slough to Sutter By-Pass. During low flow periods gates at head of Slough are regulated (Table 30) 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). This station is maintained and operated by the Division of Water Resources.

TABLE 41

FLOW OF WADSWORTH CANAL TO SUTTER BY-PASS - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	378	149	46	37	98	237	166	143	210	178	102	41
2	291	149	46	37	112	237	152	135	208	146	34	40
3	271	149	46	37	98	237	149	146	214	146	31	41
4	409	149	46	37	98	217	145	141	206	131	33	58
5	411	140	46	37	127	217	133	140	197	141	30	180
6	319	131	46	37	143	198	132	140	193	143	33	258
7	301	123	46	37	143	160	135	154	206	141	42	176
8	269	115	46	37	143	178	146	167	204	146	45	136
9	219	107	46	41	160	178	143	169	197	102	43	109
10	190	99	46	64	160	178	145	169	202	85	26	97
11	166	91	46	85	160	143	146	162	206	61	25	93
12	152	84	46	45	143	160	148	178	206	59	20	85
13	143	77	46	60	178	178	135	174	236	81	30	79
14	140	70	46	60	178	178	143	154	273	75	49	71
15	140	64	46	45	198	178	151	154	293	75	83	67
16	135	64	46	100	217	178	150	153	310	81	35	63
17	140	64	40	120	217	160	148	163	308	77	15	63
18	140	64	40	125	217	160	152	187	275	71	10	59
19	140	64	40	70	217	160	150	190	238	85	13	57
20	140	64	40	59	217	160	148	204	259	176	10	55
21	140	58	40	70	217	143	151	218	266	176	7	52
22	140	58	40	83	217	143	129	227	250	204	46	50
23	140	58	40	70	237	160	106	229	278	185	73	48
24	140	58	40	47	237	178	106	234	210	192	56	47
25	140	58	40	47	237	198	118	211	195	198	49	46
26	140	52	39	70	280	198	164	187	173	174	46	45
27	140	52	40	59	301	178	162	182	151	165	43	45
28	140	52	40	59	301	178	148	187	157	181	43	43
29	140		40	59	301	143	148	204	178	190	42	42
30	140		36	98	280	160	164	220	198	178	41	40
31	140		37		237		155	171		170		40
Mean	195	88	43	61	196	179	144	177	223	136	38	75
Runoff in Ac. Ft.	11970	4890	2630	3630	12040	10650	8860	10900	13280	8360	2290	4610

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 40) make up the entire Feather River contribution to the Sutter By-Pass. See footnote Table 40.

TABLE 42

FLOW OF RECLAMATION DISTRICT 1500 DRAIN - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	298	143	118	57	428	448	415	448	634	91	26	0
2	265	135	0	53	395	491	496	478	529	123	29	0
3	329	126	78	50	332	447	441	438	553	147	26	131
4	356	0	39	13	338	438	483	414	502	115	26	0
5	429	161	72	0	396	417	549	428	511	120	29	74
6	349	139	77	0	368	426	503	431	548	94	26	175
7	335	0	65	72	161	416	323	430	526	74	41	231
8	281	149	0	68	422	401	459	407	571	77	14	230
9	289	137	0	13	448	411	391	472	582	73	23	135
10	287	0	0	0	513	446	420	443	608	68	26	9
11	285	153	0	4	456	497	420	430	583	15	23	168
12	264	94	68	96	502	417	410	496	583	81	25	163
13	167	12	21	94	468	457	364	435	573	71	25	109
14	295	142	0	90	458	418	377	478	542	35	26	0
15	171	0	72	0	466	450	413	460	600	63	45	95
16	277	159	23	94	517	408	424	464	560	21	8	101
17	159	54	29	129	511	393	437	491	633	60	24	101
18	218	63	80	208	458	420	437	482	591	22	24	100
19	159	47	0	88	479	365	442	478	545	50	42	96
20	142	137	87	50	442	384	466	517	538	40	44	59
21	232	0	21	100	546	396	437	465	446	45	0	76
22	129	70	50	110	541	399	416	515	374	38	56	94
23	136	123	55	108	602	341	446	473	307	33	48	54
24	139	0	4	190	535	427	413	493	236	39	0	89
25	140	74	90	99	543	408	403	487	254	0	35	81
26	139	122	0	72	600	396	461	490	208	55	12	0
27	138	0	73	72	576	436	472	526	224	40	0	0
28	136	61	16	119	546	423	493	509	200	33	0	53
29	132		52	96	549	421	487	503	189	36	48	102
30	126		43	251	474	493	456	541	156	26	64	4
31	42		7		510		485	636		26		62
Mean	221	82	40	80	470	423	440	476	464	58	27	84
Runoff in Ac. Ft.	13570	4560	2460	4750	28920	25170	27050	29270	27580	3590	1620	5140

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 43.) A small amount of gravity drainage through the pumps during the summer months is included in the above flow.

TABLE 43

FLOW OF SACRAMENTO SLOUGH TO SACRAMENTO RIVER - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1		2150	510	445	976	1030	740	863	1200	528	442	372
2	F*	1840	522	530	666	1040	773	821	1000	502	435	450
3	L	1400	558	600	644	940	735	827	1100	542	336	66
4	O	1030	644	600	633	832	707	763	1100	520	285	369
5	W	1110	862	537	699	812	756	713	1060	500	218	0
6		1440	786	537	611	835	778	726	1060	537	157	0
7	N	1110	666	622	565	828	593	735	1040	487	84	0
8	O	900	572	748	611	828	683	724	1110	476	82	1520
9	T	881	544	544	995	832	630	791	1030	468	150	2190
10		1010	572	537	900	857	655	800	1070	406	207	1810
11	C	370	530	506	767	876	652	764	1100	285	205	1510
12	O	1380	518	514	544	782	663	803	1100	213	321	1460
13	N	1200	530	518	881	786	631	792	1050	274	368	1330
14	F	1460	1150	502	1070	766	622	869	1050	20	378	1120
15	I	957	1110	415	1130	776	655	846	1050	269	460	1050
16	N	900	1240	460	1010	793	623	761	1050	19	441	1010
17	E	677	506	487	843	785	673	838	1190	149	471	967
18	D	786	530	498	1010	800	690	836	1180	0	475	915
19		881	518	481	710	785	703	823	1120	210	461	888
20	T	862	518	544	551	779	725	854	1070	0	0	820
21	O	699	484	579	805	725	684	871	1020	207	619	776
22		1090	502	767	1110	666	685	888	970	19	0	695
23	C	544	494	593	1320	615	685	885	838	19	774	0
24	H	526	498	572	1220	688	706	890	789	150	1340	631
25	A	600	475	558	1190	706	694	888	738	151	0	613
26	N	572	442	514	1200	706	730	915	684	151	1040	112
27	N	622	469	805	957	715	730	1010	655	148	832	0
28	E	666	481	1170	1240	743	740	985	598	204	767	0
29	L		445	957	1360	698	761	976	591	203	691	0
30			346	843	1420	738	792	1000	494	423	658	111
31			204		1260		925	1000		443		284
Mean		988	588	600	932	792	704	847	970	275	423	680
Runoff in Ac. Ft.		54870	36150	35670	57320	47130	43280	52080	57730	16900	25180	41890

No record of discharge.

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 31, 40, 41 and 42, which, when combined, will give the measured flow entering the By-Pass area. This station is operated by the Division of Water Resources.

TABLE 44

FLOW OF FEATHER RIVER NEAR OROVILLE - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	17200	4680	6510	7880	9970	4430	2390	2330	2030	1580	1510	1560
2	15200	4810	6240	7530	9880	4150	2380	2300	2010	1800	1500	1420
3	15800	4820	6040	7230	9860	4200	2360	2250	2350	1780	1420	1490
4	15600	4950	5830	7370	9840	4070	2370	2240	2260	1840	1410	4310
5	15700	4670	5590	7730	9480	4000	2380	2190	2160	1730	1410	8270
6	13900	4750	5410	7800	9710	3800	2360	2220	2010	1680	1460	8420
7	12600	5330	5340	7630	9700	3670	2390	2260	1990	1640	1540	5790
8	11600	4850	5460	7400	9360	3460	2400	2280	1940	1700	1360	4410
9	10500	4690	5570	7360	8560	3280	2330	2280	1910	1620	1250	3750
10	9660	4560	5860	6850	8390	3310	2280	2280	1950	1540	1200	3060
11	9080	4570	6420	6720	7890	3240	2240	2290	1940	1560	1200	2660
12	9120	4540	6340	7080	7320	3130	2330	2170	1930	1560	1270	2470
13	8640	4270	7970	7650	7120	3010	2430	2430	1940	1500	1310	2360
14	8370	4180	7320	7860	6790	2920	2480	2380	1920	1490	1360	2080
15	8030	4250	6640	8620	6470	2860	2440	2390	1860	1640	1360	1910
16	7880	4170	6440	9880	6520	2660	2410	2420	1920	1590	1190	1810
17	7620	4060	6060	11300	6620	2630	2370	2440	2040	1620	1010	1790
18	7470	4180	5970	12400	6810	2680	2360	2340	1940	1570	1660	1680
19	7300	4100	6360	12700	7020	2780	2360	2370	1990	1630	8930	1580
20	7030	4180	6540	11800	6690	2740	2380	2410	1940	1520	6130	1570
21	6960	5100	6480	10600	6340	2570	2430	2380	1840	1520	3000	1570
22	6950	5330	6340	10300	5720	2560	2430	2320	1820	1610	2790	1570
23	6800	5080	6240	10700	5620	2380	2410	2300	1750	1720	15300	1440
24	6790	5110	5910	11600	5290	2510	2360	2190	1780	1470	6070	1470
25	6860	5580	5710	12200	5020	2470	2420	2130	1900	1370	4090	1570
26	6840	5340	5930	12300	5770	2500	2480	2080	1840	1290	3170	1730
27	6630	5480	6410	11400	5640	2450	2420	2200	1690	1200	2640	2060
28	6480	6950	7240	10800	5270	2460	2340	2120	1660	1280	2140	1980
29	5630		8870	11000	4980	2540	2320	2310	1580	1550	1810	1800
30	5050		8870	10300	4640	2410	2310	2460	1520	1960	1660	1660
31	4820		8040		4530		2310	2130		1660		1540
Mean	9294	4806	6450	9400	7188	3062	2376	2287	1914	1588	2738	2606
Runoff in Ac. Ft.	571500	266900	396600	559300	442000	182200	146100	140600	113900	97630	162900	160200

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.

TABLE 45

FLOW OF FEATHER RIVER NEAR GRIDLEY - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	19500	4760	6620	7730	7550	2120	358	122	285	1010	1130	1660
2	15800	4850	6210	7350	7290	1810	368	138	228	1090	1150	1650
3	16400	5000	6150	7120	7170	1730	165	114	244	1180	1090	1640
4	15500	4900	5880	7160	7200	1750	104	88	555	1260	938	3420
5	16000	4790	5700	7310	6970	1530	78	88	465	1260	1080	6620
6	14100	4680	5460	7370	6920	1420	69	74	358	1170	1050	9020
7	12500	5430	5270	7300	7120	1350	69	88	319	1070	1070	6720
8	11500	4880	5400	7020	6770	1210	71	126	319	1140	989	4690
9	10400	4720	5500	7060	6130	1020	71	126	220	1110	938	4060
10	9730	4590	5670	6620	5940	921	69	131	280	1070	836	3290
11	9130	4760	6170	6320	5530	904	62	153	353	1060	734	2880
12	8930	4600	6340	6480	4960	836	64	145	358	1080	870	2540
13	8610	4320	7300	6760	4610	753	56	122	374	1070	989	2420
14	8430	4150	7340	7000	4390	561	68	353	368	981	964	2310
15	8180	4250	6650	7370	4070	426	174	353	384	1090	981	2020
16	7930	4220	6450	8290	4020	606	143	384	421	1100	1040	1940
17	7730	4010	6090	9150	4020	348	136	358	663	1110	1030	1970
18	7550	4170	5860	10100	4220	145	110	374	708	1080	1090	1890
19	7380	4070	6220	10400	4400	405	88	319	785	1150	5280	1730
20	7240	4100	6390	9980	4270	454	90	379	964	1120	7500	1700
21	7130	4740	6440	9050	4020	416	126	379	947	981	3620	1700
22	7030	5540	6280	8510	3430	319	159	358	930	1050	2540	1700
23	6950	5210	6210	8620	3330	280	174	309	862	1130	11600	1600*
24	6990	5150	6080*	9020	3120	159	131	309	870	1010	7400	1600*
25	6950	5470	5940*	9580	2750	174	95	260	981	870	4650	1700*
26	6920	5540	5940*	9820	3020	252	216	212	981	785	3510	1700*
27	6680	5340	5940*	9330	3700	228	236	220	981	766	2940	1700*
28	6590	6610	6210*	8500	3050	153	171	260	853	663	2410	1900*
29	6050		7730*	8340	2690	168	104	248	887	845	1970	1900*
30	5350		8150*	7900	2380	410	95	110	836	1170	1810	1700*
31	5000		7870*		2280		88	503		1220		1700*
Mean	9490	4816	6305	8085	4752	762	129	232	593	1055	2440	2680
Runoff in Ac. Ft.	583500	267500	387700	481100	292200	45300	7950	14300	35300	64800	145200	164800

* Estimated.

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

TABLE 46

FLOW OF FEATHER RIVER AT YUBA CITY (5TH ST. BRIDGE) - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	26700	5560	6830	8610	8710	3100	455	182	506	1110	1170	2110
2	21200	5370	7160	8370	7950	2590	412	186	341	1250	1060	2000
3	19800	5700	6790	8180	7540	2480	328	182	265	1450	1020	1920
4	19300	5740	6660	7930	7700	2840	221	173	468	1460	966	2620
5	21600	5700	6510	7520	7500	2720	221	145	576	1460	942	5150
6	20300	5400	6140	7370	7610	2500	220*	133	525	1460	950	8880
7	17300	5610	5920	7430	7940	2190	220*	118	357	1320	982	9420
8	15200	6290	5850	7280	7920	1940	220*	108	352	1250	982	6090
9	13400	5610	5630	6990	7150	1710	225*	137	305	1320	851	4610
10	12100	5220	5420	7060	6270	1560	225*	141	300	1250	740	3970
11	10800	5400	5450	7040	6200	1490	231	161	445	1190	654	3390
12	10400	5220	5920	6900	5650	1310	217	182	544	1160	654	3050
13	10200	4950	4990	6810	5150	1200	182	182	570	1150	829	2870
14	9730	4540	7240	7290	5040	1060	190	169	544	1080	912	2780
15	9440	4570	7560	7550	4650	978	270	336	576	1150	950	2520
16	8920	4530	7100	8290	4480	998	321	363	608	1160	974	2420
17	8720	4380	6760	9600	4520	946	290	403	800	1330	1010	2330
18	8440	4390	6410	11100	4400	711	240	369	1030	1300	873	2250
19	8440	4400	6160	12100	4690	699	280	374	998	1250	2030	2160
20	8110	4530	5790	12300	4980	675	223	352	1250	1250	7250	2080
21	8160	4810	6030	11500	5160	645	236	427	1300	1090	4290	2090
22	8080	5270	6370	10300	4780	546	270	456	1260	1090	2810	2040
23	7990	6190	6200	9830	4030	497	265	421	1170	1160	5640	1990
24	7850	5900	6000	10500	3910	434	231	369	1140	1160	9890	1960
25	7880	5670	5830	11400	3700	306	222	352	1140	904	5080	2000
26	7820	6120	5740	12600	3080	299	208	315	1260	881	3700	2030
27	7660	5980	5560	11900	4050	293	265	275	1260	822	3200	2170
28	7460	5610	5670	10300	4070	301	321	300	1100	780	2820	2420
29	7170		5540	9880	3420	288	260	321	1080	829	2450	2330
30	6280		7580	9640	3120	347	227	357	1060	1070	2260	2150
31	5810		9180		2660		186	628		1370		2050
Mean	11700	5310	6320	9120	5410	1250	254	278	771	1180	2260	3090
Runoff in Ac. Ft.	718500	294900	388700	542600	332700	74500	15600	17100	45900	72400	134800	190100

*Estimated.

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 affects the stage-discharge relationship of this station and the flows prior to June 1 have been modified accordingly.

TABLE 47

FLOW OF FEATHER RIVER BELOW SHANGHAI BEND - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	42600	8150	10700	13800	16000	5850	1270	681	842	1340	1530	2520
2	32600	7960	10700	13000	15000	5150	1170	558	645	1500	1350	2390
3	29600	8490	10100	12400	14700	4860	1080	528	612	1650	1290	2290
4	29300	8490	9900	12000	15000	5590	956	474	742	1680	1230	3200
5	32600	8420	9520	11600	14700	5430	938	431	876	1670	1110	6630
6	30700	7960	9140	11400	15200	5030	850	431	850	1640	1250	13800
7	25800	9140	9140	11400	15700	4460	819	409	727	1550	1230	13800
8	22400	9710	8700	11300	15500	3990	781	409	688	1480	1220	9140
9	19600	9140	8530	11100	13500	3600	796	445	658	1540	1100	6860
10	17600	8910	8440	11100	12400	3350	773	452	635	1480	973	5780
11	16000	8720	8840	10700	12200	3180	773	466	711	1410	885	4770
12	15000	8590	9140	10500	11300	2760	742	466	850	1410	868	4230
13	14500	8480	9710	10700	10900	2580	704	466	894	1380	1040	3890
14	13800	8320	12400	11300	10500	2420	711	445	782	1360	1160	3660
15	13300	8170	11800	12000	9900	2230	758	612	750	1380	1140	3350
16	12600	8040	10900	13000	9520	2310	812	643	758	1470	1180	3150
17	12200	7930	10300	15000	8950	2200	788	688	982	1550	1230	3040
18	11800	7810	9900	17100	9140	1940	773	643	1160	1570	1110	2940
19	11800	7720	9710	18200	10300	1880	735	635	1160	1500	1940	2780
20	11400	7600	9710	18200	11300	1820	704	620	1290	1410	8900	2730
21	11300	7540	10100	16800	11400	1720	704	681	1390	1360	6100	2690
22	11100	9140	10100	15500	10500	1640	743	711	1350	1360	3680	2610
23	10900	9520	9710	15700	8420	1520	727	688	1280	1400	6990	2580
24	10700	9140	9330	17100	7450	1420	688	650	1260	1430	12200	2510
25	10700	8950	9140	18800	6610	1290	688	635	1270	1280	6920	2550
26	10700	9140	8910	20500	6690	1190	680	612	1380	1180	4890	2610
27	10500	8840	8800	20200	8950	1150	720	582	1390	1110	4050	2750
28	10300	9330	9140	18200	7920	1140	773	605	1340	1090	3480	3130
29	9900		11300	17900	7160	1110	735	658	1230	1120	2960	3000
30	8950		14700	17400	6580	1150	666	635	1220	1340	2680	2780
31	8380		15000		6270		650	885		1640		2660
Mean	17050	8550	10110	14460	10960	2800	797	576	991	1430	2860	4220
Runoff in Ac. Ft.	1049000	474700	621800	860600	673700	166200	49000	35400	59000	87800	170000	259500

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 7000 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 48

FLOW OF FEATHER RIVER AT NICOLAUS - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	49000	8690	12100	16200	15600	6290	1040	497	745	1180	1660	3050
2	37000	8450	11400	14800	14800	5380	980	471	627	1390	1470	3080
3	32000	8960	10700	13700	14500	4990	930	433	556	1560	1350	3010
4	31100	9200	10400	12800	14700	5580	802	409	549	1630	1330	3370
5	34500	9000	9820	12600	14700	5650	738	385	752	1630	1240	6180
6	34700	8500	9390	12700	14800	5280	682	374	745	1600	1320	12400
7	31600	9560	8980	12600	15000	4750	661	363	675	1550	1270	15000
8	29400	10700	8980	12400	15100	4310	640	358	614	1450	1290	11300
9	23000	9370	9130	12100	14100	3840	614	363	594	1490	1230	8210
10	20000	8640	9150	12000	12600	3550	588	380	568	1490	1150	6850
11	17500	8540	9630	11100	12300	3360	568	380	601	1440	1020	5640
12	16500	8470	10100	10500	11600	2960	568	385	717	1390	954	4930
13	16000	8020	11200	10800	11100	2710	530	409	788	1380	1030	4390
14	15500	7620	15200	11300	10800	2480	510	391	773	1370	1240	4140
15	15000	7440	13500	11900	10200	2260	536	439	724	1320	1290	3870
16	14500	7460	12000	12300	9780	2250	601	516	752	1440	1330	3550
17	14000	7230	11200	13400	9300	2170	620	542	788	1560	1400	3360
18	13600	7170	10600	14900	9120	1890	582	556	1020	1580	1290	3250
19	13400	7300	10100	16100	9930	1860	562	542	1100	1590	1480	3110
20	13000	7380	10900	16300	11300	1650	562	556	1110	1480	7400	3020
21	12600	7710	12000	15600	11400	1590	556	620	1260	1420	7410	3000
22	12500	10000	11400	14500	11000	1540	588	661	1280	1410	4350	2910
23	12200	10400	10900	14200	9040	1480	562	640	1230	1460	5130	2890
24	12000	9320	10400	15000	7960	1430	523	588	1180	1480	12200	2720
25	11800	9470	9880	16100	7030	1380	523	568	1170	1380	8340	3100
26	11700	9840	9510	17300	6770	1320	530	542	1240	1240	5440	3240
27	11500	9390	9660	17900	8640	1260	542	523	1300	1150	4390	3310
28	11100	9840	10100	17400	8680	1210	594	497	1300	1150	3780	3600
29	10900		13400	16700	7490	1150	601	549	1160	1110	3310	3470
30	9970		18500	16300	7010	1100	549	549	1150	1290	2960	3260
31	9100		18600		6450		530	661		1580		3090
Mean	19247	8702	11253	14050	11058	2889	626	489	902	1425	2968	4719
Runoff in Ac. Ft.	1183000	483300	691900	836000	679900	171900	38500	30040	53690	87650	176600	290200
Diversions (1)	0	0	0	50	1400	2200	2200	1850	1470	100	0	0
Flow to Sacramento R. Ac. Ft.	(2)1183000	483300	691900	835950	678500	169700	36300	28190	52220	87550	176600	290200

NOTE: Station maintained jointly by Division of Water Resources and Water Resources Branch of the U.S. Geological Survey.
(1) All below Nicolaus.
(2) Does not include channel accretions or loss between station and mouth.

TABLE 49

FLOW OF YUBA RIVER AT NARROWS DAM - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	7660	1680	3120	4240	7070	2840	798	655	565	405	365	720
2	6450	1740	2790	3820	7040	2660	750	590	565	410	285	720
3	7160	1920	2730	3540	7300	3280	750	622	595	415	280	720
4	7160	1860	2500	3540	7540	3740	750	571	585	410	300	720
5	7720	1680	2300	3580	7510	3550	750	590	600	275	325	665
6	6510	1770	2260	3550	7780	3200	750	582	605	205	270	3720
7	5500	2260	2280	3760	7860	2780	730	590	580	345	265	2830
8	4760	1960	2340	3540	7420	2420	750	590	580	410	215	2020
9	4120	1720	2380	3780	5980	2280	750	574	600	410	200	1600
10	3690	1860	2820	3600	6100	2340	745	576	600	410	200	1370
11	3340	1810	2860	3320	5860	1960	745	576	605	415	195	1210
12	3040	1630	2680	3460	5820	1770	745	576	610	380	205	1130
13	2880	1610	4980	3740	5780	1680	740	576	520	380	245	1090
14	2730	1580	4320	4220	5420	1680	745	576	425	405	205	1050
15	2560	1600	3520	4400	5260	1720	740	576	410	400	220	1030
16	2440	1520	3160	4980	4880	1620	740	576	445	405	160	1000
17	2320	1730	3130	5700	4220	1580	740	530	445	405	155	992
18	2260	1610	2980	6350	4890	1500	735	530	425	405	330	965
19	2300	1600	3120	6040	6570	1400	730	580	400	365	525	955
20	2250	1800	3460	5550	6920	1310	730	580	400	355	565	980
21	2160	2400	3320	5250	6660	1250	730	580	360	380	555	956
22	2070	3020	3140	5260	5440	1210	730	580	370	385	635	940
23	2000	2500	2930	6500	4160	1160	730	580	400	390	665	897
24	1960	2580	2960	7460	3290	1120	730	580	395	390	680	925
25	1980	2580	2760	8300	3100	1070	730	540	395	395	700	945
26	2000	2310	2760	8740	4200	990	730	575	400	370	710	955
27	1940	2280	2920	7860	4970	950	730	580	400	365	715	1040
28	1890	3540	3260	7820	3720	920	730	580	360	400	715	1080
29	1850		5220	7980	3770	930	730	590	355	400	715	1020
30	1780		5580	7580	3500	920	730	580	400	380	720	987
31	1720		4740		3800		725	540		380		935
Mean	3490	2005	3204	5249	5607	1861	740	578	480	382	411	1167
Runoff in Ac. Ft.	214600	111400	197000	312300	344800	110700	45500	35550	28550	23490	24440	71740

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 50.

TABLE 50

FLOW OF DEER CREEK NEAR SMARTVILLE - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	503	146	227	313	78	52	4.0	5.6	3.8	5.6	42	74
2	538	189	214	242	64	45	6.3	4.3	3.3	17	40	73
3	634	214	208	204	57	43	7.3	4.0	3.2	19	41	78
4	920	182	202	191	51	42	7.9	4.3	3.3	20	26	552
5	676	162	194	180	43	41	7.3	4.6	3.2	19	37	966
6	503	217	187	167	40	41	5.8	4.8	3.2	19	42	439
7	454	359	184	157	34	42	6.5	5.1	3.5	23	42	210
8	402	216	176	152	33	38	7.9	4.8	3.5	23	41	152
9	362	185	173	156	27	37	7.0	3.8	3.5	20	36	127
10	333	180	171	144	24	39	7.6	3.8	3.8	18	45	117
11	308	184	175	136	24	41	7.0	3.5	3.6	19	46	110
12	288	162	178	136	25	36	6.8	2.3	3.5	24	46	103
13	269	157	566	142	28	34	7.0	2.3	3.3	28	50	99
14	251	154	258	136	32	35	5.1	6.3	3.5	29	52	94
15	236	156	191	127	38	35	5.3	6.3	3.5	31	52	92
16	222	154	167	121	39	31	7.0	6.3	5.1	42	53	90
17	212	151	152	109	52	32	7.0	6.5	8.2	72	46	91
18	204	149	146	98	53	32	5.8	7.0	7.6	72	26	89
19	200	160	160	79	36	28	5.8	5.8	5.3	26	701	90
20	202	193	289	79	34	19	6.0	3.0	4.1	16	300	94
21	189	365	251	79	32	18	6.0	2.8	4.4	71	107	92
22	184	296	189	72	43	14	5.3	2.9	4.3	11	207	90
23	176	231	169	69	55	14	4.0	3.0	6.0	32	701	89
24	175	227	154	66	54	14	4.4	3.2	7.0	28	164	91
25	171	222	146	69	53	12	6.5	3.0	6.5	32	112	98
26	166	204	138	83	74	11	7.3	2.8	5.8	39	95	94
27	160	225	136	75	65	11	6.5	3.5	6.5	39	87	100
28	157	240	210	83	60	10	6.5	4.1	6.5	38	84	94
29	154		1080	67	63	3.5	6.8	5.1	5.3	39	80	94
30	151		879	89	56	3.0	7.3	5.6	6.0	42	69	91
31	149		391		53		6.8	4.3		40		87
Mean	308	203	257	127	45.8	28.4	6.38	4.35	4.68	30.8	116	154
Runoff in Ac. Ft.	18940	11270	15790	7580	2820	1690	392	267	278	1890	6880	9440

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 49.

TABLE 51

FLOW OF YUBA RIVER AT MARYSVILLE (SIMPSON LANE BRIDGE) - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	11000	2390	3870	5190	7290	3000	629	497	344	333	337	743
2	9000	2410	3540	4630	7050	2720	564	400	344	333	279	738
3	9800	2790	3310	4220	7160	2800	555	420	344	356	249	727
4	10000	2750	3240	4070	7300	3420	540	360	352	333	246	1370
5	11000	2540	2970	4080	7200	3220	535	330	352	282	240	1950
6	9600	2460	2840	4030	7590	3020	526	330	359	253	249	4920
7	8100	3530	2820	3970	7760	2080	516	330	359	262	221	4380
8	7200	3010	2850	4020	7580	2200	511	330	352	279	218	2680
9	6200	2670	2900	4110	6350	2020	516	320	352	279	199	2030
10	5500	2410	3020	4040	6130	1980	511	320	363	276	164	1720
11	5160	2650	3390	3660	6000	1750	502	320	371	276	164	1520
12	4630	2400	3220	3600	5650	1490	506	320	390	272	154	1400
13	4320	2280	4720	3890	5750	1400	506	320	386	262	167	1310
14	4070	2220	5160	4010	5460	1350	497	320	279	276	193	1260
15	3860	2210	4240	4450	5250	1370	497	320	243	295	167	1220
16	3680	2230	3800	4710	5040	1420	497	320	246	309	156	1190
17	3480	2060	3540	5400	4430	1350	502	290	249	326	132	1170
18	3360	2280	3490	6030	4740	1280	502	290	256	348	132	1140
19	3360	2160	3550	6140	5610	1210	497	330	230	326	678	1120
20	3290	2410	3920	5890	6320	1130	502	330	215	285	1250	1120
21	3140	2720	4070	5270	6240	1040	511	330	208	302	816	1100
22	3020	3870	3730	5190	5720	989	516	326	187	330	743	1080
23	2910	3330	3510	5870	4390	926	506	333	187	316	1950	1050
24	2840	3040	3330	6590	3540	897	502	337	196	309	1460	1060
25	2820	3280	3310	7360	3210	845	506	330	199	309	838	1090
26	2820	3020	3170	7940	3610	765	511	319	215	299	793	1090
27	2730	2820	3240	8310	4900	706	506	330	218	289	771	1120
28	2680	3720	3470	7860	3850	680	511	333	215	306	771	1230
29	2630		5760	8020	3740	675	502	344	187	344	771	1170
30	2540		7120	7760	3460	670	497	348	208	344	760	1130
31	2460		5820		3610		497	344		341		1080
Mean	5071	2702	3772	5344	5546	1613	515	338	280	305	509	1481
Runoff in Ac. Ft.	311800	150100	231900	318000	341000	96010	31690	20770	16670	18740	30280	91060

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. Stage-discharge relationship affected by variable back water for period January 1-10, for which discharge has been computed on basis of records for Yuba River at Smartville.

TABLE 52

FLOW OF BEAR RIVER NEAR WHEATLAND - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1630	767	932	1570	323	312	18	7.3	6.3	53	48	580
2	1380	772	860	1360	347	280	15	5.7	5.0	68	48	575
3	1680	932	772	1210	327	280	14	5.3	2.2	56	49	575
4	2270	878	750	1140	339	273	15	5.3	1.7	49	48	694
5	2750	800	745	1080	355	270	13	4.7	2.0	32	48	880
6	2090	812	679	1020	375	266	16	6.6	3.9	28	49	809
7	1590	1140	696	974	347	262	19	5.0	5.3	26	48	600
8	1500	1060	734	878	395	252	18	7.0	7.0	25	51	525
9	1270	956	740	800	391	252	15	4.7	6.6	28	50	470
10	1150	908	615	690	379	252	11	3.6	5.3	28	48	425
11	1080	936	520	652	339	273	8.0	3.3	2.8	26	48	382
12	1020	890	515	625	339	248	6.0	3.9	3.0	25	47	306
13	938	848	1580	605	315	230	3.9	3.6	3.3	20	48	227
14	866	830	1230	570	335	178	6.0	2.8	1.4	16	51	210
15	914	806	968	432	323	121	10	2.5	1.2	16	53	190
16	884	789	872	211	347	74	5.7	3.6	2.0	35	52	125
17	860	772	812	34	339	47	6.6	3.9	1.5	53	52	82
18	872	772	570	37	298	28	10	3.3	1.2	52	54	81
19	932	778	515	68	298	21	7.3	4.7	1.2	48	433	84
20	938	836	789	247	298	15	8.7	7.0	1.0	48	587	84
21	920	950	884	308	294	21	12	3.3	1.7	49	154	75
22	896	1110	706	298	294	19	9.6	4.7	1.7	48	121	75
23	872	824	630	180	319	19	8.3	3.3	1.7	51	466	76
24	866	745	570	150	331	19	10	3.0	2.0	48	205	129
25	830	872	505	142	331	14	13	3.0	2.2	47	130	510
26	824	860	490	117	472	13	11	2.8	2.5	44	106	490
27	806	824	490	270	444	14	9.1	2.8	2.8	45	97	450
28	800	1000	440	335	391	13	7.3	3.0	2.2	47	89	349
29	789		2020	290	355	14	7.3	3.0	2.5	48	88	167
30	778		3220	304	363	20	6.0	3.3	8.2	49	131	144
31	784		2010		331		7.0	4.4		48		125
Mean	1154	874	899	553	346	137	10.5	4.21	3.05	40.5	117	339
Runoff in Ac. Ft.	70970	48530	55260	32920	21290	8130	648	259	181	2490	6940	20810

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 53

FLOW OF RECLAMATION DISTRICT 1001 DRAIN INTO CROSS CANAL* - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	27	0	10	10	10	23						
2	27	19	10	6	0	0						
3	27	0	0	0	0	23						
4	26	18	11	0	10	8						0
5	37	14	9	11	10	10						29
6	68	10	0	10	0	0						11
7	47	10	10	0	11	11						20
8	52	9	0	10	10	8		N	N	N		0
9	28	9	10	10	10	0		0	0	0		0
10	23	0	0	6	13	6						0
11	17	10	0	0	11	10						44
12	15	10	10	0	29	0		P	P	P		0
13	0	10	10	10	14	10		U	U	U		19
14	30	10	0	0	0	0		M	M	M		0
15	17	8	10	10	0	10		P	P	P		0
16	15	8	11	6	27	0		I	I	I		0
17	12	0	0	0	0	0		N	N	N		0
18	14	11	10	10	0	27		G	G	G		0
19	16	10	10	7	26	0	0					0
20	0	9	8	0	0	0	23					0
21	26	8	0	13	24	27	0					24
22	17	0	10	0	24	0						0
23	0	10	9	0	10	20					0	0
24	13	0	0	10	11	0					11	0
25	10	10	10	0	10	0					0	0
26	9	10	0	0	0	0						0
27	0	10	10	10	10	0						0
28	25	0	5	10	0	0						0
29	10		10	10	8	0						0
30	10		6	9	10	0						0
31	10		0		0	0						0
Mean	20	8	6	6	9	6	0.7	0	0	0	0.4	5
Runoff in Ac. Ft.	1250	442	375	333	571	383	46	0	0	0	22	292

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

NOTE: Slight amount of additional drainage by gravity in August, September and October not shown.

TABLE 54

FLOW OVER SACRAMENTO WEIR FROM SACRAMENTO RIVER TO YOLO BY-PASS - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	790*											
2	580*											
3	440*											
4	380*											
5	480*											
6	500*											
7	440*											
8	380*											
9	300*											
10	210*											
11	130*											
12	30*											
13	0											
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
31												
Mean	148	0	0	0	0	0	0	0	0	0	0	0
Runoff in Ac. Ft.	9240	0	0	0	0	0	0	0	0	0	0	0

NO FLOW OVER WEIR IN 1946 EXCEPT DURING 12 DAYS IN JANUARY AS SHOWN

* Leakage through needles only.

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.

TABLE 55

FLOW OF RECLAMATION DISTRICT 1000 DRAIN (#3 PLANT) - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	70	47	25	12	17	17	0	0	28	0	3	6
2	70	47	25	12	17	17	0	0	28	0	3	6
3	70	47	25	12	17	17	0	0	28	0	3	6
4	70	47	25	12	17	17	0	0	82	0	3	6
5	70	47	25	12	17	17	0	0	76	0	3	6
6	70	47	25	12	17	16	0	0	78	0	3	6
7	70	47	25	12	17	16	0	0	75	0	3	6
8	70	47	25	12	17	16	0	0	72	0	3	6
9	70	47	25	12	17	16	0	0	70	0	3	6
10	70	47	25	12	17	16	2	0	64	0	3	6
11	70	47	25	12	17	16	2	0	62	0	3	6
12	70	47	25	12	17	16	3	0	62	0	3	6
13	70	47	25	12	17	16	3	0	68	0	3	6
14	70	47	25	12	17	16	3	0	46	0	3	6
15	70	47	25	12	17	16	3	0	63	0	3	6
16	70	47	25	12	17	16	3	0	75	0	3	6
17	70	47	25	12	17	16	3	3	66	33	3	6
18	70	47	25	0	17	16	3	3	72	33	3	6
19	67	47	25	0	17	16	3	3	67	35	3	6
20	46	47	25	0	17	16	3	3	67	39	3	6
21	46	28	20	17	17	16	1	3	42	38	6	10
22	46	26	20	17	17	0	1	30	28	50	6	12
23	46	26	12	17	17	0	0	30	41	19	6	14
24	46	26	12	17	17	0	0	29	32	25	6	14
25	46	26	12	17	17	0	0	29	35	27	6	14
26	46	26	12	17	16	0	0	28	0	27	6	14
27	46	26	12	17	16	0	3	29	0	29	6	14
28	46	26	12	17	16	0	3	29	0	27	6	14
29	46		12	17	16	0	2	29	0	27	6	14
30	46		12	17	16	0	2	29	0	27	6	14
31	46		12		16		2	29		27		14
Mean	61	41	21	12	17	11	1.5	10	48	15	4	9
Runoff in Ac. Ft.	3730	2280	1290	742	1030	677	89	607	2830	918	239	532

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 56.) Plant operates automatically on float switch. Daily distribution of flow estimated.

TABLE 56

FLOW OF RECLAMATION DISTRICT 1000 DRAIN (2ND BANNON SLOUGH) - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	53				22					0		0
2	72				0				0	38		62
3	63				15				46	55		0
4	71				40				67	35		32
5	91				0				0	78		0
6	95				40				0	0		83
7	97	N			0	N	N	N	0	70		42
8	73	O			33	O	O	O	0	59		0
9	73				43				20	42		110
10	0	D			40	D	D	D	20	45		39
11	65	R			0	R	R	R	13	0		66
12	0	A				A	A	A	23			0
13		I				I	I	I	97			
14		N				N	N	N	50			
15		A			0	A	A	A	0			
16		G			7	G	G	G	73			
17		E			33	E	E	E	20			
18					0				0			
19				0					1			
20				20					0	0		
21				23					9	51		
22				0					27	52	0	
23			0						58	0	29	
24			7						0		0	
25			27						55		44	
26			.0						0		35	
27			0						52		0	
28			33	0					29		0	
29			0	18					0		25	
30				0					63		0	
31												
Mean	24	0	2.2	2	8.8	0	0	0	24	17	4.3	14
Runoff in Ac. Ft.	1490	0	133	121	541	0	0	0	1430	1040	264	861

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 55).

TABLE 57

FLOW OF AMERICAN RIVER AT FAIR OAKS - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	10900	2300	5700	7590	10300	5520	1390	324	278	367	549	1310
2	9090	2350	4770	6530	11000	5560	1410	316	288	428	565	1170
3	8700	2750	4470	5800	11500	5890	1400	320	294	675	558	1190
4	8230	2690	4180	5520	12100	5890	1260	298	278	744	549	1310
5	10700	2510	3780	5540	12000	5780	1160	280	294	657	533	2060
6	9610	2400	3580	5540	12600	5090	1080	290	304	470	474	4800
7	7920	2640	3700	5360	12600	4440	1010	305	291	558	430	4080
8	7060	2720	3970	5110	11700	4160	954	298	304	519	459	2700
9	6130	2480	4260	5180	10900	3960	916	298	300	530	388	2110
10	5700	2420	4630	5080	10300	3800	898	354	324	552	355	1930
11	5130	2480	4930	5150	9380	3550	767	342	337	498	347	1710
12	4680	2400	4550	5660	8830	3250	734	329	333	519	362	1570
13	4420	2260	7920	6870	8700	3170	734	309	355	502	412	1490
14	4180	2230	8000	7110	8130	3040	718	316	390	498	437	1400
15	4020	2220	6110	7610	7660	2960	639	276	409	485	391	1350
16	3860	2230	5360	9040	7820	2820	639	298	430	524	416	1300
17	3700	2130	5000	10400	8520	2650	685	309	463	708	355	1250
18	3480	2080	5150	11600	9220	2470	639	273	488	675	357	1200
19	3320	2130	5360	11600	9710	2350	602	294	455	589	1100	1150
20	3250	2300	5560	11100	9270	2280	548	283	434	555	9410	1150
21	3180	2620	5800	9610	9040	2290	516	263	461	558	3240	1150
22	3040	3910	5400	9220	6890	2290	522	294	449	571	1970	1100
23	2900	3460	5080	10000	5720	2160	498	276	428	619	6100	1100
24	2760	3370	4790	11400	5260	2030	473	273	409	545	6700	1100
25	2760	3360	4540	12600	5150	1850	450	280	405	680	3210	1250
26	2760	3150	4550	13300	6460	1760	467	238	449	632	2140	1450
27	2760	3040	5090	12000	7470	1740	528	229	500	575	1850	1700
28	2690	5600	5460	11700	5580	1630	510	250	387	488	1570	2000
29	2610		9580	11900	5260	1500	479	276	365	524	1440	1750
30	2510		12000	11500	5130	1410	373	260	391	530	1400	1500
31	2360		9530		5240		342	238		505		1450
Mean	4981	2722	5574	8554	8692	3243	753	290	376	557	1600	1670
Runoff in Ac. Ft.	306300	151200	342700	509000	534400	193000	46300	17830	22400	34300	95300	102700

NOTE: Station is maintained jointly by Division of Water Resources and the Water Resources Branch of the U. S. Geological Survey.

TABLE 58

FLOW OF AMERICAN RIVER AT SACRAMENTO (H ST. BRIDGE) - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	12000	2350	6090	7730	11000	5810	1430	358	286	438	632	1390
2	10000	2350	4900	6650	11300	5790	1470	358	302	414	677	1220
3	9000	2660	4500	5900	11700	6220	1460	358	270	632	686	1260
4	8500	2680	4180	5580	12300	6220	1340	310	270	722	668	1380
5	9500	2540	3700	5540	12400	6180	1210	310	318	740	668	2040
6	10500	2350	3430	5580	13100	5450	1120	310	278	632	650	4400
7	8500	2490	3450	5410	13100	4720	1060	334	302	614	533	4160
8	7500	2730	3720	5100	12200	4280	1010	310	334	641	587	2860
9	6500	2450	4080	5120	11200	4190	963	302	286	650	533	2310
10	6000	2370	4470	5030	10700	3850	941	350	342	641	479	2130
11	5500	2420	4940	5050	9720	3690	860	406	334	614	398	1940
12	5000	2410	4550	5580	9150	3320	794	334	358	605	414	1770
13	4700	2260	6930	6690	9060	3160	776	334	358	614	497	1670
14	4400	2230	8440	7070	8530	3140	767	358	350	605	560	1550
15	4200	2160	6210	7410	7960	3020	686	286	342	614	488	1510
16	4000	2230	5450	8660	8070	2900	677	318	374	605	524	1440
17	3800	2140	4960	10200	8780	2760	713	358	422	713	430	1390
18	3600	2070	5080	11500	9410	2570	704	270	479	740	366	1350
19	3500	2100	5340	12200	9880	2410	659	310	454	686	677	1290
20	3410	2230	5520	11800	9440	2310	587	270	430	659	8470	1270
21	3200	2440	5830	10100	9330	2310	587	278	422	659	3500	1250
22	3050	3700	5390	9520	7330	2370	533	310	454	668	1990	1200
23	2870	3490	5070	10200	6140	2270	524	310	454	677	4910	1190
24	2800	3290	4800	11800	5560	2110	515	286	430	632	8160	1170
25	2800	3260	4450	13100	5430	1950	497	326	430	704	3530	1310
26	2830	3060	4420	13600	6320	1850	524	231	422	695	2230	1520
27	2790	2900	4850	12300	7980	1840	560	247	497	659	1860	1720
28	2680	4870	5430	11900	5980	1720	587	231	479	623	1600	2060
29	2630		8950	12300	5520	1590	524	263	390	596	1550	1820
30	2550		11600	12000	5410	1490	414	278	366	632	1470	1550
31	2450		9870		5470		406	224		614		1510
Mean	5186	2651	5503	8687	9015	3383	803	307	374	637	1658	1762
Runoff in Ac. Ft.	318900	147200	338400	516900	554300	201300	49380	18900	22280	39150	98650	108400

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 1946.

TABLE 59

FLOW OF CACHE CREEK AT YOLO - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1460	155	240	181								0
2	1160	155	217	199								0
3	1070	164	208	194								0
4	1030	172	194	181								0
5	3500	146	177	164								0
6	3460	138	168	155								175
7	3170	138	159	138								417
8	3120	230	150	130								244
9	2900	204	138	134								139
10	2780	181	130	118								87
11	2600	164	122	106								49
12	2490	155	118	61								35
13	2310	142	118	51								24
14	2430	134	122	44	N	N	N	N	N	N	N	19
15	1100	130	134	35	0	0	0	0	0	0	0	16
16	580	130	118	24								12
17	480	134	110	16	F	F	F	F	F	F	F	4.3
18	425	126	110	9.2	L	L	L	L	L	L	L	0
19	380	122	110	1.0	0	0	0	0	0	0	0	0
20	345	134	110	0	W	W	W	W	W	W	W	0
21	320	186	106	0								0
22	298	266	103	0								0
23	280	320	100	0								0
24	266	271	96	0								0
25	248	253	90	0								0
26	230	253	80	0								0
27	212	230	71	0								0
28	199	222	71	0								0
29	190		80	0								0
30	177		103	0								0
31	164		146									0
Mean	1270	181	129	64.7	0	0	0	0	0	0	0	39.4
Runoff in Ac. Ft.	78100	10030	7930	3850	0	0	0	0	0	0	0	2420

NOTE: Station maintained and operated by Water Resources Branch of the U. S. Geological Survey.

TABLE 60

FLOW OF YOLO BY-PASS NEAR WOODLAND* - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	74600	591	194	73	56	50	46	44	51	36	18	20
2	49100	585	196	171	57	49	46	44	58	34	19	17
3	35300	423	203	196	58	49	46	45	65	36	14	15
4	30400	357	194	198	58	48	46	45	71	47	12	15
5	33100	316	183	196	58	48	47	45	77	48	10	15
6	37400	307	151	201	57	47	47	45	81	47	8	19
7	37200	295	106	194	56	47	47	45	82	39	8	31
8	34800	265	75	192	56	47	47	45	80	44	9	83
9	29700	262	64	177	56	47	47	45	76	66	6	561
10	25100	251	64	149	56	47	47	45	79	86	6	836
11	20800	251	71	88	56	47	46	45	80	88	5	525
12	15900	236	81	116	55	47	47	45	79	63	5	315
13	11800	219	103	116	54	46	47	45	78	52	4	221
14	7710	219	132	70	54	45	47	45	76	47	5	157
15	5560	203	127	57	54	45	47	45	75	62	6	115
16	3140	192	136	52	54	45	47	45	75	70	6	86
17	1600	175	139	50	55	45	47	45	75	64	7	67
18	1250	167	141	50	56	45	47	45	73	53	7	53
19	1100	154	177	51	58	45	46	45	73	45	8	42
20	1020	141	179	53	56	45	46	45	71	37	10	32
21	960	133	186	54	55	45	45	45	71	31	10	27
22	911	141	177	55	54	44	44	46	70	26	10	23
23	884	154	175	56	53	44	44	46	67	24	15	20
24	848	177	179	57	52	44	44	46	64	21	17	18
25	821	186	201	57	51	44	44	47	59	19	19	18
26	772	181	173	56	51	44	44	48	55	18	24	17
27	696	186	153	56	51	45	44	48	50	17	30	17
28	662	192	126	56	52	45	44	49	44	17	29	15
29	637		111	56	52	45	44	49	39	16	26	14
30	618		96	56	52	45	44	49	37	16	24	14
31	606		71		51		44	50		17		12
Mean	15000	249	141	100	54.6	46.0	45.7	45.8	67.7	41.5	12.6	110
Runoff in Ac. Ft.	922300	13800	8660	5970	3360	2740	2810	2820	4030	2551	748	6780

* Also known as Yolo By-Pass at Elkhorn.

NOTE: The flow at 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 54 and the flows of Putah Creek. The flow in this table includes the flows of Cache Creek (Table 59), Knights Landing Ridge Cut (Table 37), 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 61

FLOW OF COSUMNES RIVER AT MICHIGAN BAR - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1800	365	815	1610	900	340	81	19	3.4	4.1	28	121
2	1530	370	770	1380	880	328	77	17	3.4	4.1	28	113
3	1610	608	752	1210	870	315	70	16	8.1	13	30	107
4	1760	584	725	1150	870	299	67	14	5.2	39	33	115
5	2340	457	672	1100	860	284	63	12	3.8	29	33	189
6	1830	432	640	1080	851	269	60	11	3.6	29	34	367
7	1560	536	624	1040	824	247	57	11	3.8	25	31	499
8	1410	544	616	1000	761	234	54	9.4	3.8	21	30	315
9	1220	457	624	990	725	218	53	8.9	3.8	22	32	251
10	1100	432	640	960	680	212	52	8.5	3.6	21	36	215
11	1010	506	664	950	640	209	48	8.1	3.4	22	31	192
12	910	457	648	970	600	197	45	7.7	3.4	21	31	178
13	833	420	1340	1010	576	184	41	7.7	3.2	20	34	165
14	779	396	1260	1020	544	173	38	7.7	3.0	20	35	152
15	725	396	1050	1040	520	165	36	14	2.2	20	36	145
16	680	450	980	1090	513	160	35	12	2.6	25	38	138
17	632	414	930	1150	499	152	35	6.5	3.4	45	39	132
18	600	402	910	1200	499	143	34	5.2	4.4	46	41	127
19	568	402	960	1200	506	134	31	6.5	4.4	37	127	119
20	552	471	1150	1170	506	121	28	6.2	4.1	31	1100	115
21	520	568	1220	1090	492	117	26	5.8	5.2	26	384	113
22	499	716	1060	1030	471	113	26	5.2	5.8	28	209	109
23	471	608	970	1010	444	109	25	4.9	6.2	29	834	107
24	457	576	890	1040	408	107	24	4.4	5.8	30	693	119
25	444	616	842	1090	380	103	23	4.1	4.6	34	315	189
26	432	576	806	1120	555	97	24	4.1	4.4	33	224	215
27	420	568	797	1070	648	92	24	3.8	4.1	30	181	241
28	408	860	860	1020	464	88	24	3.8	3.8	29	160	336
29	402		2900	990	408	86	23	4.1	3.4	27	143	254
30	380		3640	960	375	82	22	3.8	3.2	26	132	227
31	370		2010		355		20	3.6		27		200
Mean	911	507	1057	1091	601	179	40.8	8.26	4.1	26.2	170	189
Runoff in Ac. Ft.	56040	28140	64990	64940	36940	10670	2510	508	244	1610	10120	11630

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 62

FLOW OF COSUMNES RIVER AT McCONNELL - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2360	420	849	2200	912	351	54	8		0	20	132
2	1910	417	773	1590	874	339	57	8		0	20	120
3	1810	474	749	1350	866	322	54	8		0	21	115
4	1780	757	733	1240	862	302	58	7		0	23	111
5	3000	685	697	1160	854	297	50	7		0	24	134
6	2570	546	658	1120	842	281	41	5		0	24	216
7	1940	513	637	1080	810	260	41	3		0	24	523
8	1690	606	623	1040	758	243	40	2	N	8	23	431
9	1470	516	620	1020	730	231	40	1	O	15	18	306
10	1280	483	626	1000	680	221	37	0		11	21	246
11	1140	483	644	1000	640	204	28	0	F	10	28	211
12	1030	501	662	990	600	195	25	0	L	10	24	189
13	928	450	773	990	570	182	24	0	O	8.2	21	178
14	857	447	1500	1000	550	168	25	0	W	9.1	24	164
15	809	435	1100	1000	520	154	28	0		10	24	151
16	753	450	1020	1040	511	150	24	0		11	28	144
17	697	456	955	1080	495	152	21	0		10	28	136
18	658	432	906	1140	485	144	21	0		7.6	34	126
19	623	426	964	1180	469	129	20	0		22	47	120
20	592	438	1040	1160	463	112	20	0		24	645	113
21	574	495	1320	1100	460	100	16	0		21	745	110
22	556	616	1160	1030	456	100	15	0		15	284	104
23	528	654	1070	994	453	98	13	0		13	327	100
24	513	598	991	1000	435	88	13	0		14	1030	98
25	501	581	928	1040	408	74	11	0		14	494	132
26	489	592	874	1060	396	70	10	0		19	304	218
27	477	594	849	1060	634	74	9	0		18	226	220
28	468	654	857	1020	540	67	9	0		20	187	315
29	456		1910	989	447	62	9	0		21	164	312
30	447		3000	953	402	57	8	0		20	146	256
31	429		3800		375		8	0		19		230
Mean	1075	526	1074	1121	597	174	26.7	1.58	0	11.3	168	192
Runoff in Ac. Ft.	66120	29190	66030	66700	36690	10370	1640	97	0	694	9970	11820

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 63

FLOW OF DRY CREEK NEAR GALT* - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	307	56	92	565	32	9.7					0	0
2	254	56	84	468	32	7.5					0	0
3	285	139	80	336	31	5.9					0	0
4	345	300	78	269	30	4.3					0	0
5	879	178	74	226	27	3.0					0	0
6	536	144	70	196	25	2.5					0	0
7	409	137	65	177	22	1.3	N	N	N	N	0	0
8	322	153	56	160	19	.3	0	0	0	0	0	29
9	256	138	49	152	18	0					0	14
10	213	124	46	142	14	0					0	5.7
11	194	134	45	131	17	0					0	2.7
12	174	133	46	124	16	0	F	F	F	F	0	.2
13	162	115	70	113	14	0	L	L	L	L	0	.2
14	156	105	164	102	13	0	O	O	O	O	0	0
15	150	99	108	94	12	0	W	W	W	W	0	0
16	143	104	88	82	11	0					0	0
17	131	104	77	76	11	0					0	0
18	122	96	70	70	11	0					0	0
19	114	92	77	67	11	0					0	0
20	105	103	111	68	10	0					0	0
21	104	111	250	68	10	0					11	0
22	93	132	205	66	10	0					.9	0
23	86	122	162	66	10	0					4.8	0
24	83	110	138	61	10	0					79	0
25	80	106	122	55	9.2	0					17	2.7
26	74	98	109	49	18	0					5.5	61
27	69	90	98	46	83	0					.7	56
28	66	95	91	44	50	0					0	92
29	62		515	41	26	0					0	88
30	57		1070	34	18	0					0	60
31	54		974		12							38
Mean	196	120	170	138	20.4	1.15	0	0	0	0	3.96	14.5
Runoff in Ac. Ft.	12070	6690	10480	8230	1250	68	0	0	0	0	236	892

* Also known as Dry Creek at Dustin Road.

NOTE: Station is maintained jointly by U. S. Geological Survey and U. S. Bureau of Reclamation.

TABLE 64

FLOW OF MOKELUMNE RIVER AT WOODBRIDGE - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3660	667	623	431	1420	889	60	24	62	165	222	405
2	3610	675	653	467	1430	1210	33	29	32	218	285	449
3	3710	703	663	567	1430	1600	32	30	29	278	298	539
4	3780	707	414	495	1430	1830	31	30	29	285	167	573
5	3880	691	599	521	1470	1870	30	28	36	272	277	555
6	3870	683	633	553	1460	1900	29	27	214	169	322	561
7	3820	687	665	513	1440	1660	29	28	247	72	332	537
8	2760	681	661	184	1420	631	28	28	230	207	328	238
9	1610	679	629	349	1410	426	26	28	47	250	337	509
10	1420	647	537	455	1410	373	26	29	40	207	300	631
11	1110	541	310	418	1410	760	26	29	150	200	177	637
12	1030	607	563	374	1440	860	26	27	127	218	217	621
13	1000	663	623	405	1450	659	27	26	151	207	296	627
14	980	667	607	440	1420	545	27	26	120	81	306	623
15	805	669	649	687	1380	571	26	27	157	172	315	355
16	727	673	623	593	1390	595	26	28	49	252	330	465
17	711	617	561	818	1410	555	26	29	57	232	327	563
18	701	443	189	1290	1420	429	26	29	169	230	201	599
19	691	645	92	1380	1430	283	25	26	137	226	334	605
20	683	689	630	1440	1460	286	26	25	126	167	457	627
21	669	693	527	1620	1380	259	26	25	151	153	369	593
22	673	681	517	1450	1430	226	25	28	141	250	355	507
23	673	661	517	1490	1460	247	24	29	42	269	429	241
24	671	569	513	1440	1380	168	24	43	237	250	447	509
25	665	501	291	1430	1450	135	24	27	241	236	791	597
26	667	627	401	1430	1500	99	24	28	131	238	631	451
27	645	659	625	1440	1500	106	25	28	170	223	533	527
28	661	655	519	1450	1460	112	26	28	147	142	517	603
29	665		591	1460	1460	87	24	29	153	209	323	631
30	671		605	1440	1470	147	24	30	62	254	427	589
31	673		581		1480		24	68		264		479
Mean	1545	646	536	901	1435	651	27.6	31.5	123	213	355	531
Runoff in Ac. Ft.	94990	35860	32950	53610	88260	38710	1700	1940	7310	13080	21120	32620

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

TABLE 65

FLOW OF CALAVERAS RIVER AT JENNY LIND - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	359	88	166	1230	80	50	13	7.2		0	8.9	47
2	306	90	151	866	79	49	13	3.6		0	8.9	43
3	356	252	139	630	75	46	13	.5		0	9.5	43
4	564	299	134	496	69	45	12	0		0	10	43
5	1420	221	126	425	68	41	11	0		0	11	44
6	1060	166	118	375	68	37	9.8	.7		0	11	52
7	670	148	112	337	66	36	8.0	1.1		0	12	195
8	488	163	108	310	64	35	7.2	.6		0	13	216
9	394	178	102	288	59	33	6.4	0	N	0	14	143
10	325	157	100	267	57	33	6.4	0	0	0	15	98
11	285	148	98	245	56	33	6.4	0		0	15	78
12	249	148	95	228	54	33	7.2	0	F	0	15	69
13	218	139	105	214	53	31	8.0	0	L	0	16	62
14	201	128	263	201	53	30	5.2	0	0	0	16	58
15	188	120	231	188	54	28	3.2	0	W	0	16	54
16	172	126	175	175	56	27	3.2	0		0	16	49
17	163	142	151	166	56	25	4.8	0		0	17	48
18	154	137	139	154	57	24	5.6	0		3.1	17	45
19	145	128	145	148	56	23	6.0	0		11	25	43
20	137	128	194	137	53	21	5.2	0		12	307	43
21	131	148	398	131	51	19	4.8	0		12	367	43
22	126	188	425	126	51	18	4.4	0		11	157	41
23	120	194	337	123	53	17	2.4	0		10	531	43
24	115	169	278	112	56	16	4.0	0		9.5	760	47
25	112	157	235	105	57	16	6.5	0		8.9	248	68
26	110	148	204	98	66	16	8.0	3.8		7.8	126	146
27	105	142	182	92	92	16	8.0	16		7.8	86	229
28	102	142	172	88	102	16	8.0	16		7.3	68	378
29	100		609	84	80	16	9.8	2.5		7.3	56	242
30	92		1810	82	66	14	8.6	0		7.8	50	163
31	90		1990		56		8.0	0		7.8		126
Mean	292	157	306	271	63.3	28.1	7.34	1.68	0	3.98	101	96.7
Runoff in Ac. Ft.	17960	8720	18830	16110	3890	1670	451	103	0	245	5990	5950

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 66

FLOW OF STOCKTON DIVERTING CANAL AT STOCKTON* - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	442	76	130	1350	53	24					0	22
2	389	75	141	910	50	20					0	18
3	380	166	127	705	48	18					0	14
4	386	455	117	543	45	9.4					0	14
5	1560	305	110	450	40	5.8					0	15
6	1370	208	103	389	39	0	N	N	N	N	0	18
7	915	158	94	334	34	0	O	O	O	O	0	30
8	655	138	90	297	30	0					0	183
9	519	168	86	273	27	0	F	F	F	F	0	153
10	410	155	80	245	26	0	L	L	L	L	0	102
11	338	138	76	223	21	0	O	O	O	O	0	72
12	277	136	72	204	19	0	W	W	W	W	0	55
13	226	133	80	184	22	0					0	45
14	204	122	108	171	16	0					0	37
15	190	112	234	155	17	0					0	32
16	171	110	171	144	16	0					0	28
17	152	127	138	136	17	0					0	24
18	141	133	125	125	20	0					0	22
19	133	125	117	112	18	0					0	20
20	130	117	130	105	18	0					0	18
21	122	125	230	105	14	0					0	18
22	117	146	406	100	14	0					0	18
23	108	174	347	94	16	0					30	15
24	100	161	277	90	15	0					90	18
25	96	144	226	82	16	0					368	28
26	92	136	184	75	21	0					156	69
27	90	127	158	72	30	0					87	201
28	86	122	144	70	53	0					58	343
29	84		216	65	56	0					41	296
30	80		1140	58	42	0					30	180
31	75		1930		31							131
Mean	324	153	245	262	28.5	2.57	0	0	0	0	28.7	72.2
Runoff in Ac. Ft.	19910	8510	15050	15600	1750	153	0	0	0	0	1710	4440

* Also known as Calaveras River at Stockton.
NOTE: Station maintained and operated by Water Resources Branch of the U. S. Geological Survey.

TABLE 67

DAILY CONTENT OF FRIANT RESERVOIR IN ACRE-FEET - 1946

Date	Figure given is amount in storage at end of day											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	300000	265100	273600	277400	407400	432100	426400	355700	252400	193400	148800	198400
2	301500	265100	274000	278700	413000	435200	425500	352600	248900	192600	148600	200100
3	303600	265500	275000	280100	416800	438700	424700	349100	246300	191600	148100	202100
4	305100	265500	275300	281800	421200	441400	423400	345200	243800	190200	147600	204400
5	305100	265800	275700	283900	424700	441800	421600	341700	241900	188600	147900	207200
6	304000	266500	275700	286300	428600	441400	419900	338300	240600	186200	147900	214400
7	303300	266800	275300	288400	429900	441000	417700	334800	238700	184300	147900	218600
8	302600	267200	275000	290200	430300	440100	416000	331400	236200	182600	148300	221600
9	301800	267200	275700	292200	430300	439600	414700	328000	234300	180800	148600	224000
10	300800	267200	276000	294000	428600	439600	413400	324600	232200	179200	148300	226700
11	299700	267800	276000	296100	426000	438700	411700	320500	230300	177700	148600	229400
12	298600	268200	275700	299000	422000	438300	410000	316400	228800	175900	149200	230900
13	296500	268200	275700	302600	421200	438300	408200	313100	227000	173300	149900	232800
14	295100	268500	276000	305800	421600	438300	406500	309400	225500	172000	150900	234600
15	293300	269200	275300	309400	423400	437800	404400	306200	223400	170200	151900	236500
16	292200	269200	275300	313400	424200	436900	402200	302600	221000	169000	152600	238400
17	290800	269200	274300	319000	425100	436500	399700	299300	218600	167200	152800	240500
18	289400	269500	273600	325400	426800	436100	396800	295400	216800	166000	153500	242500
19	287700	270200	272900	331000	429500	435600	393800	291900	215000	164700	155200	244100
20	285300	270600	272300	337100	432100	436100	390900	288800	213000	162400	162500	246000
21	283500	270900	271900	342100	433400	436100	387600	285600	211200	160700	164200	248200
22	281800	271200	271200	346800	431200	436100	384700	282800	208900	159500	166000	250100
23	279700	271600	270900	351800	428600	435200	381800	279700	207000	158300	177400	252100
24	277700	271600	269500	358100	426800	433900	379000	277000	205200	157100	182600	254000
25	276000	272300	269200	365200	426400	432500	376100	273300	203500	155900	185600	257200
26	273600	272600	268900	373700	427300	431700	373300	270200	201800	154500	188300	262200
27	271600	272600	269200	381400	427300	430300	371200	267500	199800	152800	191000	268900
28	269500	272900	269200	388000	427300	429500	368000	264200	198100	151400	193200	272600
29	267200		270200	395500	427700	428100	365200	261500	196200	150200	195100	275300
30	265100		275300	401800	428600	427300	361600	258600	194600	149200	196700	277700
31	264800		276300		429900		358800	255600		149000	196700	280400
Monthly Change Ac. Ft.	-33500	+8100	+3400	+125500	+28100	-2600	-68500	-103200	-61000	-45600	+47700	+83700

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

TABLE 68

FLOW OF SAN JOAQUIN RIVER BELOW FRIANT - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1490	1200	1210	2000	3310	2930	3070	2760	2360	1630	772	451
2	1500	1200	1210	1700	3500	2930	3070	2750	2360	1620	772	451
3	1500	1220	1210	1570	4150	3220	3070	2740	2280	1610	772	451
4	1800	1210	1210	1570	4520	4100	3080	2730	2090	1610	754	455
5	2510	1210	1140	1570	4520	4620	3070	2730	1960	1600	736	455
6	2500	1200	1200	1570	5280	4630	3010	2730	1900	1600	730	460
7	2500	1200	1600	1570	6370	4400	2940	2720	1920	1640	730	460
8	2500	1200	1600	1570	6560	4230	2820	2700	1920	1470	730	460
9	2500	1200	1600	1580	6560	4050	2610	2700	1920	1470	670	465
10	2500	1200	1600	1580	6560	3930	2610	2700	1870	1460	615	470
11	2480	1200	1830	1580	6290	3830	2610	2700	1800	1470	615	470
12	2480	1200	2050	1700	5840	3560	2610	2700	1810	1460	560	470
13	2480	1210	2210	1810	4930	3520	2610	2700	1810	1460	451	470
14	2480	1210	2330	1810	4320	3540	2610	2690	1810	1460	428	470
15	2480	1220	2160	1880	4230	3540	2600	2690	1810	1470	428	470
16	2470	1220	2050	2180	4230	3340	2640	2690	1920	1460	428	470
17	2470	1210	2050	2350	4240	3170	2760	2690	2000	1460	428	470
18	2470	1210	2090	2520	4270	3080	2740	2680	1970	1460	428	470
19	2470	1210	2110	2550	4280	3020	2740	2640	1860	1460	432	470
20	2470	1210	2110	2340	4580	3020	2730	2540	1860	1460	437	470
21	2460	1210	2050	2340	5420	3070	2730	2530	1850	1450	437	470
22	2460	1210	1940	2450	5950	3070	2730	2530	1850	1450	437	475
23	2460	1210	1940	2600	5350	2990	2770	2520	1820	1440	442	475
24	2450	1210	1940	2610	4400	2920	2770	2520	1770	1440	446	598
25	2450	1210	1880	2780	3840	2920	2760	2510	1760	1440	446	712
26	2450	1210	1830	3000	3540	3010	2820	2510	1760	1440	446	712
27	2450	1210	1940	3010	3460	3070	2880	2500	1750	1440	446	730
28	2450	1210	2010	3040	3340	3070	2880	2480	1750	1440	446	724
29	2440		2020	3050	3060	3070	2870	2470	1750	1370	451	724
30	2440		2030	3060	2930	3070	2840	2440	1700	1220	451	724
31	1710		2030		2930		2770	2360		1080		724
Mean	2331	1208	1812	2165	4605	3431	2800	2624	1900	1469	545	527
Runoff in Ac. Ft.	143300	67080	111400	128800	283200	204100	172200	161400	113000	90330	32460	32420

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. Daily mean release from Friant Reservoir into San Joaquin River obtainable from this table by subtracting flows of Cottonwood Creek (Table 69).

TABLE 69

FLOW OF COTTONWOOD CREEK NEAR FRIANT - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	0.2	0.2	0.4	4.2							0	0
2	.2	.3	.4	3.2							0	0
3	.2	3.5	.4	2.2							0	0
4	.2	2.9	.4	1.9							0	0
5	.9	1.2	.3	1.8							0	0
6	.9	.8	.3	1.6							0	.2
7	.5	.8	.3	1.5	N	N	N	N	N	N	0	.2
8	.4	.6	.3	1.4	O	O	O	O	O	O	0	0
9	.4	.5	.2	1.0							0	0
10	.4	.5	.2	.9							0	0
11	.3	.5	.2	.8							0	0
12	.3	.5	.2	.8	F	F	F	F	F	F	0	0
13	.3	.4	.9	.6	L	L	L	L	L	L	0	0
14	.3	.4	1.9	.5	O	O	O	O	O	O	0	0
15	.3	.8	.8	.4	W	W	W	W	W	W	0	0
16	.3	3.7	.5	.4							0	0
17	.3	1.6	.4	.2							0	.1
18	.3	1.1	.4	.1							0	.1
19	.3	1.0	.8	.1							.2	.1
20	.3	.9	1.0	0							.2	.1
21	.3	.8	.8	0							0	.1
22	.3	.8	.5	0							.1	.1
23	.3	.7	.4	0							.1	.1
24	.3	.6	.4	0							0	.6
25	.3	.5	.3	0							0	9.2
26	.4	.5	.3	0							0	9.2
27	.4	.5	.2	0							0	35
28	.3	.5	.2	0							0	20
29	.3		1.2	0							0	14
30	.3		24	0							0	9.2
31	.2		7.0									5.8
Mean	0.35	0.97	1.47	0.79	0	0	0	0	0	0	0.02	3.36
Runoff in Ac. Ft.	21	54	90	47	0	0	0	0	0	0	1.2	206

NOTE: Station maintained and operated by Water Resources Branch of the U. S. Geological Survey.

TABLE 70

FLOW OF SAN JOAQUIN RIVER AT WHITEHOUSE - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1640	1930	1240	2160	2920	2760	2860	2580	2240	1630	1180	455
2	1640	1520	1250	2060	3020	2730	2840	2570	2240	1570	925	455
3	1660	1520	1240	1820	3150	2720	2800	2570	2230	1560	842	455
4	1720	1520	1310	1630	3680	2980	2800	2560	2160	1560	810	455
5	1930	1490	1320	1590	4010	3810	2820	2560	2020	1560	798	455
6	2510	1470	1260	1590	4080	4310	2810	2550	1860	1560	766	460
7	2540	1430	1180	1590	4690	4340	2760	2540	1790	1560	754	470
8	2550	1410	1560	1580	5450	4070	2720	2530	1800	1580	749	470
9	2550	1390	1610	1550	5640	3880	2620	2530	1800	1480	754	470
10	2540	1380	1610	1530	5670	3740	2410	2520	1770	1450	754	480
11	2530	1380	1620	1510	5700	3610	2380	2510	1740	1450	683	485
12	2550	1380	1710	1520	5490	3490	2380	2500	1680	1450	661	495
13	2560	1370	1960	1590	5150	3270	2370	2480	1680	1450	656	490
14	2560	1360	2130	1700	4380	3240	2360	2480	1670	1460	568	490
15	2550	1350	2250	1720	3790	3230	2360	2460	1660	1450	500	490
16	2540	1360	2140	1750	3690	3200	2350	2460	1660	1440	475	495
17	2530	1340	2020	1980	3760	3030	2400	2450	1740	1410	470	490
18	2530	1320	2020	2190	3760	2910	2510	2440	1830	1400	470	495
19	2530	1310	2050	2310	3780	2830	2520	2430	1810	1410	470	495
20	2540	1300	2100	2380	3780	2780	2520	2390	1730	1420	500	495
21	2550	1300	2090	2210	4060	2770	2520	2300	1720	1430	495	485
22	2550	1280	2010	2230	4780	2800	2520	2290	1710	1420	470	485
23	2550	1270	1920	2330	5220	2780	2530	2280	1720	1400	466	485
24	2530	1260	1920	2460	4720	2750	2560	2290	1710	1400	480	500
25	2520	1250	1930	2460	3940	2730	2560	2300	1660	1400	465	550
26	2480	1250	1880	2590	3520	2720	2560	2300	1660	1390	465	699
27	2470	1240	1790	2790	3320	2780	2610	2280	1650	1370	460	710
28	2470	1240	1850	2850	3210	2830	2680	2280	1640	1360	460	721
29	2440		1940	2890	3080	2840	2680	2290	1640	1380	460	721
30	2430		2060	2900	2860	2850	2660	2310	1630	1350	455	721
31	2420		2170		2750		2640	2300		1280		721
Mean	2390	1380	1780	2050	4100	3160	2580	2430	1800	1450	615	527
Runoff in Ac. Ft.	146995	76602	109369	121904	252000	187993	158896	149415	106810	89316	36617	32396

NOTE: Station maintained and operated by San Joaquin Canal Company.

TABLE 71

FLOW OF FRESNO SLOUGH BY-PASS* - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1020				675	10						108
2	920				540	9						60
3	825				330	138						28
4	710				128	370						20
5	600				35	188						17
6	640				300	77						12
7	735				610	62						40
8	780				860	48						670
9	665	NO	NO	NO	920	27	NO	NO	NO	NO		550
10	490				645	15						430
11	310	F	F	F	495	7	F	F	F	F		295
12	280	L	L	L	400	5	L	L	L	L		230
13	265	O	O	O	245	2	O	O	O	O		195
14	215	W	W	W	79	0	W	W	W	W		140
15	165				89							72
16	125				140							54
17	92				355							29
18	62				350							18
19	37				215							9
20	30				285							4
21	18				375							3
22	14			0	465							3
23	13			14	375						0	2
24	10			50	173						17	2
25	8			149	88						515	3
26	5			325	31						1505	3
27	0			440	18						1415	1
28	0			465	18						355	330
29	0			625	22						168	690
30	0			645	18	0					150	1050
31	0				12							685
Mean	291	0	0	90	300	32	0	0	0	0	138	186
Runoff in Ac. Ft.	17900	0	0	5380	18400	1900	0	0	0	0	8180	11400

* Also known as James By-Pass.

NOTE: Station maintained, operated, and flow computed by Kings River Water Association. Station is located on Kerman-San Joaquin highway crossing on Fresno Slough By-Pass.

TABLE 72

FLOW OF SAN JOAQUIN RIVER NEAR MENDOTA - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2620	2110	421	288	1010	1580	693	348	331	265	224	577
2	2480	1510	473	314	1580	1520	710	341	331	263	187	472
3	2360	1380	489	317	1790	1460	710	334	311	265	146	396
4	2350	1340	509	320	1550	1480	701	331	320	265	127	363
5	2500	1310	417	320	1700	1620	705	320	334	272	114	375
6	2950	1260	337	320	1860	2070	693	301	334	258	104	366
7	3280	1240	237	314	2600	2600	681	307	327	260	101	381
8	3480	1230	196	301	3760	2700	661	311	324	268	88	567
9	3490	1200	291	285	4610	2540	625	311	324	263	56	908
10	3320	1180	279	307	4810	2360	458	320	304	260	53	934
11	3070	923	258	331	4740	1720	288	324	264	263	47	862
12	2980	1020	255	324	4650	1460	246	327	249	263	51	754
13	2930	1120	348	320	4430	1390	231	331	249	263	70	693
14	2870	1120	505	314	3280	1130	252	337	246	263	71	629
15	2780	1100	402	304	2340	1010	243	344	249	263	72	557
16	2710	1170	282	291	2200	1020	237	348	252	263	72	505
17	2680	1140	276	291	2190	1010	228	341	240	263	74	468
18	2640	1100	276	295	2390	894	258	330	222	260	74	431
19	2600	1100	273	295	2410	710	304	311	225	254	84	418
20	2560	1080	267	295	2310	681	307	314	225	249	88	408
21	2570	1060	267	298	2350	569	291	324	234	247	88	859
22	2540	1040	295	295	3180	477	285	334	237	240	119	1020
23	2520	998	307	291	3990	457	279	331	237	242	153	421
24	2510	885	311	291	3930	521	273	327	237	235	156	190
25	2460	844	307	295	3160	577	285	327	249	231	156	258
26	2430	813	304	374	2620	633	295	327	279	229	171	874
27	2390	488	301	621	2390	609	295	327	276	227	1240	836
28	2370	282	285	633	1630	621	317	327	270	220	2120	714
29	2350		264	750	1410	661	355	327	270	220	1230	1060
30	2310		261	854	1530	681	365	327	267	220	759	1490
31	2280		261		1560		355	331		220		1580
Mean	2690	1109	321	362	2708	1225	407	327	274	251	270	657
Runoff in Ac. Ft.	165400	61570	19740	21520	166500	72910	25040	20110	16300	15420	16060	40400

NOTE: Station maintained jointly by U. S. Geological Survey and U.S. Bureau of Reclamation.

TABLE 73

FLOW OF SAN JOAQUIN RIVER NEAR DOS PALOS - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2700	2270	334	52	514	1400	396	5.1	0.3	37	0.6	645
2	2580	1810	396	57	867	1370	408	5.1	.3	35	.4	503
3	2470	1490	426	68	1390	1310	417	1.4	.3	35	.3	411
4	2410	1400	387	68	1300	1280	417	.3	.3	33	.3	353
5	2430	1380	334	57	1310	1350	423	.3	.3	33	.2	326
6	2680	1320	262	54	1440	1570	426	.3	.3	31	.2	326
7	3020	1300	211	54	1720	2140	414	.2	.3	33	.2	360
8	3160	1280	141	55	2630	2490	396	.2	.4	34	.2	401
9	3230	1260	123	39	3400	2420	366	.2	.4	36	.1	653
10	3150	1220	155	34	3720	2240	284	.2	.6	19	.1	845
11	3070	1140	141	56	3740	1950	110	.2	.6	.8	.1	861
12	2840	916	130	59	3730	1340	33	.2	.6	.7	.1	805
13	2800	1080	125	60	3660	1260	11	.2	.7	.7	.1	749
14	2750	1120	219	59	3360	1120	8.2	.2	.7	.7	.1	693
15	2720	1120	240	59	2230	794	6.5	.2	.7	.7	.1	637
16	2680	1150	177	64	2000	786	5.5	.3	.7	.7	.1	574
17	2650	1170	101	66	1930	786	4.7	.3	.7	.7	.1	536
18	2610	1120	66	66	2010	726	4.4	.3	.7	.6	.1	503
19	2650	1100	64	68	2140	559	4.4	.3	.7	.6	.1	478
20	2540	1070	60	70	2110	480	5.1	.3	.7	.6	.1	460
21	2540	1050	58	73	2110	447	5.1	.3	.7	.6	.1	468
22	2530	1020	41	71	2280	337	4.4	.3	.7	.5	0	1020
23	2520	1000	36	70	3260	326	4.4	.3	.5	.5	0	815
24	2500	918	36	66	3450	286	4.4	.3	.5	.5	0	318
25	2470	846	37	65	3170	225	4.4	.3	.5	.5	0	275
26	2450	806	36	72	2580	289	4.4	.3	14	.4	0	324
27	2420	753	36	172	2300	328	4.7	.3	33	.5	126	964
28	2410	328	33	272	1980	315	4.7	.3	34	.5	1490	753
29	2390		31	299	1230	334	5.1	.3	35	.4	1470	813
30	2330		31	435	1300	378	5.1	.3	34	.3	901	1140
31	2320		40		1340		5.1	.3		.4		1510
Mean	2646	1158	145	92	2265	1021	135	.62	5.44	10.9	133	630
Runoff in Ac. Ft.	162700	64340	8940	5470	139200	60770	8310	38	324	670	7920	38720

NOTE: Station maintained and operated by Water Resources Branch of the U. S. Geological Survey.

TABLE 74

FLOW OF SAN JOAQUIN RIVER NEAR EL NIDO - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1690	1340	230	153	313	827	348	0	0.4	4.6	0	352
2	1570	1160	290	236	434	824	190	0	.5	3.4	0	264
3	1490	932	320	256	728	794	199	0	1.0	3.4	0	206
4	1410	854	301	202	818	765	204	0	2.5	4.0	0	170
5	1420	830	268	136	768	788	208	0	.8	4.6	0	156
6	1500	806	218	94	854	884	215	0	.3	4.9	0	152
7	1710	785	178	68	965	1110	220	0	.2	4.9	0	156
8	1880	768	121	59	1280	1400	217	0	.2	5.2	0	182
9	1960	765	94	51	1760	1420	211	0	.2	6.7	0	262
10	1940	755	97	34	2080	1340	175	0	.2	9.4	0	439
11	1840	742	112	39	2170	1200	97	0	0.	1.3	0	502
12	1710	610	93	47	2200	881	33	0	0.	0	0	499
13	1650	648	94	49	2210	765	5.8	0	.1	0	0	471
14	1630	682	117	50	2170	725	0	0	.1	0	0	432
15	1600	685	184	45	1560	538	0	0	.1	0	0	394
16	1570	692	159	42	1190	497	0	0	.1	0	0	355
17	1550	715	98	43	1120	502	0	0	.1	0	0	325
18	1530	695	55	46	1140	478	0	0	.1	0	0	301
19	1510	682	50	46	1220	394	0	0	.2	0	0	279
20	1490	675	45	49	1230	309	0	0	.2	0	0	264
21	1480	660	40	52	1220	279	0	0	0	0	0	254
22	1480	650	35	52	1250	238	0	0	0	0	0	462
23	1460	638	30	47	1680	94	0	0	0	0	0	550
24	1450	605	29	44	2000	200	0	0	0	0	0	287
25	1450	545	29	42	1960	220	0	0	0	0	0	148
26	1430	514	28	41	1610	222	0	0	.4	0	0	160
27	1410	495	28	58	1390	155	0	0	.7	0	0	421
28	1400	230	28	142	1240	322	0	0	1.0	0	486	456
29	1400		28	180	828	333	0	0	3.4	0	872	407
30	1380		28	235	776	364	0	6.3	3.4	0	560	560
31	1360		30		794		0	7.7		0		803
Mean	1560	720	112	879	1321	629	74.9	.45	.54	1.69	63.9	344
Runoff in Ac. Ft.	95900	39980	6860	5230	81240	37420	4610	28	32	104	3800	21160

NOTE: Station maintained jointly by U. S. Geological Survey and U. S. Bureau of Reclamation.

TABLE 75

FLOW OF SAN JOAQUIN RIVER AT DELTA BRIDGE* - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1265	969	202	67	218	606	98	1	0	0	3	340
2	1151	883	226	157	268	613	604	1	0	0	3	292
3	1088	716	251	189	469	599	241	1	0	0	1	247
4	1038	638	251	172	645	589	221	1	0	0	1	205
5	1038	606	226	130	603	589	216	1	0	4	2	185
6	1064	589	197	94	652	620	221	1	0	4	1	174
7	1183	576	172	73	731	691	218	1	0	7	0	172
8	1318	563	137	59	939	790	209	1	0	23	0	197
9	1359	556	105	55	1259	820	200	2	0	39	0	227
10	1371	546	95	44	1263	801	186	2	0	133	0	330
11	1339	536	111	36	1069	764	136	2	0	37	0	360
12	1265	466	98	44	1142	655	61	2	0	23	0	355
13	1220	459	95	46	1191	569	32	2	0	18	0	335
14	1195	497	94	47	1238	576	13	2	0	10	0	319
15	1179	503	148	45	1123	487	2	2	0	1	0	305
16	1163	500	153	42	994	405	0	2	0	4	0	286
17	1147	513	114	41	947	408	0	2	0	1	0	266
18	1131	507	74	41	951	402	0	2	0	2	0	252
19	1115	497	55	42	998	363	0	1	0	0	0	242
20	1107	491	49	43	959	286	0	1	0	1	1	232
21	1092	481	46	44	943	211	2	0	0	2	0	225
22	1092	478	46	44	955	34	2	0	0	4	0	286
23	1084	469	40	43	1081	32	0	0	0	0	0	390
24	1072	450	33	39	1142	36	1	0	0	0	0	290
25	1061	417	32	36	1033	63	7	0	0	1	0	140
26	1049	396	32	35	955	53	14	0	0	8	0	145
27	1038	381	32	38	857	30	4	0	0	5	0	240
28	1030	313	32	77	813	48	2	0	0	4	135	355
29	1030		33	127	677	75	2	0	0	4	700	322
30	1011		33	155	624	82	1	0	0	4	500	380
31	988		32		603		1	0		4		462
Mean	1138	536	105	70	882	410	87	1	0	11	45	276
Runoff in Ac. Ft.	69980	29740	6440	4180	54230	24390	5340	60	0	680	2672	16970

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

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

TABLE 76

FLOW OF SAN JOAQUIN RIVER AT FREMONT FORD BRIDGE - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3280	2380	984	1180	557	1880	380	212	296	271	120	1410
2	3110	2360	778	1560	644	1850	407	210	313	282	127	1100
3	2910	2310	754	1470	771	1880	567	206	348	301	139	911
4	2750	2080	750	1290	1120	1870	590	190	360	313	148	788
5	2690	1960	746	1170	1400	1740	578	190	385	340	145	701
6	2670	1920	712	984	1450	1660	578	188	390	368	143	671
7	2790	1840	647	869	1570	1700	581	182	400	352	165	659
8	2950	1770	581	820	1730	1900	593	175	410	352	224	665
9	3050	1700	509	802	2010	2160	593	175	402	355	226	841
10	3090	1660	460	736	2320	2310	584	167	388	301	208	1020
11	3100	1610	438	659	2560	2360	554	156	382	269	179	1190
12	3050	1560	438	575	2710	2300	470	154	358	264	162	1310
13	2940	1410	415	527	2870	2060	375	150	330	243	160	1270
14	2830	1370	408	482	2980	1760	315	148	310	224	158	1180
15	2750	1430	402	462	3040	1580	282	165	320	204	152	1100
16	2700	1480	468	460	2930	1350	264	177	335	204	152	1010
17	2660	1640	521	440	2570	1210	253	202	368	200	147	942
18	2640	2020	479	418	2240	1170	236	206	380	202	147	880
19	2600	2110	442	425	2140	1090	220	206	362	198	152	834
20	2560	1930	435	452	2170	981	204	196	355	188	218	806
21	2570	1740	440	462	2200	841	196	186	345	180	340	778
22	2570	1590	450	442	2210	718	192	190	313	177	348	740
23	2580	1510	448	410	2260	557	188	180	284	169	402	862
24	2570	1460	448	380	2420	521	190	177	266	158	430	1120
25	2560	1390	432	350	2700	509	188	200	262	150	509	988
26	2540	1290	428	325	2900	430	206	216	262	132	584	740
27	2510	1220	415	308	2970	408	232	220	253	120	512	806
28	2480	1160	405	340	2970	445	222	262	243	115	445	1140
29	2450		398	362	2750	405	214	291	253	115	624	1600
30	2420		418	452	2340	375	214	275	262	115	1440	1760
31	2400		641		2000		210	284		117		1740
Mean	2735	1711	525	654	2177	1334	351	198	331	225	297	1018
Runoff in Ac. Ft.	168100	95010	32310	38900	133900	79380	21570	12170	19710	13840	17660	62600

NOTE: Station is on county 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. Measurements of flow by U. S. Geological Survey, Bureau of Reclamation and Division of Water Resources. Additional water during high flow periods passes this station via Mud Slough, see Table 77.

TABLE 77

FLOW OF MUD SLOUGH (BRANCHES COMBINED) AT GUSTINE-STEVINSON HIGHWAY - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1							0.3					
2												
3												
4											0.2	
5												52
6												
7						6.4						
8		166			7.4							
9												
10				35.2								
11			94									
12				FIGURES ARE RESULTS OF CURRENT-METER MEASUREMENTS MADE								
13				ON DATES SHOWN. DAILY MEAN FLOWS WERE NOT COMPUTED IN 1946								
14												
15												
16												
17												
18						3.0						
19		289									3.0	
20						0		0			28	
21					158							
22												
23	569			15.8			0					
24									0			85
25												
26												
27												
28												
29												
30												
31												
Mean												
Runoff in Ac. Ft.												

NOTE: Station is maintained jointly by U. S. Geological Survey and U. S. Bureau of Reclamation. To determine total flow passing the Gustine-Stevinson highway (Fremont Ford Bridge Road) combine the flow in this table with that shown in Table 76.

TABLE 78

FLOW OF SAN JOAQUIN RIVER NEAR NEWMAN - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	4980	4010	2400	1610	3640	3120	724	498	564	581	292	1570
2	4820	3970	2190	2040	3730	2700	712	484	571	606	295	1320
3	4540	3970	2130	2320	3840	3220	1020	498	557	654	300	1110
4	4250	3760	2090	2190	4100	3570	923	515	602	654	305	990
5	4190	3590	2070	2090	4400	3600	896	512	606	634	308	909
6	4630	3460	2050	1880	4440	3510	878	494	610	623	310	888
7	4660	3340	1970	1720	4500	3400	900	459	613	595	325	896
8	4780	3250	1910	1690	4800	3260	932	448	632	592	385	892
9	4940	3170	1820	1650	5130	3180	923	452	636	578	391	1060
10	5060	3120	1540	1520	5400	3290	905	459	620	528	391	1300
11	5110	3080	1170	1370	4650	3310	864	445	610	478	364	1450
12	5080	3000	1060	1250	3800	3270	796	459	578	463	349	1580
13	4950	2890	1020	1130	3760	2960	692	442	557	427	355	1580
14	4760	2790	1090	1060	3820	2510	644	424	564	406	358	1490
15	4590	2820	1160	978	3870	2280	602	438	582	397	361	1430
16	4510	2900	1180	946	3830	2110	582	466	606	403	358	1360
17	4460	3300	1220	870	3480	1900	574	494	624	400	358	1300
18	4410	3500	1070	807	3010	1740	540	487	616	379	358	1230
19	4360	3690	992	812	2750	1580	501	480	616	373	373	1180
20	4300	3540	1030	861	2950	1420	518	466	620	361	445	1140
21	4300	3270	1100	897	4080	1240	512	448	602	349	634	1120
22	4320	3070	1080	920	4610	1110	522	448	574	343	665	1080
23	4350	2930	1050	879	4820	1000	490	428	543	338	760	1120
24	4360	2850	1030	812	4830	959	448	398	518	328	788	1400
25	4360	2780	987	752	4620	887	452	420	504	320	824	1370
26	4320	2660	942	1670	4630	800	462	462	494	310	896	1140
27	4290	2580	879	2690	4840	752	490	448	508	300	868	1220
28	4220	2520	870	3070	5270	788	518	490	508	298	772	1640
29	4160		874	3360	5040	776	540	550	522	295	776	2140
30	4100		951	3500	4480	724	522	550	554	292	1400	2190
31	4050		1060		3850		494	536		292		2120
Mean	4523	3208	1354	1578	4225	2166	664	471	577	439	512	1330
Runoff in Ac. Ft.	278100	178100	83280	93910	259800	128900	40810	28950	34340	26970	30470	81750

NOTE: This is a permanent station maintained throughout the year under Federal-State cooperation by the Water Resources Branch of the U. S. Geological Survey. It is located at Hills Ferry Bridge, Mile 123.7 above mouth of San Joaquin River and just below the mouth of the Merced River. Combine flow of Merced River Slough, Table 85, to give total flow passing this point.

TABLE 79

FLOW OF SAN JOAQUIN RIVER AT GRAYSON (LAIRD SLOUGH) - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	4950	4320	2780	1720	3920	4480	1100	670	820	800	480	1570
2	4880	4300	2620	2120	4020	3600	1040	680	850	870	480	1630
3	4720	4300	2440	2500	4140	3400	1000	640	870	920	480	1460
4	4550	4270	2350	2660	3040	3940	1170	690	840	950	490	1320
5	4410	4130	2340	2580	4560	4360	1170	780	820	970	500	1220
6	4520	3920	2330	2430	4840	4500	1110	730	780	970	505	1170
7	4790	3760	2300	2260	4890	4440	1120	690	810	970	510	1160
8	4800	3640	2260	2130	5180	4170	1170	680	820	940	505	1150
9	5040	3540	2250	2030	5660	3970	1150	670	870	890	550	1160
10	5260	3440	2080	1470	5980	3890	1080	680	900	860	580	1330
11	5340	3380	1770	1700	6100	3880	1070	730	860	850	560	1520
12	5380	3310	1480	1550	5660	3840	1110	720	860	820	540	1650
13	5360	3240	1370	1410	4020	3700	1040	690	830	760	570	1750
14	5270	3110	1310	1320	3970	3270	1010	620	800	740	600	1740
15	5160	3070	1360	1230	3970	2780	970	610	830	760	595	1680
16	5060	3120	1370	1130	4000	2540	870	670	890	810	590	1600
17	4970	3250	1380	1020	4270	2320	840	710	910	720	580	1540
18	4900	3600	1360	950	3670	2130	790	780	880	600	560	1480
19	4810	3750	1280	990	3370	1990	720	820	910	560	580	1440
20	4710	3840	1320	1100	3280	1850	720	760	870	550	650	1400
21	4640	3720	1410	1130	3580	1650	750	720	850	540	700	1360
22	4610	3500	1500	1110	4130	1500	780	700	860	500	810	1320
23	4580	3330	1500	1070	4470	1440	730	680	840	470	900	1280
24	4580	3220	1440	940	5200	1320	660	710	740	480	970	1410
25	4600	3120	1410	960	5760	1200	670	710	700	475	990	1590
26	4580	3040	1250	1090	5960	1130	680	780	720	490	1040	1520
27	4550	2930	1150	2120	5700	1040	720	800	700	480	1090	1380
28	4540	2850	1090	3000	5900	1010	740	780	720	450	1070	1510
29	4540		1140	3420	6020	1070	800	750	780	440	1030	1920
30	4460		1250	3700	6030	1100	800	770	800	450	1130	2180
31	4370		1370		5220		730	820		485		2270
Mean	4804	3536	1686	1761	4726	2717	913	717	824	696	688	1507
Runoff in Ac. Ft.	295400	196400	103700	104800	290600	161700	56200	44100	49100	42800	40900	92600

NOTE: Recording gage 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.

TABLE 80

FLOW OF SAN JOAQUIN RIVER AT HETCH HETCHY AQUEDUCT CROSSING - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	7850	5770	4120	2970	6450	7770	1510	970	1290	1200	1920	2990
2	7720	5670	4050	3180	6420	7130	1500	970	1290	1270	1940	3100
3	7400	5700	3930	3750	6400	7470	1420	900	1320	1330	1940	3000
4	7270	6000	3800	4350	6650	8370	1480	940	1290	1370	1910	2950
5	7200	6280	3750	4360	7100	9150	1560	1030	1280	1430	1910	2880
6	7820	5570	3820	4320	7670	9570	1550	1050	1280	1500	1970	2860
7	8350	5330	3770	4150	8030	9150	1550	940	1280	1530	2000	2850
8	8300	5170	3690	4000	9100	8220	1600	920	1270	1490	2010	2770
9	8700	5020	3560	3790	10620	7140	1630	960	1300	1400	2020	2670
10	8900	4900	3410	3540	11200	6360	1510	940	1300	1490	2030	2810
11	8970	4800	2850	3160	11430	6430	1450	970	1280	1750	2000	3100
12	8900	4730	2320	2870	10980	7170	1480	980	1300	1770	1950	3250
13	8620	4720	2130	2430	9620	6400	1450	930	1260	1770	2020	3350
14	8320	4630	2060	2370	8550	5270	1390	830	1210	1750	2150	3400
15	8170	4620	2180	2490	8330	4270	1400	850	1220	1760	2160	3340
16	8200	4670	2180	2430	8420	3570	1300	900	1280	1890	2150	3220
17	8000	4700	2150	2610	8570	3170	1220	960	1300	1850	2150	3150
18	7640	4950	2140	2860	8450	3000	1160	1070	1280	1670	2090	3170
19	7250	5100	2040	3200	8450	2700	1100	1130	1280	1610	2150	3130
20	6690	5200	2300	3500	9050	2420	1060	1080	1270	1590	2330	3100
21	6400	5170	2460	3675	9670	2230	1085	1050	1220	1620	2370	2980
22	6320	4960	2600	3420	10820	2050	1100	980	1250	1550	2450	2720
23	6150	4750	2640	3220	11400	2000	1085	950	1270	1610	2550	2440
24	6100	4570	2450	3130	10650	1900	1000	980	1200	1610	2630	2390
25	6080	4450	2310	3320	9220	1750	990	1010	1170	1610	2500	2530
26	5950	4340	2090	3780	8500	1710	1000	1100	1150	1630	2500	2520
27	5870	4230	2300	4810	9250	1600	1050	1160	1120	1610	2650	2400
28	5970	4150	2150	5820	10525	1540	1060	1170	1120	1520	2700	2450
29	6370		2150	5980	10800	1500	1160	1150	1160	1500	2600	2800
30	6300		2350	6150	10020	1520	1160	1170	1180	1660	2500	3060
31	5880		2770		8700		1050	1250		1850		2780
Mean	7344	5005	2791	3655	9066	4751	1292	1009	1247	1587	2208	2908
Runoff in Ac. Ft.	451557	277983	171610	217458	557445	282704	79458	62063	74221	97567	131405	178830

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

TABLE 81

FLOW OF SAN JOAQUIN RIVER NEAR VERNALIS - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	10800	6910	5030	4850	10900	9920	1800	1150	1460	1460	2190	3290
2	10900	6730	4940	5040	10900	9010	1710	1120	1480	1520	2210	3670
3	10600	6710	4760	5500	10800	9340	1600	1090	1500	1590	2230	3600
4	10500	6800	4400	5820	11000	10400	1690	1130	1520	1660	2210	3540
5	10400	7310	4280	5780	11600	11300	1760	1220	1520	1730	2200	3550
6	11000	6680	4480	5890	12200	12000	1710	1230	1480	1760	2310	3470
7	11600	6370	4690	5550	12700	11700	1710	1160	1450	1800	2340	3470
8	11400	6210	4670	5370	13800	10300	1770	1140	1520	1800	2310	3450
9	11700	6030	4580	5290	15500	8460	1770	1180	1550	1770	2360	3380
10	11900	5920	4390	5140	16200	7300	1640	1170	1570	1800	2380	3430
11	12000	5600	3510	4470	16500	7520	1610	1200	1550	1910	2360	3890
12	11700	5540	2790	4100	16100	7890	1630	1260	1520	1910	2270	4090
13	10900	5710	2910	3500	14600	7610	1580	1200	1520	1920	2380	4270
14	10100	5720	3010	3460	12900	6180	1550	1110	1460	1930	2560	4320
15	9990	5800	3100	3750	12400	5040	1570	1100	1460	1940	2560	4270
16	10200	5810	3070	3890	12300	4310	1450	1140	1510	2000	2520	4150
17	10100	5730	3050	4460	12300	3920	1360	1190	1530	2090	2680	4050
18	9680	5680	2750	5200	12000	3640	1320	1290	1510	1970	2750	4080
19	9300	5840	2800	6110	12100	3280	1290	1370	1500	1870	2810	4050
20	8480	6120	3230	6910	12800	2910	1260	1370	1510	1820	2880	4010
21	7830	6170	3510	7270	13500	2700	1300	1290	1490	1830	2940	3890
22	7820	5960	3700	6960	14800	2500	1290	1210	1480	1800	3010	3650
23	7800	5700	3750	6410	15700	2440	1280	1160	1510	1810	3170	3130
24	7730	5380	3560	6090	14600	2400	1180	1180	1470	1820	3310	2880
25	7600	5200	3470	6590	12200	2200	1150	1250	1440	1820	3170	2950
26	7270	5060	3440	7380	10900	2010	1170	1280	1400	1810	2990	2930
27	7020	5060	3600	8660	11500	1870	1200	1320	1380	1780	3120	2820
28	6840	4990	3250	10100	13400	1780	1220	1330	1380	1720	3250	2780
29	7250		3190	10400	14100	1770	1320	1340	1400	1710	3240	3120
30	7390		3490	10500	13300	1800	1310	1350	1430	1820	2990	3490
31	7020		4350		11200		1230	1410		2080		3560
Mean	9510	5955	3734	6015	13060	5783	1465	1224	1483	1815	2657	3588
Runoff in Ac. Ft.	584800	330700	229600	357900	802900	344100	90110	75250	88260	111600	158100	220600

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

TABLE 82

FLOW OF MERCED RIVER AT YOSEMITE VALLEY RAILROAD CROSSING - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	631	1360	1320	469	3850	491	6	59	13	48	7	5
2	650	1370	1320	808	3850	2090	1	59	14	46	6	5
3	663	1440	1330	663	3850	2300	0	62	14	45	5	5
4	1150	1400	1330	580	3750	2390	0	55	16	43	5	6
5	1600	1380	1380	531	3590	2310	0	59	14	11	7	6
6	1490	1380	1380	592	3750	2110	0	59	14	9	6	10
7	1460	1380	1380	644	4140	1530	0	85	15	10	5	24
8	1430	1380	1150	580	4120	1010	1	85	14	8	6	31
9	1430	1370	580	475	3590	855	4	85	15	7	5	28
10	1430	1370	187	464	1400	840	3	120	14	7	4	25
11	1430	1330	171	396	256	801	0	85	15	8	4	21
12	1440	1280	175	334	223	568	52	85	16	8	5	20
13	1440	1340	347	286	199	421	54	85	15	8	6	19
14	1420	1340	437	191	203	475	55	59	19	7	7	18
15	1430	1410	421	134	199	432	54	59	20	8	6	18
16	1430	1600	290	95	203	351	62	59	20	12	6	16
17	1420	1380	148	141	203	248	80	59	24	10	5	16
18	1420	1370	134	183	219	109	67	41	26	9	5	16
19	1420	1370	227	215	785	2	50	26	32	8	8	16
20	1430	1370	219	227	2970	1	46	26	37	7	26	16
21	1430	1370	203	235	3140	10	41	20	38	6	25	16
22	1420	1370	211	235	3100	12	41	13	38	6	19	16
23	1420	1370	207	187	2610	11	41	13	41	6	21	16
24	1410	1370	179	285	1830	12	43	14	41	5	22	20
25	1380	1370	141	2830	1460	12	52	16	40	5	18	26
26	1380	1370	120	3510	1730	12	62	18	37	5	13	134
27	1370	1370	130	3640	2630	8	57	14	38	5	12	155
28	1350	1370	130	3880	2220	9	54	16	38	5	9	75
29	1350		95	3850	2080	6	54	19	41	5	7	46
30	1340		179	3850	1750	8	56	14	41	5	6	45
31	1340		298		663		54	12		5		36
Mean	1340	1380	510	1020	2080	648	35	48	25	12	10	29
Runoff in Ac. Ft.	82120	76520	31380	60520	128100	38550	2160	2940	1510	748	567	1800

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

TABLE 83

FLOW OF MERCED RIVER AT CRESSEY BRIDGE - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	721	1240	1190	401	4090	550	153	121	98	159	79	114
2	712	1270	1230	730	4110	1270	139	123	98	164	82	112
3	727	1330	1220	709	4120	1940	126	124	100	171	80	109
4	783	1470	1220	677	4100	2160	127	134	104	166	85	109
5	1770	1370	1220	602	3900	2140	129	134	101	150	85	109
6	1540	1320	1220	596	3810	2010	132	132	97	118	86	112
7	1440	1310	1230	662	4380	1690	135	139	98	103	86	118
8	1370	1290	1220	659	4450	1110	123	140	103	101	85	161
9	1350	1240	927	544	4450	912	131	147	103	97	88	175
10	1350	1240	420	494	2450	822	140	155	105	94	88	147
11	1340	1250	306	469	599	842	139	143	104	91	86	137
12	1340	1250	288	433	392	709	126	135	98	88	86	131
13	1320	1250	226	347	339	539	109	131	98	86	89	127
14	1300	1250	578	281	316	497	112	135	101	85	95	126
15	1300	1250	518	223	288	516	106	132	98	83	94	124
16	1320	1770	506	164	281	450	108	135	103	91	95	123
17	1310	1460	310	151	281	367	124	134	104	91	94	121
18	1310	1330	258	182	283	265	137	126	109	91	95	121
19	1300	1290	250	239	322	190	124	117	118	92	97	121
20	1310	1280	335	263	2390	153	117	121	120	91	121	120
21	1290	1250	304	276	2960	140	114	118	126	88	131	121
22	1280	1240	302	281	3160	153	105	109	132	85	131	124
23	1290	1240	302	254	2880	156	104	103	135	83	140	126
24	1300	1240	292	188	1940	159	94	100	147	80	137	132
25	1280	1240	251	1300	1420	156	94	103	145	82	123	153
26	1270	1230	219	3210	1270	158	98	97	143	80	137	254
27	1270	1230	212	3570	2310	151	108	98	140	77	129	294
28	1270	1230	212	4020	2240	155	115	94	145	77	121	384
29	1260		215	4040	1920	150	115	91	153	76	120	299
30	1260		206	4060	1820	151	117	95	159	76	117	237
31	1250		382		1120		121	92		75		206
Mean	1260	1300	567	1000	2210	689	120	121	116	100	103	156
Runoff in Ac. Ft.	77220	72120	34850	59550	135700	40980	7380	7450	6910	6130	6110	9610

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

TABLE 84

FLOW OF MERCED RIVER NEAR STEVINSON - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	735	1340	1270	522	3570	1260	302	267	264	337	159	179
2	741	1350	1270	636	3600	1000	291	250	259	362	158	176
3	735	1360	1260	942	3630	1810	302	282	234	391	157	175
4	738	1430	1260	948	3680	2100	292	304	256	377	156	173
5	994	1510	1260	918	3670	2200	284	318	251	311	156	174
6	1700	1400	1260	843	3560	2140	279	304	240	274	160	175
7	1490	1370	1240	831	3620	1960	306	266	232	255	160	175
8	1410	1350	1240	843	3940	1600	309	256	248	248	161	176
9	1380	1340	1120	798	4010	1220	299	279	261	223	161	201
10	1370	1330	723	688	3650	1100	279	287	253	208	164	216
11	1370	1310	512	615	1970	1010	275	294	245	196	162	205
12	1370	1310	444	568	885	975	269	311	238	189	164	196
13	1380	1310	444	508	747	840	274	287	250	175	166	190
14	1370	1310	572	474	620	692	289	274	271	178	170	187
15	1360	1320	625	424	548	670	275	284	289	188	172	184
16	1360	1400	612	396	506	670	282	304	309	202	172	182
17	1370	1800	555	342	498	632	286	299	275	194	172	182
18	1370	1500	452	316	492	518	264	296	264	179	172	182
19	1360	1390	424	333	496	442	245	282	280	179	178	183
20	1360	1360	500	353	1060	382	289	275	280	179	183	182
21	1360	1340	542	386	2520	335	296	259	272	178	196	182
22	1360	1320	520	424	2930	326	306	263	266	177	199	179
23	1360	1320	486	410	3000	371	266	244	267	176	203	181
24	1360	1300	480	378	2640	373	239	233	256	174	206	183
25	1370	1300	428	351	1960	320	248	244	250	172	205	188
26	1360	1280	389	1820	1780	308	250	256	258	169	203	198
27	1350	1280	339	2870	1930	294	263	234	287	167	203	306
28	1350	1270	359	3220	2510	308	292	240	289	166	196	546
29	1340		375	3500	2230	308	318	261	297	164	185	516
30	1340		434	3540	2120	297	286	269	320	161	182	353
31	1340		450		1910		269	258		161		302
Mean	1286	1364	705	973	2267	882	281	274	265	216	176	220
Runoff in Ac. Ft.	79050	75770	43330	57910	139400	52480	17300	16820	15790	13310	10470	13540

NOTE: U. S. Geological Survey and U. S. Bureau of Reclamation cooperative station located about 4 miles above mouth. The recording gage operated by the Division of Water Resources at a point 1.1 miles above mouth was discontinued in 1944. Above flow includes the flow of Merced River Slough, Table 85. Station also known as "Merced River below Stevinson Drain (near Mouth)."

TABLE 85

FLOW OF MERCED RIVER SLOUGH NEAR NEWMAN - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	27	71	49	0	572	61						
2	24	70	48	0	580	27						
3	19	74	46	4.6	584	142						
4	15	79	46	7.4	591	212						
5	31	89	45	4.8	593	238						
6	136	75	43	1.4	570	226						
7	106	68	42	1.2	580	183						
8	95	64	41	1.6	649	113						
9	95	62	30	.9	667	50						
10	98	61	10	.3	613	36						
11	98	59	.1	0	226	25						
12	97	58	0	0	37	22						
13	96	57	0	0	18	8.0	THERE WAS NO FLOW IN THE SLOUGH DURING THE PERIOD JULY 1 TO DECEMBER 31, 1947					
14	91	56	0	0	5.2	.8						
15	84	56	0	0	4.0	.4						
16	83	64	0	0	1.2	.5						
17	83	129	0	0	.6	.2						
18	83	84	0	0	.3	.1						
19	82	71	0	0	.2	0						
20	80	66	0	0	32	0						
21	80	61	0	0	300	0						
22	80	58	0	0	411	0						
23	80	55	0	0	438	0						
24	80	54	0	0	372	0						
25	79	54	0	0	208	0						
26	78	54	0	200	155	0						
27	77	52	0	398	188	0						
28	77	52	0	481	337	0						
29	74		0	551	271	0						
30	73		0	565	233	0						
31	71		0		186							
Mean	76.5	66.2	12.9	73.9	304	44.8	0	0	0	0	0	0
Runoff in Ac. Ft.	4700	3680	794	4400	18690	2670	0	0	0	0	0	0

NOTE: This station records the flow which at high stages in the Merced River by-passes the Hills Ferry Road Bridge and reaches the San Joaquin River below the U.S.G.S. station "near Newman", at Mile 122.2 above mouth. Table 84 records the entire flow of the Merced River and the flow in Table 85 is included in Table 84. This is a U. S. Geological Survey and U. S. Bureau of Reclamation cooperative station. Station also known as "Merced River Slough near Hills Ferry Road Bridge."

TABLE 86

FLOW OF TUOLUMNE RIVER AT LA GRANGE BRIDGE - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1360	1210	1300	215	2660	2660	13	19	26	26	1160	1210
2	1340	1210	1310	994	2560	4100	13	19	26	27	1100	1350
3	1460	2150	1350	1190	2600	4940	13	19	26	36	1030	1360
4	1500	1770	1390	1150	2800	5890	13	19	16	23	1200	1350
5	1650	1180	1360	1150	2780	5840	14	19	12	23	1210	1410
6	2290	1170	1270	1280	3130	4400	14	20	13	15	1260	1410
7	2440	1170	1150	1190	5530	3510	14	20	12	21	1260	1280
8	3360	1170	970	1090	7180	2480	14	20	12	98	1260	1160
9	3360	1170	832	1080	7230	1970	14	20	12	568	1260	1350
10	3360	1180	349	1080	6580	2450	13	21	13	573	1120	1350
11	3320	1770	194	812	5720	2850	14	21	11	556	1140	1350
12	3300	1130	76	585	4460	2280	15	21	11	556	1220	1380
13	3240	1160	287	802	4070	1160	16	21	11	547	1360	1410
14	3180	1160	455	922	4260	581	19	21	10	547	1330	1360
15	3140	1170	382	994	4490	27	19	20	10	552	1310	1270
16	2790	1140	445	1400	4720	21	19	23	10	568	1300	1380
17	2370	1170	278	2030	4900	19	19	23	10	631	1200	1410
18	1770	1140	419	2790	5480	19	20	22	9	581	1370	1390
19	1350	1130	493	2890	6240	18	20	21	7	680	1400	1390
20	1380	1140	493	2580	6890	18	22	19	7	606	1300	1200
21	1220	1140	539	2070	7410	17	22	16	7	724	1350	900
22	988	1090	432	1730	6090	16	20	15	5	719	1370	685
23	1020	1120	62	1980	3820	15	16	15	4	709	1260	661
24	1010	1130	22	2670	2370	15	17	15	13	709	1150	665
25	1020	1110	290	3200	1850	17	18	12	23	709	1280	636
26	976	1110	661	3640	3140	16	19	10	18	689	1310	636
27	1520	1150	505	3230	4550	15	19	39	19	636	1390	640
28	2460	1170	336	2740	3640	16	20	124	18	734	1190	640
29	1520		353	2840	2140	16	21	34	13	946	1340	675
30	1210		101	2800	1970	15	21	26	19	1100	1350	648
31	1210		20		1860		19	26		1140		644
Mean	2000	1230	585	1770	4290	1510	17	24	13	518	1260	1100
Runoff in Ac. Ft.	123200	68400	36000	105400	264000	90000	1050	1470	799	31800	74900	67800

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

TABLE 87

FLOW OF TUOLUMNE RIVER AT ROBERTS FERRY BRIDGE - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1640	1190	1290	194	2640	2450	81	79	86	83	1110	1170
2	1360	1160	1340	844	2680	3880	81	75	81	103	1020	1210
3	1470	1860	1370	1070	2770	4860	81	70	77	105	990	1350
4	1540	2380	1440	1080	2830	5740	83	72	75	115	1070	1360
5	1680	1200	1410	1070	3020	5890	90	75	64	105	1140	1360
6	2300	1200	1340	1200	3210	4790	81	72	64	103	1130	1360
7	2520	1200	1220	1210	5150	3590	81	68	68	86	1120	1360
8	3380	1190	1020	1070	7220	2730	81	70	72	93	1130	1360
9	3370	1190	1070	1050	7130	1970	81	70	70	461	1130	1360
10	3370	1170	628	963	6720	2310	81	68	70	610	1060	1350
11	3350	1190	371	823	5720	2860	81	68	68	634	1050	1360
12	3350	1170	278	574	4650	2680	77	70	0	610	1150	1360
13	3240	1170	290	742	4190	1370	68	66	68	610	1280	1360
14	3300	1170	598	914	4380	767	68	68	68	610	1210	1420
15	3300	1200	569	928	4610	215	70	68	68	616	1210	1400
16	3090	1240	569	1240	4870	118	72	68	68	628	1190	1480
17	2620	1170	456	1890	5030	100	75	68	68	640	1050	1600
18	2190	1190	448	2480	5450	95	75	70	68	610	1150	1600
19	1480	1130	610	2760	6230	90	70	70	68	670	1300	1600
20	1440	1150	586	2660	6770	88	68	70	68	682	1240	1380
21	1420	1160	636	2200	7510	88	68	70	66	706	1170	1080
22	1020	1130	604	1860	6500	90	70	68	66	760	1190	830
23	1010	1110	282	1980	4270	90	72	68	66	742	1210	767
24	990	1120	155	2490	2630	88	68	68	66	736	1240	754
25	990	1160	194	3090	1790	88	77	68	66	724	1210	748
26	990	1130	706	3600	2780	92	77	68	66	700	1250	742
27	1370	1130	586	3340	4660	88	79	68	83	676	1280	742
28	2130	1150	452	2790	3910	88	81	430	79	700	1240	712
29	1890		412	2870	2560	81	83	180	79	858	1130	712
30	1200		290	2920	1920	81	83	100	79	1090	1220	742
31	1190		148		1980		81	90		1110		718
Mean	2070	1240	689	1730	4380	1580	77	87	68	548	1160	1170
Runoff in Ac. Ft.	127300	68650	42380	102900	269300	94150	4730	5320	4080	33670	69160	72090

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

TABLE 88

FLOW OF TUOLUMNE RIVER AT HICKMAN-WATERFORD BRIDGE - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1910	1310	1330	146	2560	2390	153	134	122	141	1330	1380
2	1450	1290	1410	693	2470	3480	153	128	131	159	1310	1430
3	1550	1680	1450	1140	2590	4600	150	119	122	159	1240	1550
4	1630	2540	1450	1220	2650	5390	144	122	122	166	1250	1520
5	1630	1360	1500	1230	2730	5780	141	122	122	159	1290	1560
6	2230	1320	1330	1300	2840	5090	138	125	122	159	1300	1580
7	2350	1320	1350	1320	4360	3550	138	125	122	156	1300	1410
8	3100	1310	1100	1150	6630	2970	138	125	122	147	1300	1290
9	3100	1270	1090	1130	6630	2230	138	125	122	417	1340	1360
10	3080	1290	665	1100	6380	2420	138	122	122	687	1280	1470
11	3100	1310	369	1010	5580	2930	138	134	122	715	1260	1470
12	3090	1290	268	587	4500	2790	138	122	122	704	1360	1490
13	3010	1280	230	754	3940	1840	138	122	122	715	1540	1510
14	3010	1290	483	957	4120	1090	138	122	122	721	1540	1480
15	3060	1300	511	978	4240	397	138	125	122	826	1490	1450
16	2970	1360	471	1330	4560	223	138	125	122	732	1490	1490
17	2550	1250	475	1910	4660	201	141	122	125	693	1410	1580
18	2270	1280	341	2450	4970	195	156	125	122	704	1480	1610
19	1610	1240	561	2660	5760	185	144	122	125	704	1680	1600
20	1560	1240	587	2680	6280	182	153	122	122	796	1660	1430
21	1560	1250	637	2310	6900	179	138	122	122	710	1600	1130
22	1170	1240	648	2010	6410	185	122	125	122	862	1600	826
23	1110	1210	361	2060	4280	185	122	122	122	868	1590	749
24	1090	1210	185	2430	2790	179	122	122	125	856	1430	726
25	1090	1240	155	2850	2080	166	125	128	128	856	1390	726
26	1110	1230	626	3270	2590	166	128	131	131	832	1470	715
27	1260	1220	615	3240	4510	166	138	125	144	820	1500	738
28	2030	1240	450	2670	3980	159	138	166	147	760	1400	704
29	2030		483	2670	2860	153	138	195	147	964	1360	704
30	1320		373	2750	2130	159	138	144	144	1250	1410	704
31	1310		185		2300		138	122		1340		704
Mean	2040	1340	700	1730	4170	1650	139	129	126	638	1420	1230
Runoff in Ac. Ft.	125600	74120	43020	103200	256400	98440	8530	7910	7510	39230	84500	75540

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

TABLE 89

FLOW OF TUOLUMNE RIVER AT MODESTO - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2340	1470	1340	632	2920	2510	428	350	350	303	1370	1630
2	1690	1450	1420	747	2730	3270	406	340	370	303	1350	1470
3	1720	1530	1460	1420	2890	4480	363	333	360	309	1340	1660
4	1780	2700	1440	1570	2960	5030	339	340	350	324	1260	1680
5	2150	1840	1510	1600	3120	5860	348	360	348	357	1410	1680
6	3100	1560	1470	1600	3160	5580	392	360	342	363	1430	1750
7	2780	1510	1450	1680	3810	4100	375	350	351	363	1440	1780
8	3200	1470	1250	1580	6240	3600	412	351	342	351	1440	1580
9	3500	1440	1210	1500	7000	2590	390	350	324	390	1420	1460
10	3490	1430	978	1420	7070	2460	380	330	315	772	1390	1640
11	3500	1460	689	1440	6540	2890	370	350	312	836	1300	1640
12	3460	1460	527	1160	5560	3000	350	360	333	876	1340	1640
13	3420	1430	477	1060	4740	2360	339	330	312	862	1470	1650
14	3340	1430	583	1260	4650	1550	340	290	306	862	1550	1700
15	3460	1430	680	1310	4760	1200	360	280	300	958	1550	1610
16	3470	1490	626	1390	5010	814	360	290	290	1110	1510	1500
17	2980	1470	696	1820	5070	708	360	297	290	942	1520	1620
18	2700	1550	552	2490	5300	645	360	310	280	912	1460	1690
19	1990	1420	689	2920	5960	580	360	320	280	889	1740	1670
20	1720	1400	785	3060	6520	546	363	320	270	938	1820	1630
21	1710	1390	843	2700	7090	530	380	310	264	889	1710	1450
22	1470	1380	876	2370	7300	564	370	294	270	981	1710	1150
23	1310	1320	776	2160	5820	518	360	290	270	995	1820	978
24	1320	1310	567	2420	3970	480	345	276	280	1010	1640	952
25	1290	1330	487	2910	2890	434	350	290	290	995	1490	948
26	1320	1320	676	3290	2860	440	360	320	270	978	1640	932
27	1280	1300	958	3680	4720	446	375	350	260	962	1650	942
28	2000	1330	827	3100	5100	431	370	351	258	889	1650	995
29	2220		886	2840	4310	449	390	350	246	995	1480	1050
30	1680		942	3050	2800	459	350	350	252	1210	1620	988
31	1460		836		2820		350	342		1350		905
Mean	2350	1486	920	2006	4700	1951	368	327	303	783	1517	1418
Runoff in Ac. Ft.	144500	82550	56540	119400	289000	116100	22600	20100	18020	48150	90290	87210

NOTE: Station is maintained jointly by Division of Water Resources, U. S. Geological Survey, Modesto Irrigation District and U. S. Bureau of Reclamation. It is located at old U. S. 99 Highway Bridge and is at Mile 15.75 above mouth.

TABLE 90

FLOW OF TUOLUMNE RIVER AT TUOLUMNE CITY - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	2520	1670	1350	720	3080	2760	520	460	500	400	1460	1760
2	2140	1650	1420	660	2900	3080	490	460	520	380	1470	1980
3	1980	1680	1460	1350	2960	4080	470	460	460	400	1460	1600
4	1950	2300	1460	1680	3050	4620	480	460	460	400	1360	1660
5	2040	2210	1480	1730	3210	5440	490	465	470	440	1460	1640
6	2750	1720	1490	1720	3310	5500	490	460	460	465	1520	1700
7	2880	1620	1450	1800	3310	4450	470	460	470	460	1530	1690
8	2860	1550	1330	1740	5090	3830	510	460	445	460	1520	1560
9	3210	1500	1210	1620	6050	2960	480	465	440	445	1510	1430
10	3270	1460	1130	1530	6020	2560	490	455	430	680	1500	1550
11	3310	1480	840	1520	5810	2830	480	460	445	860	1410	1600
12	3300	1470	820	1300	5240	3060	480	460	445	890	1420	1610
13	3260	1450	560	1060	4700	2600	470	400	400	900	1540	1640
14	3200	1430	560	1220	4480	1780	480	380	380	890	1650	1640
15	3180	1430	710	1360	4620	1330	480	440	370	940	1640	1620
16	3180	1470	690	1340	4800	840	480	455	400	1160	1630	1490
17	2920	1470	700	1680	5000	720	480	460	380	1020	1650	1580
18	2690	1580	640	2220	5200	620	470	465	370	940	1550	1630
19	1400	1550	650	2660	5740	590	480	465	400	920	1730	1620
20	1850	1500	780	2800	6280	570	480	460	370	950	1830	1600
21	1800	1490	820	2710	6590	540	490	455	360	940	1740	1430
22	1750	1460	850	2470	6630	580	470	430	360	980	1720	1160
23	1710	1410	830	2210	5810	570	460	430	360	1050	1780	960
24	1620	1360	650	2310	4300	550	460	400	360	1040	1660	900
25	1600	1360	550	2670	3540	470	465	430	370	1050	1500	880
26	1590	1360	530	2980	3120	450	470	460	340	1040	1590	870
27	1540	1340	850	3380	4080	540	480	400	340	1000	1620	880
28	1900	1340	810	3230	5120	510	465	460	370	940	1630	920
29	2230		820	2860	4720	510	490	500	400	1000	1490	1000
30	2030		910	3070	3640	510	465	540	400	1200	1550	990
31	1700		900		3160		460	500		1400		890
Mean	2366	1547	944	1987	4566	1982	479	453	409	827	1571	1403
Runoff in Ac. Ft.	145507	85904	58017	118215	280780	117917	29445	27878	24347	50856	93461	86241
Diversions below Station Ac. Ft.	0	0	70	187	122	156	224	248	180	118	0	0
M.I.D. Spill below Station Ac. Ft.	0	0	139	812	1865	1534	928	524	468	340	0	0
Acre Feet to San Joaquin River (1)	145507	85904	58086	118840	282523	119295	30149	28154	24635	51078	93461	86241

NOTE: Station maintained jointly 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 3.35 miles above the mouth.

(1) Does not include channel accretions or loss between station and mouth.

TABLE 91

FLOW OF DRY CREEK NEAR MODESTO (CLAUSS ROAD BRIDGE) - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	80	36	37	127	81	129	80	68	69	60	31	27
2	69	39	37	111	79	76	91	70	64	62	35	27
3	62	47	38	87	87	79	80	76	64	64	36	26
4	60	59	38	77	95	70	74	73	82	71	34	26
5	447	129	38	65	111	71	71	82	78	79	37	26
6	807*	109	38	63	107	68	69	80	64	86	40	26
7	293*	79	38	61	91	68	69	83	64	81	39	26
8	150*	61	40	51	93	76	79	84	62	66	36	26
9	109*	51	40	58	89	78	77	71	63	60	36	26
10	86*	47	66	58	81	74	79	69	64	73	35	27
11	73*	43	78	59	111	82	78	59	63	72	35	32
12	65	41	80	58	144	78	75	56	70	70	34	31
13	60	39	79	60	140	69	65	58	60	74	36	29
14	56	38	74	69	139	66	63	72	64	69	40	29
15	53	39	38	82	129	68	71	81	68	75	40	26
16	50	40	33	79	127	78	73	80	64	159	38	25
17	48	154	34	78	114	97	72	82	57	103	36	22
18	46	144*	44	69	105	96	82	89	62	82	33	24
19	44	82*	49	71	114	84	73	76	61	71	35	23
20	44	63*	53	76	136	84	68	69	56	56	51	23
21	43	54*	57	65	124	74	75	81	59	42	70	22
22	41	53*	63	78	116	87	68	71	55	38	48	23
23	39	49	64	84	125	81	59	66	57	37	40	23
24	39	46	63	80	150	79	57	69	52	38	45	24
25	38	45	61	71	177	76	62	69	49	39	42	29
26	37	41	59	79	281	79	71	73	46	36	40	43
27	38	39	58	91	503	78	71	82	50	36	43	73
28	38	38	68	71	486	80	86	83	50	36	36	177
29	38		71	82	368	84	85	77	49	32	31	236
30	37		123	84	148	81	81	70	52	29	29	103
31	37		189		114		78	60		30		52
Mean	101	61	60	75	154	80	74	74	61	62	39	43
Runoff in Ac. Ft.	6200	3380	3670	4450	9450	4740	4530	4520	3610	3820	2300	2640
M.I.D. Spill Below Station Ac. Ft.	0	0	89	664	514	371	547	382	388	257	0	0
Discharge to Tuolumne River Ac. Ft.	6200	3380	3760	5110	9960	5110	5080	4900	4000	4080	2300	2640

* Estimated

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.

TABLE 92

FLOW OF STANISLAUS RIVER AT ORANGE BLOSSOM BRIDGE - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	4570	812	730	2180	4290	1970	46	42	34	31	119	416
2	4520	474	215	1540	4410	2220	46	42	35	31	125	438
3	4570	378	96	1080	4610	2370	45	43	37	32	122	486
4	4890	500	206	1100	5110	2480	45	43	40	32	125	486
5	4560	740	692	1510	5360	2490	46	42	35	32	125	486
6	3910	740	836	788	5810	2410	45	43	34	32	125	500
7	4010	788	774	1200	5790	1420	48	42	34	31	125	500
8	3720	884	788	1650	5030	252	46	40	37	28	122	465
9	3670	615	443	1300	4580	391	48	40	35	28	125	913
10	3540	324	77	846	4350	1320	48	40	34	29	119	966
11	2590	586	366	836	4080	1430	43	38	32	27	119	956
12	1350	1010	937	634	3640	1040	43	40	32	27	119	942
13	1120	1170	946	702	3500	345	43	40	32	26	122	932
14	1760	1170	774	1270	3400	231	42	42	32	26	125	913
15	2010	1030	922	1940	3460	223	43	43	31	28	125	879
16	2010	469	434	2410	3100	240	43	43	31	37	119	870
17	2000	273	469	3120	2960	227	43	43	31	31	125	860
18	2000	548	610	3790	3530	92	42	40	31	24	125	850
19	1380	817	932	4270	4060	67	38	40	32	17	136	841
20	1050	807	1040	4200	4080	65	38	40	31	16	438	831
21	1660	783	1040	3640	4170	62	37	42	27	14	452	572
22	1660	500	1050	3260	3670	62	42	42	24	12	447	194
23	1660	324	990	3510	2300	62	42	43	26	10	529	149
24	1440	240	1600	4300	1690	62	40	43	27	10	161	105
25	1100	391	1970	5040	1710	60	43	40	27	14	452	125
26	543	596	1440	5530	1950	59	45	42	27	46	447	127
27	311	668	994	4740	2880	50	45	38	24	50	447	150
28	538	663	913	4580	2740	46	42	38	24	85	294	130
29	884		1170	4860	2270	45	40	37	26	113	286	63
30	1090		2160	4720	1630	45	40	34	27	116	421	48
31	836		2090		1760		42	34		108		48
Mean	2289	654	894	2685	3610	728	43	41	31	37	224	524
Runoff in Ac. Ft.	140700	36300	54950	159800	222000	43310	2660	2500	1840	2270	13330	32210

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 93

FLOW OF STANISLAUS RIVER AT RIVERBANK (BURNEYVILLE BRIDGE) - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	4320	733	647	2030	4240	1910	119	107	96	93	220	486
2	4270	733	592	1880	4090	2040	111	100	100	98	228	482
3	4320	528	235	1310	4280	2220	111	101	107	100	231	507
4	4320	588	167	1240	4610	2280	118	102	110	95	228	511
5	4690	812	474	1500	4960	2350	121	105	112	98	231	409
6	3780	815	758	1180	5200	2310	123	101	107	94	231	521
7	3680	871	790	951	5500	1820	120	104	108	95	231	558
8	3520	835	919	1290	5830	684	123	104	105	97	231	578
9	3600	809	790	1590	4400	635	127	105	108	101	231	498
10	3300	474	257	957	4240	1050	123	104	106	100	228	784
11	2820	470	204	993	4030	1290	117	107	107	101	231	829
12	1870	919	803	694	3660	1280	113	108	107	97	231	829
13	1440	983	945	852	3350	828	112	109	106	90	235	829
14	1520	1210	942	1010	3350	635	116	106	99	93	242	809
15	1930	1080	748	1370	3300	401	120	106	100	97	238	806
16	1890	887	919	2180	3260	345	124	105	98	112	232	733
17	1880	415	276	2120	2900	345	117	105	97	117	232	756
18	2310	437	622	3180	3170	269	117	100	98	102	232	758
19	1490	822	951	3920	3750	181	106	96	102	98	243	753
20	1350	838	967	4010	3890	168	107	100	100	94	386	751
21	1930	790	976	3670	3920	181	98	102	100	91	502	812
22	1910	733	983	3240	3530*	171	102	104	94	91	480	478
23	1790	412	1040	3170	1990*	168	107	105	93	91	628	302
24	1710	373	1310	3760	1730*	156	102	108	93	90	430	233
25	1220	384	1640	4430	1770	147	108	101	90	89	286	220
26	1160	595	1730	5070	1910*	140	111	99	88	100	497	235
27	758	373	1100	4950	2610	131	109	100	91	111	531	220
28	633	743	1020	4300	2810	126	106	99	90	124	528	287
29	738		1020	4510	2450	126	111	100	91	206	287	155
30	954		1810	4590	1590*	124	105	99	91	231	486	128
31	838		2270		1730*		111	98		213		110
Mean	2320	702	900	2530	3490	817	113	103	100	110	315	528
Runoff in Ac. Ft.	142700	39000	55350	150600	214300	48620	6970	6330	5940	6760	18740	32460

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

TABLE 94

FLOW OF STANISLAUS RIVER AT RIPON BRIDGE - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3950	990	823	2100	4940	2000	296	226	224	180	272	549
2	4140	982	842	2180	4600	2080	272	218	246	186	274	543
3	4180	812	568	1740	4460	2240	264	212	240	202	276	558
4	4250	826	415	1450	4620	2270	280	246	242	198	282	579
5	4460	939	478	1540	4970	2370	270	234	270	204	278	588
6	4500	992	879	1640	5340	2370	264	222	226	194	280	592
7	3910	1040	954	1160	5700	2290	252	210	260	192	280	599
8	3790	1010	994	1420	5950	1540	270	206	254	198	278	619
9	3600	1080	1040	1730	5420	1010	238	210	244	200	278	586
10	3470	832	682	1400	4850	1090	236	204	230	198	278	752
11	3300	734	474	1150	4610	1450	236	216	212	172	274	865
12	2600	925	687	1040	4280	1550	246	224	212	170	280	867
13	1650	1130	1080	1030	3800	1160	248	232	208	172	292	879
14	1460	1320	1130	1100	3610	844	262	228	226	166	296	882
15	1930	1330	1020	1300	3410	713	254	204	230	176	296	882
16	2030	1200	1120	1940	3400	693	254	226	196	200	290	839
17	2010	784	784	2300	3090	660	254	228	186	202	288	867
18	1980	600	796	2780	3060	605	264	218	174	188	288	889
19	1960	900	1030	3350	3420	484	240	238	188	176	296	891
20	1380	958	1220	3720	3730	419	230	232	176	172	316	879
21	1230	942	1260	3830	3830	382	226	214	174	176	482	877
22	1620	922	1230	3510	4120	366	238	216	202	166	511	704
23	1710	709	1240	3170	3580	358	242	196	208	172	547	488
24	1700	616	1150	3360	2520	350	218	200	214	196	625	402
25	1380	562	1510	3870	2000	336	226	220	194	196	419	346
26	1240	685	1790	4360	2080	334	260	220	172	176	427	342
27	870	736	1490	5060	2480	314	260	222	176	184	570	334
28	743	848	1180	5160	3010	318	264	222	184	190	588	346
29	889		1180	4880	2890	324	276	224	182	210	503	338
30	987		1490	4960	2370	314	238	236	172	264	425	260
31	1140		2200		2010		236	246		286		230
Mean	2389	907	1056	2608	3811	1041	252	221	211	192	360	625
Runoff in Ac. Ft.	146900	50390	64930	155200	234300	61950	15500	13590	12540	11830	21400	38420

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

TABLE 95

FLOW OF STANISLAUS RIVER NEAR MOUTH (MILE 4.3) - 1946

Date	Daily Mean Flow in Second Feet											
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1									231*	216	245	526
2									253*	216	260	571
3									247*	236	266	574
4									249*	259	274	596
5									277*	254	257	619
6									233*	257	275	624
7									267*	229	262	630
8									261*	219	249	650
9									251*	233	270	661
10									237*	225	276	672
11							RECORDER		219*	204	277	871
12							INSTALLED		219*	194	277	916
13							AUGUST 16, 1946		215*	188	285	930
14									233*	201	293	938
15									237*	211	293	938
16								232	206*	229	293	918
17								245	196*	213	291	918
18								251	184*	196	289	944
19								275	198*	190	293	946
20								277	186*	190	301	938
21								240	188*	189	354	946
22								222	216*	192	479	876
23								218	222*	201	504	647
24								225	228*	204	596	515
25								250	208	204	504	429
26								226	194	188	389	397
27								231	201	194	521	391
28								229	206	197	608	376
29								229	219	201	585	403
30								247	218	212	418	332
31								245		246		301
Mean									223	213	349	677
Runoff in Ac. Ft.									13290	13070	20790	41640

* Estimated.

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."

TABLE 96

RECORD OF DAILY PRECIPITATION (IN INCHES) AT CHICO - 1946*

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	.02			.13						.03		
2	.02	.20	T									
3	.28			T						.10		.77
4	.87	.16										.83
5	T		T									1.85
6		.31										.70
7	.10											.32
8												
9												
10		.18										
11												
12			T									
13			.01									
14											.03	
15		.14	.02									
16									.15			
17											.02	
18			.11								.39	
19	.07	.10	.09								.38	
20			.21								.11	
21		.53	T							T	.01	
22										.23	.47	
23											.40	
24		.20										.25
25							.06					.24
26		T					.01					
27		.15	T									.15
28	T		.24									
29			.17									
30			.75									.08
31			.18									
Total for Month	1.36	1.97	1.78	.13	0	0	.07	0	.15	.36	1.81	5.19
Total for Year						12.82						

* United States Weather Bureau Records.

TABLE 97

RECORD OF DAILY PRECIPITATION (IN INCHES) AT M. & T. INC. - CHICO LANDING - 1946*

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				.18								
2		.20										
3	.40									.10		
4	.35											1.83
5	.10											1.00
6	T	.10										.98
7	.05	.16										T
8												.10
9												
10												
11												
12												
13												
14											T	
15												
16									.15			
17		.10										
18											.27	
19			.15								.20	
20		.15	.05								.13	
21		.37	.09								T	
22										T	.12	
23										.20	.91	
24												
25		.18										.34
26					.43		.10					
27		.20										
28												
29			.18									
30			.21									
31			.36									
Total for Month	.90	1.46	1.04	.18	.43	0	.10	0	.15	.30	1.63	4.25
Total for Year						10.44						

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

TABLE 98

RECORD OF DAILY PRECIPITATION (IN INCHES) AT LLANO SECO RANCHO - 1946*

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				.04								
2	.05	.08										
3	.31									.10		.91
4	.35	.12										.70
5	.05											1.39
6		.14										.75
7	.08											.01
8												.11
9												
10												
11		.02										
12												
13												
14												
15		.07										
16									.12			
17												
18			.04								.22	
19		.11	.06								.26	
20			.13								.10	
21		.35	.01								.02	
22										.17	.68	
23											.33	
24												.23
25		.15			.02		.06					
26					.27		.02					.08
27		.08										.02
28			.06									
29			.10									
30			.29									
31			.26									
Total for Month	.84	1.12	.95	.04	.29	0	.08	0	.12	.27	1.61	4.20
Total for Year						9.52						

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

TABLE 99

RECORD OF DAILY PRECIPITATION (IN INCHES) AT COLUSA - 1946*

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				.31								
2												
3	.29	.07								.10		
4	.23	.15										1.17
5	.17											1.55
6												.75
7	.12	.22										
8												.12
9												
10												
11												
12												
13			.01									.03
14											.11	
15												.02
16		.51							.14			
17											.02	
18											.08	
19			.25								.36	
20		.14	.05								.42	
21		.14	.04								T	
22											.01	
23										.06	.56	
24												
25		.06										.34
26							.11					
27		.06										
28												
29			.09									.01
30			.27									
31			.30									
Total for Month	0.81	1.35	1.01	.31	0	0	.11	0	.14	.16	1.56	3.99
Total for Year						9.44						

* United States Weather Bureau Records.

TABLE 100

RECORD OF DAILY PRECIPITATION (IN INCHES) AT MARYSVILLE - 1946*

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				.17								
2				.05								
3	.08	.24								.30		
4	.40	.41										1.00
5	.49											.79
6												1.07
7	.04	.38										.02
8												.05
9												
10												
11		.06										
12												
13			.18									
14											.70	
15										.03		
16		.02							.20			
17											.40	
18											.11	
19			.15								.66	
20		.04	.38								.32	
21		.21	.10									
22		.01										
23										.04	1.54	
24												
25		.11										.20
26							.23					.04
27		.06					T					
28		.06										
29			.58									
30			.17									
31			.08									
Total for Month	1.01	1.60	1.64	.22	0	0	.23	0	.20	.37	3.73	3.17
Total for Year						11.80						

* U. S. Weather Bureau records.

TABLE 101

RECORD OF DAILY PRECIPITATION (IN INCHES) AT WILKINS SLOUGH - 1946*

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				.02**								
2												
3	.42											
4												.83
5	.44											.81
6												.94
7	.12											
8												.14
9			**									
10			**									
11			**									
12			**									
13			**									
14			**									
15			**									
16			**								.19	
17			**								.03	
18			**								.14	
19			**								.71	
20			1.40**								.50	
21			**									
22			**							T		
23			**								.60	
24			**									
25			**				T					.29
26			**									
27			**									
28			**									
29			.02**									
30			**									
31			**									
Total for Month	.98	0	1.42	.02	0	0	T	0	0	T	2.17	3.01
Total for Year						7.60						

* Near Grimes, at Reclamation District 108 pumping plant. Record kept by District.
** Record missing. Data from Rough and Ready Pumping Plant.

TABLE 102

RECORD OF DAILY PRECIPITATION (IN INCHES) RECLAMATION DISTRICT 1500
AT EVERGLADE - 1946*

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1												
2	.03	.07								.15		
3	.16											.73
4	.22											.54
5												1.14
6	.08	.11										.02
7	.01											.13
8												
9												
10		.02										
11												
12			.13									
13											.03	
14												
15		.10							.11	.03		
16												
17											.04	
18			.24								.45	
19	.06	.10	.27								.25	
20		.10	.04									
21					.06							
22										.03	.80	
23												
24		.05										.24
25					.24		.09					.02
26												
27		.05										
28			.15									
29			.09									
30			.08									
31			.29									
Total for Month	.56	.60	1.29	0	.30	0	.09	0	.11	.21	1.57	2.82
Total for Year						7.55						

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

TABLE 103

RECORD OF DAILY PRECIPITATION (IN INCHES) RECLAMATION DISTRICT 1500
AT ROBBINS - 1946*

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				.08								
2	.22	.20								.18		
3	.21											.82
4	.32											.62
5												1.12
6	.10	.16										.02
7												.09
8												
9												
10		.03										
11												
12			.13									.03
13											.06	
14												
15		.09							.20	.02		
16												
17											.02	
18			.24								.55	
19	.06	.17	.31								.49	
20		.09	.14									
21					.05							
22										.08	1.15	
23												
24		.10										.30
25					.31		.09					.01
26												
27		.11										
28			.20									.02
29			.10									
30			.03									
31			.49									
Total for Month	.91	.95	1.64	.08	.36	0	.09	0	.20	.28	2.27	3.03
Total for Year						9.81						

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

TABLE 104

RECORD OF DAILY PRECIPITATION (IN INCHES) AT NICOLAUS - 1946*

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				.17								
2										.08		
3	.18	.40								.19		
4	.22	.02								.01		.69
5	.32											.71
6												
7	.05	.18										1.30
8	.01											.03
9												
10												
11		.03	T									
12												
13			.15									
14			T								.07	
15												
16												
17									.15	.09		
18											.07	
19		.24	.13								.02	
20		.10	.31								.67	
21		.02	.09								.38	
22										T		
23										.12	1.18	
24		.09										
25												.31
26							.06					.02
27		.02										
28		.04										
29			.41									.02
30			.09									
31			.06									
Total for Month	.78	1.14	1.24	.17	0	0	.06	0	.15	.49	2.39	3.08
Total for Year						9.50						

* U. S. Weather Bureau records.

TABLE 105

RECORD OF DAILY PRECIPITATION (IN INCHES) RECLAMATION DISTRICT 1500 AT KARNAK - 1946*

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1												
2	.16	.23								.25		
3	.16											.47
4	.26											.70
5												1.05
6	.08	.14										.01
7												.05
8												
9												
10												
11												
12			.12								.03	
13												
14												
15		.18							.05	.04		
16		.02									.07	
17											.65	
18			.22								.31	
19	.01	.27	.34								.01	
20		.04	.11									
21		.01			.12							
22										.09	1.27	
23												
24		.07										.28
25					.34		.04					.02
26		.05										.02
27		.04										
28			.42									.05
29			.08									
30			.02									
31			.33									
Total for Month	.67	1.05	1.64	0	.46	0	.04	0	.05	.38	2.34	2.65
Total for Year						9.28						

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

TABLE 106

RECORD OF DAILY PRECIPITATION (IN INCHES) AT KNIGHTS LANDING - 1946*

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				.55								
2	T											
3	.16	.21								.14		
4	.18	.10										.83
5	.27											.70
6												1.13
7	.08	.11									T	
8	.02											.09
9												
10												
11		T										
12			T									
13			.11									
14											.05	.05
15										.03		
16		.22							.06			
17											T	
18				T							.09	
19			.30								.62	
20	T	.19	.31								.35	
21		.05	.05									
22										T	T	T
23										.07	1.17	T
24												T
25		.10										.37
26							.02					
27		.05										.05
28												
29			.18									.04
30			.10									T
31			.07									
Total for Month	0.71	1.03	1.12	0.55	0	0	.02	0	.06	0.24	2.28	3.26
Total for Year						9.27						

* United States Weather Bureau Records.

TABLE 107

RECORD OF DAILY PRECIPITATION (IN INCHES) AT SACRAMENTO - 1946*

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				.06								
2	.13	.30								.07		
3	.01	.07								.63		.28
4	.53											.21
5												.31
6		.10										.26
7	.10											T
8				T								
9												
10		T										
11												
12			.20								T	T
13			.10								T	T
14											T	T
15		.03	T									
16									.04	T	T	
17										T		
18			.03								.25	
19	T	.15	.09									
20			.41								1.13	
21		.07	.01							T		T
22	T									.05	T	T
23											.95	T
24		.07									.09	.25
25							T					
26												.05
27		.11										T
28			.30									
29			.16									.14
30			.59									
31			.05									
Total for Month	.77	.90	1.94	.06	0	0	T	0	.04	.75	2.42	1.56
Total for Year						8.44						

TABLE 108

SUMMARY OF WATER UTILIZATION OF SACRAMENTO-SAN JOAQUIN VALLEYS

	Year	Acreage			Diversion Acre-Feet	Gross Duty of Water**		Runoff in per cent of Normal*		Irrigation Draft
		General	Rice	Total		Ac. Ft. per Acre	Acres per Sec. Ft.	Sacto. R. at Red Bluff	S.J.R. at Vernalis	Average c.f.s. July
Sacramento River Redding to Sacramento	1939	158800	63900	222700	1301000	5.74	85	50		3746
	1940	119700	64400	194100	1063000	5.65	86	120		4050
	1941	118600	85200	203800	1150000	5.53	88	164		4314
	1942	111200	107600	218800	1279000	5.73	85	129		4662
	1943	107400	115600	223000	1417000	6.24	78	97		4699
	1944	111800	122300	234100	1678000	7.06	69	53		5502
	1945	106500	115100	221600	1676000	7.44	65	76		5766
	Av. 1939 to 1945	119100	96300	215400	1366000	6.20	79	98		4677
	1946	117400	124100	241500	1778000	7.24	67	92		5560
Sacramento River Tributaries (1)	1939	56500	39900	96400	758000	7.86	62			2299
	1940	56800	29800	86600	666300	7.69	63			2438
	1941	53800	34600	88400	672100	7.60	64			2364
	1942	47300	50500	97800	751600	7.69	63			2796
	1943	45800	69800	115600	925700	8.01	61			3173
	1944	45700	67000	112700	983300	8.72	56			3429
	1945	50800	70900	121700	1004000	8.25	59			3316
	Av. 1939 to 1945	51000	51800	102700	823000	7.97	61			2831
	1946	63500	74000	137500	1120800	8.15	60			3800
Sacramento River and Tributaries	Av. 1939 to 1945	170100	148100	318100	2189000	6.88	70			7508
	1946	180900	198100	379000	2898800	7.65	64			9360
San Joaquin River Fremont Ford Bridge to Garwood Bridge	1939	61100	420	61500	171200	2.78	175		46	600
	1940	57800	470	58300	142500	2.44	199		105	637
	1941	59200	480	59700	133500	2.24	217		127	626
	1942	59900	580	60500	146600	2.42	201		118	659
	1943	60800	340	61200	173400	2.83	172		117	596
	1944	62700	1460	64200	197600	3.08	158		62	625
	1945	61500	800	62300	194100	3.12	156		106	708
	Av. 1939 to 1945	60400	650	61100	165600	2.70	183		97	636
	1946	67600	1400	69000	237200	3.44	141		92	770
San Joaquin River Tributaries and Old San Joaquin River and Tom Paine Slough	1939	49500	0	49500	110600	2.23	218			342
	1940	44100	0	44100	92100	2.09	233			373
	1941	44600	110	44700	87800	1.96	248			346
	1942	45100	130	45200	93100	2.06	236			383
	1943	58500	150	58700	112500	1.92	253			395
	1944	53500	235	53700	145100	2.70	180			449
	1945	51900	200	52100	143400	2.75	176			503
	Av. 1939 to 1945	49600	118	49700	112100	2.24	221			399
	1946	54400	317	54700	172200	3.15	155			530
San Joaquin River and Tributaries Including Old S.J. and Tom Paine Slough	Av. 1939 to 1945	110000	768	110800	277700	2.51	194			1035
	1946	122000	1717	123700	409400	3.31	147			1300
Sacramento River and Tributaries and San Joaquin River and Tributaries Including S.J. and Tom Paine Slough	Av. 1939 to 1945	280100	148900	428900	2466700	5.75	84			8543
	1946	302900	199800	502700	3308200	6.58	74			10660

* 50 year normal 1889 to 1939

** Excluding municipal diversions on Sacramento River, the City of Sacramento and the City of Redding.

(1) Includes Butte Creek, Butte Slough, Colusa Trough, Back Borrow Pit and the By-Pass channels, also Feather, Yuba and American Rivers.

TABLE 109

SEASONAL DIVERSIONS, ACREAGE IRRIGATED, AND GROSS SEASONAL DUTY OF WATER (MARCH TO OCTOBER, INCLUSIVE) IN THE SACRAMENTO-SAN JOAQUIN AREA - 1946

Source	Table Number	Seasonal Diversions Acre-Feet (1)	Acreage Irrigated			Gross Seasonal Duty of Water Acre-Feet per Acre
			General	Rice	Total	
Sacramento River - Redding to Sacramento	115	1778000	117396	124135	241531	(2) 7.3
Feather River below Oroville	122	744800	27189	51082	78271	9.5
Yuba River on Valley floor	123	98700	8872	1956	10828	9.1
American River below Fairoaks	124	4120	2893	0	2893	1.4
By-Pass and Drainage Channels	118-119-121	89400	11170	7920	19090	4.7
Lower Butte Creek and Slough	120	41700	8247	1440	9687	4.3
Colusa Trough and Back Borrow Pit	116-117	(3)142100	5092	11574	16666	(3) 8.5
Total above Sacramento		2898820	180859	198107	378966	(2) 6.4
Delta Uplands from:						
Old San Joaquin River	125	106400	34263	0	34263	3.1
Tom Paine Slough	126	19700	5733	317	6050	3.3
San Joaquin River (below Vernalis Bridge)	127	77200	24545	0	24545	3.1
San Joaquin River from Fremont Bridge to Vernalis Bridge	128	160000	43094	1396	44490	3.6
Merced River below Snelling	131	14400	4484	0	4484	3.2
Tuolumne River below Roberts Ferry Bridge	132	4920	3564	0	3564	1.4
Stanislaus River below Orange Blossom Bridge	133	26800	6343	0	6343	3.4
Total Delta Uplands and pumping diversions in San Joaquin River and Tributaries*		409420	122026	1713	123739	3.0
Totals		3308240	302885	199820	502705	
Sacramento-San Joaquin Delta**		(See Table 157)				

* Note that major gravity diversions by canals of Oakdale, South San Joaquin, Modesto, Turlock, Waterford and Merced Irrigation Districts and Miller and Lux are not included within the scope of these measurements.
** Delta crop census not taken in 1946. See 1938 report and reports prior to 1933 for detailed data.
(1) Diversions before March 1st and after November 1st not included.
(2) Analysis excludes City of Sacramento and City of Redding as these are municipalities.
(3) A large portion of this diversion was used to supply acreages reported under Sacramento River Diversions (Provident Irrigation District). See footnote Table 115, Provident Irrigation District diversions at Mile 154.8R.

TABLE 110

SACRAMENTO RIVER - REDDING TO SACRAMENTO

STRLAM FLOW - IRRIGATION DRAFT - ACREAGE IRRIGATED - GROSS DUTY OF WATER - 1924 - 1946

(NOTE: In previous reports a similar tabulation included diversions by municipalities. This tabulation has been revised to exclude municipal diversions.)

Year	Seasonal Runoff at Red Bluff in Per Cent of Normal *	fFlow of Sacramento River at Keswick c.f.s.		Irrigation Draft (Excluding Municipal Diversions)			Acreage Irrigated			Gross Duty of Water				
										Acre-feet per Acre			Acres per Sec.	
		Average July	Average July-Sep. Incl.	Average c.f.s. July	Average July-Sep. Incl.	Acre-feet Mar.-Oct. Incl.	General	Rice	Total	July	July-Sep. Incl.	Mar.-Oct. Incl.	July-Sep. Incl.	Mar.-Oct. Incl.
1924	38	2890**	2920**	3030	2430	935000	104300	59700	164000	1.14	2.70	5.70	67	85
1925	92	3640**	3630**	3400	2920	828000/	76200	58000	134200	1.56	3.97	6.17	46	79
1926	65	2880	2780	4180	3170	1092000/	76600	87500	164100	1.57	3.53	6.66	52	73
1927	125	3950	3550	4180	3460	1141000/	77900	79800	157700	1.63	4.01	7.24	46	67
1928	87	3580	3320	3640	2870	1036000/	88200	63500	151700	1.48	3.45	6.83	53	71
1929	50	3060	2920	3330	2720	1048000/	136900	43900	180800	1.13	2.75	5.80	66	84
1930	70	3070	2970	3490	2830	1038000/	96600	56200	152800	1.40	3.38	6.79	54	72
1931	38	2600	2570	3890	2980	1315000	141500	73900	215400	1.11	2.53	6.11	72	80
1932	58	2940	2730	3170	2530	1001000	130700	53800	184500	1.06	2.50	5.43	73	90
1933	52	3010	2770	3160	2640	1025000	101100	53000	154100	1.26	3.12	6.65	58	73
1934	51	2650	2540	3250	2700	1038000	93800	56500	150300	1.33	3.28	6.91	56	70
1935	86	3330	3010	3220	2770	907000	98500	51100	149600	1.32	3.38	6.06	54	80
1936	81	3280	2910	3460	2840	1036000	93100	62700	155800	1.37	3.33	6.65	55	73
1937	68	3380	2950	3770	3160	1050000	101000	66500	167500	1.39	3.44	6.27	53	78
1938	168	4870	4220	3500	2940	911000	85600	62600	148200	1.45	3.62	6.15	50	79
1939	50	3100	3000	3680	2850	1278000	158800	63900	222700	1.02	2.34	5.74	78	85
1940	120	3625	3425	3990	3220	1040000	119700	64400	184100	1.33	3.19	5.65	57	86
1941	164	5180	4500	4250	3790	1127000	118600	85200	203800	1.28	3.39	5.53	54	88
1942	129	4905	4340	4590	4040	1255000	111200	107600	218800	1.29	3.36	5.73	54	85
1943	97	4305	3950	4630	4140	1391000	(1)107400	115600	(1)223000	1.28	3.39	6.24	54	78
1944	53	5003	4720	5430	4500	1652000	111800	122300	234100	1.43	3.51	7.06	52	69
1945	76	8280	7720	5690	4780	1648000	106400	115000	221400	1.58	3.94	7.44	46	65
1946	92	8710	7820	5480	5380	1749000	117400	124100	241500	1.40	4.07	7.24	45	67
Average 1924-1946		4010	3710	3930	3290	1154000	107000	75000	181800	1.33	3.30	6.40	55	77

f Prior to 1943 station was located at Kennett.
* 50 year mean (1889-1939) of natural runoff
** Flow near Red Bluff. Station at Kennett established in 1926.
/ Diversion for March estimated.
(1) Corrected figure.

TABLE 111

FEATHER RIVER - OROVILLE TO MOUTH

STREAM FLOW - IRRIGATION DRAFT - ACREAGE IRRIGATED - GROSS DUTY OF WATER 1924-1946

Year	Seasonal Runoff at Oroville in Per Cent of Normal*	Flow of Feather River at Oroville c.f.s.		Irrigation Draft			Acreage Irrigated			Gross Duty of Water				
										Acre-Feet per Acre			Acres per Sec. Ft.	
		Average July	Average July-Sep. incl.	Average c.f.s. July	Av. cfs July-Sep Incl.	Acre-Feet Mar.-Oct. Incl.	General	Rice	Total	July	July-Sep. Incl.	Mar.-Oct. Incl.	July-Sep. Incl.	Mar.-Oct. Incl.
24(1)	27	852	933	950	917	355346	22402	22541	44943	1.30	3.72	7.92	49	61
25	65	1770	1719	1464	1287	417150	25560	26734	52294	1.72	4.49	7.98	41	61
26	65	1840	1839	1712	1432	474025	23545	34694	58239	1.81	4.49	8.14	41	60
27	121	2110	1920	1857	1578	533615	24944	38513	63457	1.80	4.54	8.41	40	58
28	88	1980	1689	1697	1363	497201	23383	33145	56528	1.85	4.40	8.80	41	55
29	38	1920	2080	1416	1134	453464	29011	23917	52928	1.64	3.91	8.57	47	57
30	80	1890	1986	1517	1225	450020	25604	24258	49862	1.87	4.48	9.03	41	54
31	30	1230	1177	1333	1059	464138	24683	27079	51762	1.58	3.73	8.97	49	54
32	68	1990	1570	1621	1327	496713	24115	28108	52223	1.91	4.64	9.51	39	51
33	39	1590	1389	1533	1286	478326	21897	26541	48438	1.95	4.84	9.88	38	49
34	42	1530	1445	1325	1085	428008	23984	24918	48902	1.67	4.05	8.75	45	56
35	88	2067	1937	1502	1258	390873	25162	20849	46011	2.01	4.99	8.50	37	57
36	88	2242	2171	1612	1349	479093	23990	26546	50536	1.96	4.87	9.48	37	51
37	65	2138	1760	1787	1529	507765	26705	30203	56908	1.93	4.90	8.92	37	54
38	175	3334	2674	1757	1594	512600	26938	27144	54082	2.00	5.38	9.48	34	51
39	39	1460	1516	1497	1168	501357	29234	26303	55537	1.66	3.84	9.03	48	54
40	116	1913	1966	1713	1414	473974	30117	23526	53643	1.96	4.81	8.84	34	55
41	133	2754	2229	1681	1547	475240	27658	26640	54298	1.90	5.20	8.75	35	56
42	136	3169	2558	2042	1833	539693	25177	38477	63654	1.97	5.25	8.48	35	57
43	115	2236	1957	2134	1906	623641	24089	46566	70655	1.87	4.95	8.88	37	55
44	57	2237	1990	2312	1974	712911	25235	49843	75078	1.89	4.81	9.50	38	51
45	77	2297	2140	2313	2012	698394	25106	47865	72971	1.95	5.04	9.57	36	51
46	85	2376	2192	2362	1967	744800	27189	51082	78271	1.86	4.60	9.52	40	51
Average (1) 1925-1946		2100	1867	1736	1469	516046	25606	31952	57558	1.85	4.65	9.00	40	54

* 50 year mean (1889-1939) of natural runoff. See tables 3, 5 and 7 for comparison of 40 and 50 year means.
(1) Some of the smaller plants were omitted in 1924, therefore 1924 not used to compute average.

TABLE 112

YUBA RIVER - SMARTVILLE TO MOUTH

STREAM FLOW - IRRIGATION DRAFT - ACREAGE IRRIGATED - GROSS DUTY OF WATER - 1926-1946

Year	Seasonal Runoff at Smartville in Per Cent of Normal *	Flow of Yuba River at Smartville c.f.s.		Irrigation Draft			Acreage Irrigated			Gross Duty of Water				
										Acre-Feet per Acre			Acres per Sec. Ft.	
		Average July	Average July-Sep. incl.	Average c.f.s. July	Av. cfs July-Sep. incl.	Acre-Feet Mar.-Oct. incl.	General	Rice	Total	July	July-Sep. incl.	Mar.-Oct. incl.	July-Sep. incl.	Mar. -Oct incl.
1925(1)	85	637	417	16	10	4045	1796	0	1796	0.55	1.01	2.25	180	217
1926	65	280	226	145	133	35908	3234	3279	6513	1.37	3.73	5.51	49	88
1927	142	868	495	160	125	39750	4003	1930	5933	1.66	3.84	6.71	47	73
1928	98	546	374	157	114	36800	4935	1875	6810	1.42	3.04	5.40	60	90
1929	41	340	252	152	139	53254	5180	2450	7630	1.23	3.33	6.99	55	69
1930	73	347	296	191	163	58521	4680	2875	7555	1.56	3.93	7.74	46	63
1931	26	152	146	146	134	63320	4823	2950	7773	1.16	3.14	8.14	58	60
1932	85	603	359	155	137	58201	4950	2615	7565	1.26	3.32	7.70	55	63
1933	43	420	293	178	162	63369	5935	2645	8580	1.27	3.46	7.38	53	66
1934	40	222	185	183	127	52651	6305	1667	7972	1.40	2.91	6.51	63	74
1935	90	602	383	184	153	48850	6535	1552	8887	1.40	3.46	6.05	53	80
1936	104	584	394	168	155	64058	5202	2665	7867	1.31	3.58	8.14	51	60
1937	75	541	360	159	156	59163	6699	2598	9297	1.05	3.06	6.37	60	76
1938	162	1410	748	162	152	43257	5772	1605	7377	1.35	3.75	5.88	49	83
1939	36	238	213	210	186	73113	6642	1898	8540	1.51	3.97	8.56	46	57
1940	115	390	342	247	207	69968	7220	1270	8490	1.79	4.45	8.24	41	59
1941	129	1565	787	221	206	73530	7472	1345	8817	1.54	4.27	8.34	43	58
1942	137	1386	792	243	235	74706	6661	1125	7786	1.92	5.50	9.59	33	51
1943	126	743	576	280	278	93799	6280	2310	8590	2.00	5.91	10.92	31	45
1944	56	626	420	273	250	93264	7009	2401	9410	1.78	4.85	9.91	38	49
1945	98	703	609	228	223	84228	8815	1085	9800	1.44	4.18	9.59	44	51
1946	96	746	604	278	259	98686	8872	1956	10828	1.58	4.38	9.11	42	53
Average (1) 1926-1946		634	421	196	176	63733	6058	2100	8192	1.48	3.91	7.75	48	65

* 50 year mean (1889-1939) of natural runoff.
(1) Records obtained for Lower Yuba River only and record not included in average.

TABLE 113

AMERICAN RIVER - FAIROAKS TO MOUTH

STREAM FLOW - IRRIGATION DRAFT - ACREAGE IRRIGATED - GROSS DUTY OF WATER 1925 - 1946

Year	Seasonal Runoff at Fairoaks in Per Cent of Normal *	Flow of American River at Fairoaks c.f.s. Average July	Flow of American River at Fairoaks c.f.s. Average July-Sep. Incl.	Irrigation Draft Average c.f.s. July	Irrigation Draft Aver. cfs July-Sep. Incl.	Irrigation Draft Acre-Feet Mar.-Oct. Incl.	Acreage Irrigated General	Acreage Irrigated Rice	Acreage Irrigated Total	Gross Duty of Water Acre-feet per Acre July	Gross Duty of Water Acre-feet per Acre July-Sep. Incl.	Gross Duty of Water Acre-feet per Acre Mar.-Oct. Incl.	Gross Duty of Water Acres per Sec. Ft. July-Sep. Incl.	Gross Duty of Water Acres per Sec. Ft. Mar.-Oct. Incl.
1925	94	1080	565	20	16	4353	3510		3510	0.35	0.82	1.24	219	392
1926	48	247	207	25	16	4606	3073		3073	0.50	0.94	1.50	192	324
1927	127	1240	653	29	21	5636	3343		3343	0.52	1.16	1.68	159	288
1928	88	414	286	21	17	5635	3071		3071	0.41	1.00	1.83	181	264
1929	40	482	262	25	20	6324	3077		3077	0.50	1.20	2.04	154	239
1930	57	414	276	21	15	4955	2639		2639	0.49	1.06	1.87	176	262
1931	25	136	98	20	15	5620	2694		2694	0.46	1.03	2.09	179	232
1932	90	1500	679	21	17	5481	3165		3165	0.42	0.96	1.73	187	281
1933	44	633	344	21	15	4651	2848		2848	0.46	0.94	1.62	190	300
1934	39	192	179	21	15	5505	2770		2770	0.46	0.98	1.99	185	245
1935	90	1009	504	21	15	4815	2808		2808	0.46	0.97	1.71	187	284
1936	118	1364	753	20	16	4727	2492		2492	0.49	1.16	1.90	156	256
1937	81	873	497	25	20	5381	3353		3353	0.45	1.07	1.61	168	302
1938	157	2101	1060	20	16	4287	2923		(1)2923	0.43	1.03	1.47	182	331
1939	36	165	127	28	19	6654	3064		(1)3064	0.55	1.11	2.17	161	224
1940	118	734	511	29	19	6052	3061		(1)3061	0.58	1.15	1.98	159	245
1941	109	1319	715	25	19	5309	3046		(1)3046	0.50	1.12	1.74	160	279
1942	136	2402	1115	23	18	4167	3132		(1)3132	0.44	1.08	1.33	174	364
1943	135	1273	628	25	19	4581	3112		(1)3112	0.49	1.12	1.47	164	346
1944	51	632	357	25	19	4819	3205		(1)3205	0.49	1.11	1.50	169	323
1945	88	949	512	16	15	3856	2935		(1)2935	0.35	0.91	1.31	201	371
1946	100	753	473	18	15	4124	2893	0	(1)2893	0.38	0.95	1.43	193	340
Average 1925-1946		905	492	23	17	5070	3010	0	3010	0.46	1.04	1.69	177	296

* 50 year mean (1889-1939) of natural runoff.
(1) An estimated 2200 acres have been added for Carmichael Irrigation District.

TABLE 114

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.
		Per Cent of Seasonal Diversion							
SACRAMENTO VALLEY									
Sacramento River - Redding to Sacramento	1924 to 1946	0.6	7.2	17.7	19.5	20.9	19.4	11.0	3.7
Feather River - Oroville to mouth	1924 to 1946	0.2	5.1	18.1	19.5	20.6	19.3	12.1	5.1
Yuba River - Smartville to mouth	1926 to 1946	0.1	7.2	15.4	18.4	18.9	17.9	13.5	8.6
American River - Fairoaks to mouth	1925 to 1946	0.5	3.9	8.8	20.4	27.5	21.3	12.8	4.8
DELTA UPLANDS									
Old San Joaquin River	1924 to 1946	2.5	9.2	17.1	17.8	20.4	17.2	11.2	4.6
Tom Paine Slough	1924 to 1946	1.5	7.8	15.3	17.3	18.8	18.4	14.2	6.7
San Joaquin River below Vernalis	1924 to 1946	2.7	12.5	16.1	13.8	23.3	18.8	9.1	3.7
SAN JOAQUIN VALLEY									
San Joaquin River - Fremont Ford Bridge to Vernalis	1931 to 1946	2.8	10.0	15.1	15.7	22.5	19.0	11.4	3.5
Merced River - Yosemite Valley Railroad Crossing to mouth	1931 to 1946	1.4	6.9	14.2	18.6	22.7	19.2	12.8	4.2
Tuolumne River - La Grange to mouth	1931 to 1946	2.1	8.0	16.1	17.4	20.3	19.1	12.0	5.0
Stanislaus River - Orange Blossom to mouth	1931 to 1946	1.1	8.4	14.1	18.7	20.7	19.0	12.3	5.7

TABLE 115

DIVERSIONS AND ACREAGES IRRIGATED - SACRAMENTO RIVER - 1946

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--													
City of Sacramento	0.8L	1-18" 3-20"	2140	2745	3289	3925	4552	4312	3563	2690	27216	Municipal	
--AMERICAN RIVER - MILE 1.1L--													
--BACK BORROW PIT RECLAMATION DISTRICT 1000 - MILE 1.3L--													
E. Fourness	1.45R	1-8"			13	8	11	2			34	6	
--RECLAMATION DISTRICT 1000 DRAIN - MILE 2.1L--													
Elmer F. Christophel	2.15L	1-8"	4	11	11	16	20	15	13		90	38	
H. M. Swalley	2.3L	1-5"		11	13	12	15	8	10	2	71	28	
D. D. Parr	3.15L	1-6"				15	29	3	12	1	60	26	
Rose Orchard	3.55R	(1)1-12" 1-16"		136	47	173	170	150			676	165	
W. E. M. Beardsley Estate	3.75R	1-5"				6	12	3			21	31	
M. C. C. Van Loben Sells	4.0R	1-10"				NO DIVERSION							
Reese and Greer	4.65R	1-7"			7	24	45		20		(2) 96	(2) 83	
A. M. Harbinson	5.05R	1-14"			50	28	82	2	5		167	112	
R. A. Westbrook	5.25R	1-8"			82	88	109	114	31		424	200	
A. R. Merkley	5.3R	1-6"			32	23	14				69	59	
Lucy Casselman	5.5R	1-6"			11	12	6				29	37	
A. A. Casselman	5.55R	1-6"			7	20	16				43	40	
K. L. Lovdal	5.7R	1-10"				NO DIVERSION							
J. E. Bandy	6.0R	1-6"				37	30	19	73	53	212	48	
(Natomas) Riverside Mutual Water Co.	6.1L	2-18"		337	1187	1485	1628	818	764	226	6445	1791	
O. A. and F. L. White	6.6R	1-6"				NO DIVERSION							
E. S. Fisk	7.0R	1-4"				NO DIVERSION							
Fred C. Jones	7.5L	1-8"		9	10	5	33	32	11	1	101	98	
M. R. Williamson	7.8L	1-10"				NO DIVERSION							
A. Marty	7.9R	1-8"			63	124	77	38			(3) 302	(3)400	
E. D. Willey	7.9L	1-10"		62		11	54	41			168	142	
M. Marty	8.3R	(4)1-8" 1-10"			94	183	202	117	26	3	625	(5)	
Blauth Estate	8.5R	1-7"			31	100	96				227	83	
H. Waldeck	8.7R	1-6"			58	34	67	26	3		188	43	
Mullin & Plato	8.95R	1-6"				NO DIVERSION							
Capital Company (Utterback)	9.35R	1-14"			152	55	36	75	35		353	165	
Nesbit, Driver & Fong Yen Co.	9.8L	1-14"		83	207	220	405	275	21		1211	(6)492	
Carl Casselman	9.9R	1-12"			117		167	64	136	12	496	100	
Lloyd M. Robbins	10.25L	1-14"			18	192	101	22	52	7	(2) 392	(2)548	
Ray Hughes	10.65L	1-12"				NO DIVERSION							
Fiddymint & John Sing, Jr.	10.75L	1-12"			37	62	50	80	55		284	80	
Joseph Mellor (7)	11.1R	1-10" (8)1-12"			38	67	85	46		10	246	130	
Federal Farm Mortgage Co.	11.6L	1-10"				13	77	36			126	38	
--ELKHORN FERRY - MILE 11.9--													
Conaway Ranch	12.0R	4-36"		4019	10953	12640	14030	12780	4088		(9)58510	(10)1460	(11)9844
Thomas O'Connor Estate	12.5R	1-12"			130	58	118	39	11		356	80	
Gertrude Brown	12.7R	1-6"			9	20	25	4			58	28	
Frank F. Newman	13.1R	1-12"			33	134	147	60			374	100	
J. Corey	13.2R					NO DIVERSION							
J. DeNigris	13.25R	1-8"			37	70	39	70	15		231	46	
Elkhorn Mutual Water Co.	14.1L	1-20" 1-24"		686	4445	3169	2192	2617	981		14090	(2) 2038	(2)228

(1) Temporary installation in 1946.
(2) Also served from wells.
(3) Combined acreage for this plant and one at Mile 8.3R. Also served from wells.
(4) 8" unit only operated in 1946.
(5) See plant at Mile 7.9R.
(6) Acreage estimated from previous year.
(7) Formerly listed as William A. Ten Eyck.
(8) Operated 12" unit only in 1946.
(9) Additional water received from Willow Creek
(10) An additionsl 960 acres irrigated with controlled drainage water.
(11) Includes 1480 acres of rice irrigated outside of district.

TABLE 115 (CONT'D)

DIVERSIONS AND ACREAGES IRRIGATED - SACRAMENTO RIVER - 1946

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"			27	105	32	62	7		233	160	
M. E. Dole	14.4R	1-6"				NO DIVERSION							
Capital Company	15.15R	1-10"				NO DIVERSION							
Central Mutual Water Company	16.0L	1-30" 2-38"		3879	4938	3941	4842	6100	3284	314	(1)(2)27298	1312	4238
Henry Rich (Hershey Plant)	16.27R	1-20"			19			23			42	18	
H. T. Silvius	16.4R	1-6"				NO DIVERSION							
Henry Rich	16.62R	1-14"			34			22			56	37	
Henry Rich	17.4R	1-16"			157			128			285	115	
California Western States Life Ins. Company	17.75R	1-16"		622	49	491	754	619	272		2807		(3) 600
Harms Brothers	18.0R	1-20"		926	1135	1330	870	1170	637		6068		(4)
H. C. Lauppe	18.2L	(5)2-10"		117	285	421	489	420	294		2026	155	120
M. & J. Scheiber	18.45L	1-12"			70	87	110	111	39	72	489	80	
G. H. Lyall	18.7L	1-8"			45	60	75	75	45		300	110	
Natomas Central Mutual Water Co. (Bennett Subd. Plant)	(6)(1.0S)	(7)1-10" 1-20"		1131	1038	1482	1911	1804	974		8340		(8)1697
Natomas Northern Mutual Water Co. (Central) (9)	(6)(2.0S)	2-24"		2531	4392	3387	3855	3910	1896		19971		(10)
Natomas Co. (Ben May) Plant	(6)(3.35N)	1-16"		447	850	626	773	705	409		3810		460
--VERONA GAGING STATION - MILE 19.6--													
SACRAMENTO TO VERONA													
Totals			2144	17752	34220	34959	38451	37017	17782	3391	185716	10722	17187
Average cubic feet per second			35	298	555	586	623	600	298	54	382		
Monthly use in per cent of seasonal			1.2	9.6	18.4	18.8	20.7	19.9	9.6	1.8			
--FEATHER RIVER - MILE 20.9L--													
--SACRAMENTO SLOUGH - MILE 21.2L--													
West Coast Life Ins. Co.	21.7R	1-15"			250	487	8	145	14		904	160	
Henry Rich (Keller Plant)	22.5R	1-22"		819	851	1412	1373	1650	811		6916		760
A. F. Johnston	26.8L	(11)2-14"			525	637	1141	1082	580		3965		380
Anthony Furlan	28.2L	1-4"				NO DIVERSION							
Gustaf Inglin	28.2R	1-6"	3	6	20	19	23	19	15		105	32	
Russell Bros.	29.2R	1-12"			43	43	60	59	19	30	254	84	
M. R. Richardson (Mrs.)	29.7R	1-8"		30	75	10		30	8		153	65	
Kate Russel and P.L.Traganza	29.75R	1-8"				NO DIVERSION							
Sebastine Yturralde	29.9L	1-12"				31					(12) 31	(12)60	
Leo Giovanetti	30.2L	1-5"				31	8				39	17	
M. R. Richardson (Mrs.)	30.6R	1-12"				NO DIVERSION							
Floyd Anderson	30.7R	1-6"				NO DIVERSION							
Alice E. West	30.9L	1-8"				NO DIVERSION							
A. C. Huston	31.5R	1-12"				NO DIVERSION							
Mary Anna Richardson	(13)31.75R	(14)1-10"			326	301	296	305	299		1527	22	160
M. Alonso (15)	31.8L	1-6"				3	6				9	20	
Sutter Mutual Water Co. (Portuguese Bend)	32.0L	2-24"		1632	4666	4546	4611	4346	2905	152	22858	1001	1085
Collier Bros.	32.5R	1-10"		4	6	47	21	28	5	5	116	93	
Walter H. Ziegler	33.2L	2-10"			102	307	280	365	176		1230	250	100
J. G. Knox	33.35L	1-8"				NO DIVERSION							
Sidney Epperson	33.5R	1-12"				95	69	37	6		207	(16)120	
Leiser Bros.	33.75L	(17)1-12" 1-14"		45	77	82	55				259	100	
Sidney Epperson	33.8R	1-3"				NO DIVERSION							
Sidney Epperson	33.85R	1-6"			28	44	22	3	10		107	(18)	
VERONA TO KNIGHTS LANDING													
Totals			3	2536	6969	8095	7973	8069	4848	187	38680	2024	2485
Average cubic feet per second			0	43	113	136	130	131	81	3	80		
Monthly use in per cent of seasonal			--	6.5	18.0	20.9	20.7	20.9	12.5	0.5			

(1) Also irrigated from wells.
(2) An additional 2592 acre-feet was received from controlled drain water.
(3) Combined acreage this plant and one at Mile 18.0R.
(4) See plant at Mile 17.75R.
(5) Replaces 6", 7" and 14" units.
(6) Cross Canal--the main drain between R.D. 1000 and 1001, joins the Sacramento River at Mile 19.6L. Distance of plant from Sacramento River and bank is shown in ().
(7) Listed in 1945 Report as 12" unit.
(8) Combined acreage this plant and one at Mile 19.6L (2.0S).
(9) Formerly listed as Natomas Central Mutual Water Co.
(10) See plant at Mile 19.6L (1.0S).
(11) Replaces 5" unit previously listed at this location.
(12) Water used to condition earth prior to leveling.
(13) Mileage correction. Formerly listed as Mile 32.0R.
(14) Replaces 12" unit previously listed at this location.
(15) Formerly listed as "Alonzo."
(16) Combined acreage, this plant and one at Mile 33.85R.
(17) 12" unit removed in 1946.
(18) See plant at Mile 33.5R.

DIVERSIONS AND ACREAGES IRRIGATED - SACRAMENTO RIVER - 1946

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
--COLUSA BASIN DRAINAGE - MILE 34.15--													
Earl Wallace	34.2R	1-10" 2-16"			PLANT REMOVED								
Commercial Investment Co.	34.85L	1-12"				122		35			157	120	
Walter Raymond	35.2L	1-7" (1)1-12"				130	84				214	163	
Susie M. Donnely	35.8L	1-10"			14	108	39				161	65	
J. Goffitzer	35.85L	1-6"			46	34	24	25	11	4	144	18	
Kilgore and Rossi (2)	36.2L	1-14"			475	551	377	595	113		2111	207	180
R. H. Bailey	36.45L	1-8"				31		46			77	49	
Amedio Moroni	36.7L	1-5"			NO DIVERSION								
Robert Bottimore	37.2L	1-14"			NO DIVERSION								
Maybelle J. Bundock	37.75L	1-8"			58	17	32	15			122	65	
Addie Reel	38.4L	1-10"				87		55			142	95	
C. L. Reel	38.8L	1-10"			NO DIVERSION								
F. O. Eastman	39.4L	1-12"				31		25			56	80	
Commercial Investment Co. (C. L. Reel)	39.8L	1-10"					69	45			114	90	
William Duffy, Jr.	39.9L	1-6"			NO DIVERSION								
Sutter Mutual Water Co. (State Ranch Bend)	40.6L	2-24" 1-36"		3116	4931	4326	5010	5082	2331	77	24873	2572	2038
Buell Ranch (M.K. Dean)	41.8L	1-4"			PLANT REMOVED								
El Dorado Ranch	42.0R	1-14" 1-16"		290	151	201	170	443			1255	(3)956	25
Buell Ranch (M.K. Dean)	42.2L	1-6"			PLANT REMOVED								
Matteoli and Fracchia	42.3L	1-8"				31	24	3			58	50	
El Dorado Ranch	43.1R	1-18"			NO DIVERSION								
Reclamation District #2047	43.1R	2-50"		8120	10978	9898	11878	10055	2612		53541	(4)(5)1375	(6)6550
Kramer Ranch (7)	43.1L	1-12"			7	113	134	113	6		373	88	
--RECLAMATION DISTRICT #108 DRAINAGE PLANT - MILE 44.0R--													
John Clauss	44.2L	1-18"			129	80	121	35			365	(8) 450	
John Clauss (Fuchlin)	45.6L	1-14"			182	5	364	89	50		690	(9)	
P. J. Hiatt	48.7L	2-20"		990	1997	1910	2221	1661	994		9773	500	375
G. J. Hiatt	49.7L	1-14"			NO DIVERSION								
R. D. 108 (Tyndall Mound)	51.1R	2-24" 1-36"		3876	6275	5464	4927	4576	2796		(10)27914	(10)978	2391
Holmes and Westover Co.	51.2L	(11)2-16"		546	1047	1104	1081	1090	403		5271	250	175
B. M. Chaplin	52.0L	1-16"				60		36			96	100	
River Farms Co.	52.35R	1-12"			91	74	7	157	166		495	252	
George Van Ruiten	52.9L	1-10"			121	92	109	21			343	(12)450	
George Van Ruiten	53.9L	1-12"				67	151	12			230	(13)	
Broomieside Farm	55.1L	1-20"			48	49	95	44			236	130	
R.D. #108 (Boyer Bend Pl.)	56.4R	1-18" 1-30"		412	2897	2117	2436	2429	744		11035	44	770
C. M. Miller	56.42R	1-6"				45	22	27			94	41	
C. M. Miller (Asa Morris)	56.65R	1-12"			NO DIVERSION								
Broomieside Farm (Spencer C. Crawford)	56.95L	1-20"		750	1475	1420	1523	1313	1328	91	7900	(14)625	(15)1000
L. M. Miller	57.0R	1-10"			NO DIVERSION								
Lamb Bros.	57.5L	1-16"			NO DIVERSION								
James A.Nielsen and W. H. Saylor	58.2L	1-15			98	100	75	40			313	165	
Alex Grant	58.9L	1-16"			16	81	42	13			152	80	
I. G. Zumwalt	59.1R	1-12"				180	139	143			462	300	
Lamb Brothers	59.8L	(16)1- 8" 1-12" 1-14"		301	1046	836	852	807	137		3979	320	(17)
Reclamation Dist. #108	59.85R	1-16"			NO DIVERSION								

(1) No operation of 12" pump in 1946
(2) Formerly listed as F. L. Burrell.
(3) 180 acres of this acreage received some water from controlled drainage.
(4) All River Farms lands.
(5) Also received some water from controlled drainage.
(6) 4854 acres of rice on R.D. #108 lands--1696 acres of rice on River Farms lands.
(7) Listed in 1945 Report as C. L. Reel.
(8) Combine acreage of this plant and one at Mile 45.6L.
(9) See plant at Mile 44.2L.
(10) Received some water from controlled drainage.
(11) Only 1-16" unit operated in 1946.
(12) Combine acreage for this plant and one at Mile 53.9L.
(13) See plant at Mile 52.9L.
(14) Includes 500 acres on R.D. 1500 lands.
(15) This is all Sutter Basin District Lands. Also served from plant at Mile 59.8L.
(16) No operation of 8" unit during 1946.
(17) Also served plant at Mile 56.95L.

TABLE 115 (CONT'D)

DIVERSIONS AND ACREAGES IRRIGATED - SACRAMENTO RIVER - 1946

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
F. L. Burrell	60.4L	1-10"		97	467	477	530	483	260		2314		250
A. Earl Lane	60.5L	1-12"		190	378	368	399	375	226	3	1939	100	85
Robert Lane	61.35L	1-12"		119	336	331	357	332	264		1739	10	156
I. G. Zumwalt	61.5R	1-12"			46	27	15	42			130	60	
Samuel Hines	62.3R	1-10"			5	9	12	8	1		35	9	
Blanche Coulter Brown	62.3L	1-8"				NO DIVERSION							
Jake Locovitch	62.6R	1-8"			22	15	14				51	30	
R. L. Young	62.8L	1-8"			19	30	11	50	9	4	123	36	
KNIGHTS LANDING TO WILKINS SLOUGH Totals			0	18807	33355	30621	33344	30320	12451	179	159077	10923	13995
Average cubic feet per second			0	316	542	515	542	493	209	3	327		
Monthly use in per cent of seasonal			0	11.8	21.1	19.3	20.9	19.0	7.8	1			
--WILKINS SLOUGH GAGING STATION - MILE 62.9--													
R. D. 108 (Wilkins Slough)	63.2R	5-42"		15240	26404	24278	28147	25201	2648		121918	140	11639
B. W. Meister	63.65L	1-8"			35	41	25	6	30	61	198	50	
Sutter Mutual Water Co.	63.75L	6-42" 2-48"		21042	40515	35049	38364	37451	20212	31	192664	14367	13682
Edward Seamans	63.9L	2-14"		35	733	706	845	974	820		4113	250	350
Ornbaum, Nobles Land and Livestock Co.	64.3R	1-12"			3	10	12	15	6		46	10	
Tisdale Irr. & Drainage Co.	64.4L	1-12"		228	519	518	549	511	21		2346	480	
Van Horn Ranch	64.9R	1-14"					320	320			640	140	
Juan Valasyvez (1)	65.1R	(2)1-4"			10	26	21	10	2		69	33	
Capital Company	65.7L	1-8"			158	164	131	135			588	132	
M. P. Schohr	65.8R	1-16"				NO DIVERSION							
J. L. Browning	66.4R	1-18"				NO DIVERSION							
Tisdale Irr. & Dr. Co.	67.1L	1-12" 1-20"		949	1410	1960	1117	1413	718	66	7633	(3)835	485
Desmond A. Winship	67.2L	1-10"				NO DIVERSION						(4)	
Newhall Land & Farming Co.	67.5L	2-24"		2203	3402	2616	2784	2716	801		14522	(5)2761	(6)591
J. L. Browning	69.0R	1-24"			290	407	238	149			1084	210	
Faxon and Morton and P. Andreotti	69.2R	1-18"			284	344	391	129	74		1222	220	
--EDDY'S FERRY (GRIMES) MILE 69.45--													
Wilber Jensen and Mary Cecil, et al.	70.35R	1-24"				PLANT REMOVED							
H. F. Daly	70.4L	1-10"			24	111	47	38	8		228	(7) 52	
Hoffman, Beckley, Ritchie, Poundstone and Denny	70.4R	1-6" 1-20" 1-24"				NO DIVERSION							
Meridian Farms Water Co. #4	71.1L	1-24"		223	923	893	1109	923			4071	(8)6690	(8) 2406
A. B. Armstrong	71.9R	1-12"			38	106	113	21	17		295	140	
Antone Steidlmayer	71.9R	1-12"				NO DIVERSION							
H. & A. Andreotti	72.3L	1-7"			73	111	91	69			344	60	
E. B. Vann (Froh)	73.6R	1-10"				NO DIVERSION							
Meridian Farms Water Co.#3	74.8L	1-18"		720	877	810	1001	938	271	50	4667	(9)	(9)
L. B. Westfall	75.3R	1-10"			27	28	8	30	5	4	102	23	
J. H. Yates	76.1L	1-10"			76	154	67	47			344	(10)85	
Joseph Miller (Sanborn)	76.2L	1-8"			90		26	15			131	40	
Steidlmayer Bros.	76.5R	1-16"				NO DIVERSION							
E. V. Jacobs	77.9L	1-12"	7		174	258					439	220	
Sebia Davis Estate	78.2R	1-16"			256	83		83			422	180	
Sebia Davis Estate	78.8R	1-14" 1-24"		1753	1438	1753	2117	2012	963		(11)10036	600	1450
C. E. Reische	79.0L	1-10"		44	86	104	58	58			350	191	
Steidlmayer Bros.	79.0R	1-12"			120	102	44	62	5		333	105	

(1) Formerly listed as Robert S. Unsueta.
(2) Replaces 8" unit previously listed at this location.
(3) Includes 140 acres on Winship property.
(4) 140 acres irrigated by plant at Mile 67.1L.
(5) Includes 221 acres on Meridian Farms Water Company lands.
(6) All on Meridian Farms Water Company lands.
(7) Includes 37 acres on Rolinder lands
(8) Additional water received from controlled drainage. Combined acreage this plant and those at Mile 74.8L and 80.0L. Additional lands irrigated from Mile 67.5 as follows: 573 acres and 301 acres of beans.
(9) See plant at Mile 71.1L.
(10) Includes 20 acres on Coffman lands.
(11) Also served acreage on A. Davis Estate, Back Borrow Pit, Mile 33.0R.

DIVERSIONS AND ACREAGES IRRIGATED - SACRAMENTO RIVER - 1946

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
Henry Schmidt	79.3R	1-10"			125	44	70	11			250	85	
E. V. Jacobs	79.5L	1-8"			16	20					36	40	
Steve M. Burtis & G. Wood	79.7L	1-10"			66		49	9			124	94	
--MERIDIAN BRIDGE - MILE 79.85--													
Meridian Farms Water Co. No. 1 and No. 2	80.0L	1-20" 1-24"	85	3234	4039	4004	4187	4205	1425		21179	(1)	(1)
Roger C. Wilbur	80.3R	1-8"		74	44	35	37		4	17	211	55	
B. P. Lilienthal, Trustee	81.5L	1-16"	55	726	764	725	748	619	175		3812	32	225
Steidlmayer Bros.	81.9R	1-20"		615	446	4	239	140	125	45	1614	720	
F. T. Reische & L. F. Wood	82.5L	1-12"			8	8	3	15	19		53	70	
J. L. Pinkard	83.05L	1-7"			PLANT REMOVED								
J. E. Clark	83.3L	1-14"			NO DIVERSION								
J. E. Clark	83.5L	1-8"			1	8	2	4			15	23	
--BUTTE SLOUGH OUTFALL GATES - MILE 84.0L--													
Steidlmayer Bros. (2)	85.6R	1-12"			194	33	62				289	110	
Clifford Reichel	85.8L	1-8"			35	23	30				88	28	
W. H. Halsey	86.1R	1-12"		49	260	95	186	64		19	673	175	
Lydell Peck	86.1L	1-8"	159		77	91	16		60	49	452	100	
Lydell Peck	86.6L	1-18"			NO DIVERSION								
Lloyd Scoggins	86.8L	1-8"			42	34					76	45	
Roger Wilbur (3)	86.9R	1-10"	24	70	103	94	143	75	89	95	693	205	
Roger Wilbur (3)	87.4R	1-10"	17	72	12	55	40	61	34	19	310	50	
Jacobsen and O'Rourke	87.6L	1-10"			32		22	1			55	40	
Swinford Tract Irrig. Co.	87.7R	1-12"	8	81	114	104	92			65	464	136	
Edward K. Lange	88.0R	1-6"			12	12	12				36	18	
Nagel and Locovitch	88.2L	1-10"			18	35	35				88	20	
W.D. DeJarnett and Mayfair Packing Company	88.7L	1-14"		138	150	216	224	55	34	88	905	174	
Colusa Irrigation Co.	89.2R	1-20"		109	358	338	417	126	86	41	1475	452	
Phil B. Arnold	89.25L	1-8"				88	81				169	75	
G. A. Berkey	89.26L	1-12"	2			148					150	100	
WILKINS SLOUGH TO COLUSA													
Totals			357	47605	84881	76846	84320	78711	28652	650	402022	30861	30828
Average cubic feet per second			6	800	1380	1291	1371	1280	482	11	827		
Monthly use in per cent of seasonal			0.1	11.7	21.1	19.1	21.2	19.7	7.0	0.1			
--COLUSA BRIDGE AND GAGING STATION 89.4--													
Lillian and Hattie Boggs	89.7L	1-6"			PLANT REMOVED								
Roberts Ditch Co.	90.7R	(4)2-20"		244	511	572	666	427	372	138	2930	1238	
Paul R. Westfall	91.1L	1-8"				16		17			33	30	
I. G. Zumwalt	91.6R	1-12"			77		80		3	72	232	150	
George P. Ahlf	92.5L	1-8"			33	15					48	30	
Paul R. Westfall	93.0L	1-8"			NO DIVERSION								
Brown Ranch	93.0R	1-12"				21	21				42	25	
Paul R. Westfall	93.4L	1-10"				30	51	101			182	87	
Tuttle Land Co.	94.3R	(5)1-15" 1-20"		8	233	81	216	66	118	42	764	(6)180	
W. D. DeJarnett Estate	94.6R	1-8"			PLANT REMOVED								
I. G. Zumwalt	94.8R	1-12"			NO DIVERSION								
Roger Wilbur (2)	95.25L	1-8" 1-12" 1-18"		164	686	717	552	690	330	42	3181		280
George W. Lewis	95.6L	(7)1-16" 1-20"		166	709	291	728	664	89		2647		200
Bridget Graham Ranch (8)	95.8L	1-16"			722	735	750	652	261		3120	15	(9)350
I. G. Zumwalt	96.8R	1-15"			150	197	105			184	636	374	
H. Heitman	97.7R	1-12"		18	39	59	46	13	21	15	211	77	
Frank N. Beckley	98.0L	1-10"			109	29	56	2	103		299	(10)77	(11)
J. L. Erisey	98.3R	1-10"			60	45				34	139	51	
Otterson and Boggs	98.3L	1-15"			NO DIVERSION								
D. Boggs	98.8L	1-18"			87	13	49	32			181	55	

(1) See plant at Mile 71.1L
(2) New installation in 1946.
(3) Formerly listed as Capital Company
(4) Operated only one unit in 1946.
(5) No operation of 15" unit in 1946.
(6) Includes 52 acres on Mayfair Brown lands.
(7) 16" Unit removed in 1946.
(8) Formerly listed as Bridget Graham Estate.
(9) Also received water from plant at Mile 98.0L.
(10) Includes 27 acres on Bertram lands.
(11) Furnished some water to 350 acres of rice at Plant at Mile 95.8L.

TABLE 115 (CONT'D)

DIVERSIONS AND ACREAGES IRRIGATED - SACRAMENTO RIVER 1946

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
B. H. Mitchell Estate	99.0R	1-14"				NO DIVERSION							
J. P. Boggs	99.1L	1-10"			21	453	339	361	137		(1) 1311	52	
Terrill and Sartain	99.2L	1-20"		180	687	47	65				(3) 979	(2) 225	(3) 90
L. W. Seavers	99.3R	1-10" 1-14"			337	318	129	37	1	71	893	(4) 262	
Helen Forry	99.8L	1-16"			17	8	26				51	32	
St. Patricks Home Ranch	101.1R	1-20"		43	46	100	99				288	140	
Nettie, George and Ella Packer	102.8R	(5) 1-20"			336		22	300			658	414	
Charles W. Welch	103.7R	1-16"		676	769	776	768	731	39	90	3849	60	320
C. W. Tuttle	103.9R	1-16" (6) 1-20"		510	554	791	808	891	213		3767	140	220
I. G. Zumwalt	104.8L	1-12"				160	80	80			320	160	
Thousand Acre Ranch (H. W. Keller)	106.0R	1-14"		7	165	65	101	50			388	175	
Howell Davis	106.5R	1-16"				139	93	52			284	110	
Capital Company	110.0R	1-12"		62	15	60	57				194	130	
Capital Company	111.2R	1-6"			15		15				30	27	
--PRINCETON FERRY - MILE 112.0--													
Reclamation Dist. 1004	112.1L	2-30" 1-50"		8402	4842	11401	10106	7794	4465		(7) 37010	3562	4985
Princeton-Codora-Glenn I.D.	112.4R	3-24"		2290	4828	4271	4760	5371	2306		(8) 23826	(9)	(9)
I. G. Zumwalt	112.6L	1-10"			58	87	180			84	409	213	
Edward L. Steele Estate	115.5L	1-12"	19		17		15				51	28	
COLUSA TO BUTTE CITY Totals			19	12770	16123	21497	20983	18331	8458	772	98953	8719	8445
Average cubic feet per second			1	215	262	359	340	297	142	13	203		
Monthly use in per cent of seasonal			0.1	12.9	16.3	21.7	21.2	18.5	8.5	0.8			
--BUTTE CITY GAGING STATION - MILE 115.8--													
R. H. Gebicke	115.85L	1-14"		19	8	74	52	31	49		233	215	
Butte City Ranch	116.7R	1-10"			7	13	36	10			66		
R. H. Gebicke	116.9L	1-12"				NO DIVERSION							
Miller and Wright	117.0R	1-8"				NO DIVERSION							
Robert T. Miller (10)	122.3R	1-10"				15	15	10			40	25	
C. T. White (C. Reed)	123.7R	1-6"				NO DIVERSION							
Howard Leach	123.8R	1-3" (11) 1-5"					1				1	2	
Princeton-Codora-Glenn I.D.	123.9R	3-24"		1888	791	53	98				2830	(8)(9)	(9)
Provident Irrigation Dist.	124.2R	(12) 1-36" 4-42"		2325	6841	2404	8505	5909			25984	(8)(9)	(9)
F. S. Reager	130.75R	1-6"				NO DIVERSION							
--ORD FERRY - MILE 130.8--													
M. & T. Inc., and Parrott Investment Company	141.5L	5-24"		603	1081	1558	4108	4041	2325		13716	(7)(13) 2806	(7)(13) 2220
--OLD CHICO LANDING RAILROAD BRIDGE SITE - MILE 142.1--													
Alameda Putney	143.8L	1-6"				NO DIVERSION							
Edward Fiero	146.9L	1-6"				NO DIVERSION							
C. C. Dunning	148.9R	1-10"				NO DIVERSION							
--GIANELLA BRIDGE - MILE 149.5--													
Capital Company	150.0L	1-10"				NO DIVERSION							
V. G. Strain	150.8R	1-12" 1-16"	62	73	207	300	394	239	148	11	1434	610	
A. Holecek	152.2R	1-6"			20	24	22	29	16	12	123	60	
Maas Bros.	154.6R	(14) 1-4" 1-5"			4	6	6	7	10	3	36	20	
Glenn-Colusa Irr. Dist.	(15) 154.8R	2-30" 1-42" 2-50" 2-66" 4-72" 1-100"	5216	58425	92388	98101	90379	94828	64207	41611	(16)(17) /545155	21749	(18) 35960

(1) Furnished some water to 90 acres of rice for plant at 99.2L.
(2) Includes 200 acres of irrigated barley.
(3) Also received water from plant at Mile 99.1L.
(4) Includes 75 acres on B. H. Mitchell lands and 20 acres on Middlecamp lands.
(5) Replaces 18", 30" and 36" pumps previously listed at this location.
(6) No operation of 20" unit in 1946.
(7) Also received water from Butte Creek
(8) Supplementary water to plant at Mile 154.8R
(9) See plant at Mile 154.8R
(10) Formerly listed as Fred Miller
(11) 5" pump removed in 1946
(12) No operation of 36" unit in 1946.
(13) Parrott Investment Co. acreage: Rice 1452, alfalfa 75, clover 732, Sudan 104 and old pasture 500. M. & T. Inc. (Phelan Ranch) acreage: Rice 768, pasture 1105 and clover 290.
(14) 4" unit installed in 1946.
(15) This is a common point of diversion for Glenn-Colusa, Compton-Delevan, Provident, Princeton-Codora-Glenn and Maxwell Irrigation Districts.
(16) An additional 19,285 acre-feet pumped in November. Stony Creek supplied by gravity 7617 acre-feet in March and 14,678 acre-feet in April included in this figure.
(17) Includes gravity from Sacramento River as follows: 2039 acre-feet in March and 7736 acre-feet in April.
(18) Includes 1489 acres of rice outside of District.

TABLE 115 (CONT'D)

DIVERSIONS AND ACREAGES IRRIGATED - SACRAMENTO RIVER - 1946

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
Jacinto Irrigation District	(1)154.8R	(2)		2033	5544	5226	4423	2360	3828	1488	24902	8096	
Compton-Delevan Irr. Dist.	(1)154.8R	(2)		1299	4126	3808	3570	3570	2003		18376		2800
Provident Irr. Dist.	(1)154.8R	(2)		4687	9842	6863	9007	8146	4266		42811	(3)2867	(3)8207
Princeton-Codora-Glenn I.D.	(1)154.8R	(2)		3882	8757	9560	7515	7519	6048	3584	46865	(4)2204	(4)3458
Maxwell Irrigation District	(1)154.8R	(2)		595	1517	1636	1230	1230	496		6704	(5) 160	550
Jonathan Garst	161.7L	1-12"			32	30	68	55	30		(6) 215	40	
--CORNING-VINA BRIDGE - MILE 166.5--													
E. L. Dietz	166.7R	1-3"			2	5	4	5	6	6	28	8	
Guy Whitnack	166.8R	1-2"			1	1	3	2	2	1	10	4	
E. B. Noble	184.5R	1-14"	NO DIVERSION										
Coneland Water Company	187.6L	1-12"	NO DIVERSION										
Henry Tieden (7)	188.6L	1-8"	NO DIVERSION										
--RED BLUFF BRIDGE - MILE 193.45--													
G. E. Sutton	196.2R	1-3"	NO DIVERSION										
J. Keithdriber	196.5L	1-2½"					2	2	1		5	1	
S. and E. Erickson	196.6L	1-5"		5	7	22	23	7	9		73	32	
A. M. Alemeida	197.0L	1-5"	NO DIVERSION										
BUTTE CITY TO RED BLUFF Totals			5278	75834	131175	129699	129460	128000	83444	46716	729606	38934	53195
Average cubic feet per second			86	1275	2130	2180	2170	2140	1400	759	1501		
Monthly use in per cent of seasonal			0.7	10.4	18.0	17.8	17.7	17.6	11.4	6.4			
--RED BLUFF GAGING STATION (IRON CANYON) - MILE 198.6--													
C. C. Budd	206.75L	1-10"	NO DIVERSION										
--BEND FERRY BRIDGE - MILE 207.0--													
Emil E. Johnson	209.0L	1-2½"	NO DIVERSION										
J. F. Nunez	213.0R	1-7"	NO DIVERSION										
F. L. Jelly	213.5L	1-3"	NO DIVERSION										
J. F. Nunez	216.0R	1-3"			4	6	7	9	5	3	34	6	
W. A. Hunaeus	216.4L	1-3"					4	2	1		7	4	
Haakonson Brothers	217.5L	1-3½"			33	38	26	1			98	55	
J. L. Haskins	218.0L	1-5"			23	54	45				122	50	
Rio Alto Ranch	221.0R	1-10"		46	125	214	242	181	105	79	992	550	
--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"		145	48	128	212	201	117	38	889	182	
Anderson-Cottonwood I.D.	240.5L	3-16" (9) 1-24"	67	769	2559	2570	2807	2984	3227	1229	(10)16212	(11)14500	
Jack Graf	241.5L	1-8"	NO DIVERSION										
--REDDING-ALTURAS FREE BRIDGE - MILE 242.0--													
--REDDING-YREKA BRIDGE - MILE 245.9--													
Anderson-Cottonwood I.D.	246.0R	Gravity		10913	24175	23520	22625	22657	20249	18224	143363	(12)	
--SOUTHERN PACIFIC RAILROAD CROSSING - MILE 246.25--													
Isabell and Maybell Diestelhorst	246.3R	(13)1-18"			11	36	45	54	23		169	26	
--OLD REDDING-YREKA BRIDGE - MILE 246.4--													
City of Redding	246.7R	2-6"	100	90	290	225	408	419	309	198	2039	Municipal	
RED BLUFF TO REDDING Totals			167	11963	27268	26791	27421	26508	24036	19771	163925	15373	0
Average cubic feet per second			3	201	443	450	446	431	404	322	337		
Monthly use in per cent of seasonal			0.1	7.2	16.7	16.3	16.7	16.3	14.6	12.1			
Totals			7968	187267	333991	328508	341952	326956	179671	71666	1777979	117556	124135
Average cubic feet per second			1538	3147	5432	5518	5560	5316	3020	1166	3658		
Monthly use in per cent of seasonal			0.5	10.5	18.8	18.5	19.2	18.4	10.1	4.0			

(1) This is common point of diversion for Glenn-Colusa, Jacinto, Compton-Delevan, Provident, Princeton-Codora-Glenn and Maxwell Irrigation Districts.
(2) Diversion through Glenn-Colusa Irrigation District plant at Mile 154.8R.
(3) Combined acreage for this plant and one at Mile 124.2R, Sacramento River, and plants on Colusa Trough, Miles 20.5R, 24.2R and 27.2R.
(4) Combined acreage for this plant and ones at Miles 112.4R and 123.9R.
(5) All duck club lands.
(6) No deduction made for spill back to River.
(7) Formerly listed as L. C. Brooks
(8) Paynes Creek was only source in 1946.
(9) The 24" unit has been dismantled.
(10) Supplemental water to plant at Mile 246.0R.
(11) Combined acreage this plant and one at Mile 246.0R.
(12) See plant at Mile 240.5L.
(13) Formerly listed as 10" pump.

TABLE 116
DIVERSIONS AND ACREAGES IRRIGATED - COLUSA TROUGH - 1946

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 TROUGH GAGING STATION - MILE 0--													
I. G. Zumwalt	2.2L	1-12" 1-15" 1-20"		235	770	1120	1460	1503	1243	1180	7511	620	(1)500
I. G. Zumwalt	2.3L	1-12"			284	85	145	34	110	47	705	(2)	(2)
J. H. Cave (3)	2.7R	2-12"					100	464	432	170	1166	(4)400	
Capital Gun Club (Frank Ford)(3)	2.7R	1-12" (5)1-14"			100	246	342	320	306	293	1607	(4)400	
Colusa Outing Club (3)	2.7R	1-16"			253	400	467	420	321		1861	(4)640	
F. Buffum and L. W. Seever	3.0L	2-16"		65	740	583	559	565	439	101	3052	(6) 70	(6)430
Wierdsma Bros.	4.5L	1-12"				NO DIVERSION							
Lloyd W. Seavers (7)	4.5L	1-16"			545	630	665	737	200		2777	(8)	(8)
Frank J. Byington (7)	4.5L	2-16"			1101	1268	1250	1380	510		5509		500
Maxwell Irr. Dist (Plant 2A)	7.0R	1-15" 1-26"				NO DIVERSION							
Maxwell Irr. Dist.(Pl.3A) (9) Opp.	7.0R	1-15"						43	264	466	(10) 773	(4)300	
Charles Welch (11) (9) Opp.	7.25R	1-16"			450	576	697	630	135		2488	200	600
S. Ash	7.65R	1-10"				NO DIVERSION							
S. Ash	8.0L	1-20"		132	649	610	516	569	150		2626		175
Charles Welch	8.0R	1-15"		76	350	342	533	538	200		2039		180
El Dorado Sportsmans Club	9.5R	1-15"							400	400	(12) 800	(4)400	
I. G. Zumwalt (11)	9.75L	1-24"			935	592	1083	905	70		3585		427
Doc. Ellis and Knowles, Wallace R. Lynn (13)	10.5L	1-20"				NO DIVERSION							
E. Butler, Ed. Meyer and J. Jones	12.7L	1-14"			111	163	270	301	146		991		100
Provident Irr. Dist. (14) (Delevan Pump)	Opp.13.5R	1-20"				NO DIVERSION							
Walter McGowan (15)	Opp.20.5R	1-10" 1-12"		230	600	653	660	608	330	25	3106		420
--LATERAL HIGHWAY - BUTTE CITY TO WEST SIDE - MILE 20.5--													
Provident Irr. Dist. (15) (Willow Creek Plant)	Opp.20.5R	1-24" 1-36"		328	320	1779	2360	2398	484		7669	(16)	
Henry Jameson Estate	22.0R	1-18"		438	620	763	820	849	203		3693		362
Provident Irr. Dist. (17) (Drain 55)	Opp.24.2R	Gravity		391	1471	4770	2945	2945	2375	30	14927	(16)	
Provident Irr. Dist. (18) (Drain 13)	Opp.27.2R	1-24"		140	872	783	885	920	734		4334	(16)	
Totals			0	2035	10171	15363	15757	16129	9052	2712	71219	3030	3694
Average cubic feet per second			0	34.2	165.4	258.2	256.2	262.3	152.1	44.1	147		
Monthly use in per cent of seasonal			0	2.9	14.3	21.6	22.1	22.6	12.7	3.8			

* Main Drain of Reclamation District.
** Mileage along Colusa Trough above Colusa-Williams Highway.
(1) Combined acreage this plant and one at Mile 2.3L.
(2) See plant at Mile 2.2L.
(3) Located on Drain opposite Mile 2.7R.
(4) All gun club lands.
(5) Formerly listed as 12" unit.
(6) Combine acreage this plant and L. W. Seavers, Mile 4.5L.
(7) This is part of plant previously listed as Byington and Seavers at this mile.
(8) See Buffum and Seavers, Mile 3.0L.
(9) Plant is on Lateral E (Stone Corral Creek) and is 3/4 mile west of Plant 2A (Mile 7.0R).
(10) Some additional water diverted in November and December for duck clubs.
(11) New installation in 1946.
(12) Additional water diverted for duck clubs.
(13) Formerly listed as M. A. Rourke Estate.
(14) Plant is on Hunter Creek at SW corner Section 36, T. 18 N., R. 3 W.
(15) Plant is on Willow Creek at SW corner Section 33, T. 19 N., R. 2 W.
(16) See Provident Irrigation District plant on Sacramento River - Mile 154.8R.
(17) Works on Drain #55 and are in SW¼ NW¼ Section 86, Glenn Ranch Survey.
(18) Works on Drain #13 and are in SW¼ SW¼ Section 51, Glenn Ranch Survey.

TABLE 117

DIVERSIONS AND ACREAGES IRRIGATED - BACK BORROW PIT*- 1946

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	0.03L	1-10" 1-16"		558	600	1229	1390	924	576	485	5762	1832	
--KNIGHTS LANDING RIDGE CUT JUNCTION - MILE 0.4R--													
John F. Anderson (1)	1.45R	1-16"					NO DIVERSION						
John C. Cooling	2.4R	1-16"			734	604	648	733	520		3239		300
Earl L. Wallace and Cecil Hulse	3.4R	1-16"			111	1267	706	710	680	160	3634		300
W. Crawford	4.35R	1-20"					NO DIVERSION						
George E. Youngmark	8.8R	1-14"		109	561	600	563	580	185		2598		400
Hershey Estate (Cochrane)	11.15R	1-14" (3)1-16"		59	1018	644	663	500	512		3396		400
Hershey Estate	13.75R	1-16"		160	1218	1014	1037	933	60		4422		500
C. M. Mumma	14.75R	1-10"		51	202	150	165	175	50		793	20	120
--COUNTY LINE BRIDGE - MILE 15.25--													
M. T. Emmert	15.75R	(4)1-12"		189	585	449	420	417	100		2160		400
Kate West (H.B. West & Son)	18.1R	1-15" 1-20"					NO DIVERSION						
C. R. Suggett	20.0R	1-15"		217	400	424	475	364	58		1938	160	400
--RECLAMATION DISTRICT 108 GRAVITY DRAIN - MILE 20.2L--													
Gregory Estate	21.35R	1-16"		30	620	852	1000	938	298		3738		400
Bean and Brandenburg	22.15R	1-14"		173	600	610	580	548	343		2854		400
Aileen B. Armstrong (Louis Kaehlin)	22.65L	1-16" (5)1-20"		771	757	1200	1289	1546	345		5908		550
--HANNUM BRIDGE - MILE 22.8--													
--SOUTHERN PACIFIC RAILROAD CROSSING - MILE 23.0--													
H. H. Balsdon	24.6L	1-16" 1-20"		705	1207	1261	1465	1104	71		5813		930
A. M. Dobrowsky	24.7L	1-8"					NO DIVERSION						
--GRIMES-COLLEGE CITY CAUSEWAY - (SOUTH LINE OF RECLAMATION DISTRICT 2047) - MILE 25.5--													
Fred Schutz	25.9L	1-16" 1-20"		945	838	1071	789	318			3961	50	490
C. W. and M. F. Struckmeyer	27.25L	1-16" 1-20"		1480	1173	1300	1600	1336			6889		990
William P. Wallace Ranch	28.0R	2-12"					NO DIVERSION						
--WALLACE CROSSING - (OLD MERIDIAN-WILLIAMS BRIDGE) - MILE 29.2--													
Sebia Davis Estate (2)	32.5L	1-24"			980						980		(7)
A. Davis Estate	33.0R	1-14"			788	793	860	749	130		3320		400
J. C. Hornall	33.5R						NO DIVERSION						
Ord Leichman (8)	(9)34.25L	(10)1-12" 1-18"			646	496	496	496	214		2348		200
Federal Fish and Wildlife Service (11)	36.65R	1-15" 1-20"			432	1422	1611	1491	1268	939	7163		700
Federal Fish and Wildlife Service (11)	37.0L	1-15"					NO DIVERSION						
--COLUSA-WILLIAMS HIGHWAY - GAGING STATION - MILE 37.0--													
Totals			0	5447	13470	15386	15757	13862	5410	1584	70916	2062	7880
Average cubic feet per second			0	92	219	259	256	225	91	26	146		
Monthly use in per cent of seasonal			0	7.7	19.0	21.7	22.2	19.6	7.6	2.2			

* 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.

(1) Formerly listed as River Farms Company.
(2) New installation in 1946.
(3) No operation of 16" unit in 1946.
(4) Replaces 15" unit listed at this location in 1945.
(5) Replaces 24" unit listed at this location in 1945.
(6) Replaces 20" unit listed at this location in 1945.
(7) See plant at Mile 78.8R Sacramento River. This plant used only to supplement diversion from Sacramento River.
(8) Formerly listed as Mrs. Belle Moore.
(9) Mileage correction.
(10) No operation of 12" unit in 1946.
(11) Formerly listed as W. H. O'Hair.

TABLE 118

DIVERSIONS AND ACREAGES IRRIGATED - KNIGHTS LANDING RIDGE CUT - 1946

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
Lawrence Raymond	0.1R	1-5"				PLANT REMOVED							
E. L. Wallace	0.8R	1-16" 1-20"		1948	1160	2022	2270	1914	1282		10596	350	690
M. R. Richardson	0.82L	1-14"		81	624	733	843	700	646		3627	200	(1)225
--RECLAMATION DISTRICT 730 DRAIN PLANT #2 - MILE 3.8--													
Ralph Pollock (2)	3.5L	1-12"		9	3	18	7				(3) 37	(3)200	
Kenneth Lowe	4.5R	1-20"				NO DIVERSION							
Ralph W. Pollock	4.55L	1-12"				62	38	144	262		(4) 506	(4)200	
Hershey Estate	4.7L	1-15"				NO DIVERSION							
John Sieber (5)	4.7R	1-6"			5	18	16	13	7		59	20	
--WEST LEVEE YOLO BY-PASS - MILE 6.3--													
Layton G. Knaggs	5.25R	(6)1-14"			120	184	339	337	325		1305		120
Henry Rich	5.9L	(7) Gravity			1880	1340	1480	1340	680		6720		1120
Henry Rich	6.3R	Gravity				75	100	125			300	200	
E. L. Wallace	6.3R	Gravity			1040	770	850	770	410		3840		640
Totals			0	2038	4832	5222	5943	5343	3612	0	26990	1170	2795
Average cubic feet per second			0	34	79	88	97	87	61	0	56		
Monthly use in per cent of seasonal			0	7.6	17.9	19.3	22.0	19.8	13.4	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 37.

(1) Estimated.
(2) Formerly listed as Dettling Bros.
(3) Also served by wells and plant at Mile 4.55L.
(4) Furnished some water to plant at Mile 3.5L.
(5) Formerly listed as Sieber Bros.
(6) Replaces 16" unit previously listed at this location.
(7) 2-12" pumps replaced by gravity setup.

TABLE 119

DIVERSIONS AND ACREAGES IRRIGATED - YOLO BY-PASS (EAST BORROW PIT OR TULE CANAL) - 1946 (1)

Water User	Mile and Bank (1)	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
Robert Swanston	1.8S	1-16"				NO DIVERSION							
Robert Swanston	1.1S	1-12"			188		172				360	(2) 440	
Robert Swanston	0.7S	1-16"		41	232	22	198				493	(3)	
--NORTH LEVEE SACRAMENTO BY-PASS - RECORDING GAGE - MILE 0.0--													
Robert Swanston	*1.8N	1-20"				NO DIVERSION							
Ensher, Alexander and Barsoom	2.4N	1-20"	1	1	1	2	4	3	1	1	14	(4) 90	
Ensher, Alexander and Barsoom	3.4N	1-8"				NO DIVERSION							
Ralph Aitken	5.9N	1-10"		32	31		81	61	13	12	230	90	
--SACRAMENTO-WOODLAND HIGHWAY - MILE 6.18--													
--SACRAMENTO-WOODLAND RAILROAD CROSSING - MILE 6.2--													
Frank Newman (5)	*7.0N	1-16"			396	462	462	462	396		2178		200
--RECLAMATION DISTRICT 1600 DRAINAGE PLANT - MILE 10.0--													
Fisher & Rich	*10.0N	1-18"				PLANT REMOVED							
E. L. Wallace	*10.1N	Gravity				PLANT REMOVED							
Totals			1	74	848	486	917	526	410	13	3275	620	200
Average cubic feet per second			0	1.2	13.8	8.2	14.9	8.6	6.9	0.2	6.7		
Monthly use in per cent of seasonal			0	2.3	25.9	14.8	28.0	16.1	12.5	0.4			

* Asterisk indicates that land irrigated is in By-Pass area.

(1) 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 37.)
(2) Combined acreage this plant and one at Mile 0.7S.
(3) See plant at Mile 1.1S.
(4) This land was flooded once.
(5) Formerly listed as Julius Hauser.

TABLE 120

DIVERSIONS AND ACREAGES IRRIGATED - LOWER BUTTE CREEK AND BUTTE SLOUGH - 1946

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 0.0--													
Reclamation District #833	1.5L	1-8"				NO DIVERSION							
Reclamation District #833	2.9L	1-36"box				163	605	618			1386	600	
West Butte Farms Co.	3.85L	1-20"				36	86	172			294	450	
Reclamation District #1004	3.9R	1-20" (1)1-24"			282	128		351			761	450	
Butte Lodge Outing Club	4.0R	1-22"				NO DIVERSION							
El Anzar Duck Club	5.35L	(2)1-12"				46	41				87	40	
Reclamation District #1004	9.3R	Gravity		640	960	1020	1200	1200	1000	900	(3) 6920	(4)600	(4)150
Butte Basin Gun Clubs	10.0L	Gravity							6000	6000	(5)12000	(6)5000	
Howard Brady (7)	10.0L	(8)1-12"			304	225	246	247	101		1123		140
White Mallard Duck Club	10.2R	Gravity			130	96	110	95	49		480		60
C. R. and G. T. Boyd (7)	11.0L	(8)1-12"			324	180	300	276	120		1200		120
Harold Heffy (7)	11.0L	(8)1-12"			432	240	400	368	160		1600		160
L. S. Sydenstricker (7)	12.0L	(8)1-16"			1080	600	1000	920	400		4000		400
White Mallard Duck Club (9)	13.2R	(10)2-10"				90	200	200	130		(11) 620	320	
White Mallard Duck Club	13.2R	1-24"box				NO DIVERSION							
R.D. #1004 (7)	13.2R	Gravity		400	600	600	600	600	600	500	(5) 3900	(12)	(12)
Murdock Land Company	14.4L	1-12"				NO DIVERSION							
--GRIDLEY ROAD - MILE 15.4--													
Murdock Land Company	19.3R	1-14"				NO DIVERSION							
--BIGGS-AFTON ROAD - MILE 19.4--													
Glenn Rice Farms	20.4R	1-18"			298	529	751	743	483		2804		(13)300
H. W. McGowan (14)	20.9R	1-16"		61	28	213	302	278	160		1042		110
H. W. McGowan (14)	21.0R	1-16"				NO DIVERSION							
Glenn Harris	Opp.21.4R	1-14"				NO DIVERSION							
--RICHVALE-BUTTE CITY ROAD - MILE 22.5--													
McGowan Ranch	23.0R	1-20"		552	1045	1159	1149	1247	553		5705		406
Butte Slough													
Butte Slough Irrig. Co.	0.3W	Gravity									(15)	(16)	(16)
M. Marty	0.3W	1-12"			56	119			20	5	200	75	
G.S. and D.C. Smith Est.(17)	1.4E	1-8"				65	158	125			348	140	
--MAWSON BRIDGE - MILE 2.1--													
C. W. Rowley (18)	2.5W	1-12"				94	103	8			205	70	
J. E. Smith	3.0W	1-10"			14	10	25	10			59	32	
I. E. Nall Estate (19)	3.5W	1-10"			15	28	38	42	18	13	154	91	
P. A. Reische	3.7W	1-10"			5	5	11				21	43	
Granniman and Feiths	4.08W	1-6"				2	2				4	6	
P. A. Reische	4.1W	1-10"		97	59	26	73	53	20		328	130	
E. V. Jacobs Estate (20)	4.8W	1-10"			12	21	57	16			106	103	
Hensen and Jacobs (21)	5.1W	1-12"			61	33	81	30	16		221	97	
T. J. Hageman	6.8W	3-8"				NO DIVERSION							
--OLD LONG BRIDGE - MILE 7.5 WEST--													
Totals (Lower Butte Creek and Butte Slough)			0	1750	5705	5728	7538	7599	9830	7418	45568	**8247	1846
Average cubic feet per second			0	29	93	96	123	124	166	121	94		
Monthly use in per cent of seasonal			0	3.8	12.5	12.6	16.5	16.7	21.6	16.3			

* Approximate mileage from junction with Sacramento River.

** Includes 5300 acres for gun club use entirely. There is an indeterminable amount of acreage that is used for gun club after the harvesting of the season's crops.

(1) Removed in 1946.

(2) Replaced by gravity in 1946.

(3) An additional 900 acre-feet was diverted in November for duck clubs. Furnished some water to lands served by plant on Sacramento River at Mile 112.1L.

(4) Approximately 300 acres of rice and general crop lands were reused for duck club.

(5) Acre-feet was partially estimated.

(6) All gun club.

(7) Installed prior to 1946. Not previously listed.

(8) Size of unit was estimated. It is a portable unit.

(9) Formerly listed as 13.1R.

(10) Replaces 12" unit previously listed at this location.

(11) Amount of water for duck club not determined.

(12) See plant on Sacramento River - Mile 112.1L.

(13) Partially estimated.

(14) Formerly listed as Harry McGowan.

(15) 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. Ltd. The total water so diverted is shown in Table 40. See Sutter By-Pass Diversions, Table 119.

(16) See acreages under rediversion - West Borrow Pit Sutter By-Pass. A considerable additional but indefinite acreage was served by sub-irrigation and direct diversions from flow diverted to East Borrow Pit of Sutter By-Pass which is joined by Feather River return flow entering via Wadsworth Canal, Table 41. See East Borrow Pit Sutter By-Pass Diversions, Table 119.

(17) Formerly listed as G. S. and D. C. Smith.

(18) New installation in 1946.

(19) Formerly listed as I. E. Nall.

(20) Formerly listed as E. V. Jacobs.

(21) Formerly listed as Hensen, Jacobs and Locovitch.

TABLE 121

DIVERSIONS AND ACREAGES IRRIGATED - SUTTER BY-PASS AND SACRAMENTO SLOUGH -1946

Water User	Mile and Bank above Mouth	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
(1) West Borrow Pit of Sutter By-Pass													
--SOUTHERN PACIFIC RAILROAD CROSSING - MILE 2.5--													
--KNIGHTS LANDING-MARYSVILLE CAUSEWAY - MILE 12.7--													
--SOUTH LEVEE TISDALE BY-PASS - MILE 18.9--													
--RECLAMATION DISTRICT 1660 GRAVITY RETURN - MILE 19.3--													
Reclamation District 1500 (2)	8.5R	1-18"		317	614	595	614	614	297		3051		300
G. Guisti (3)	23.7R	1-16"		385	795	770	795	795	385		3925	1000	
Butte Slough Irr. Co. Ltd.	25.0R	Gravity		255	347	253	213	221	22		1311	(4)5100	(4)200
Butte Slough Irr. Co. Ltd.	28.4R	Gravity		1256	1614	1423	1576	1951	731		8551	(5)	(5)
Fred Tarke	28.6R	1-12"				125	55				180	60	
Frye Bros.	29.0R	1-7"				NO DIVERSION							
--NEW COLUSA-MARYSVILLE HIGHWAY - MILE 29.1--													
--NORTHERN ELECTRIC RAILROAD CROSSING - MILE 29.15--													
East Borrow Pit of Sutter By-Pass													
(6)													
R. E. Hughes	*0.95S	(7)1-16"		37	411	400	232	100			1180	500	
R. E. Hughes	*0.5N	1-14" 1-16"	3	23	180	148					354	350	
Cliff P. Childers (8)	1.4N(0.3)	1-18"		19	558	429	599	321	114		2040		240
Cliff P. Childers (8)	1.4N(1.3)	1-16"			66	290	22	97			475	300	
E. H. Christensen & Son (8)	1.4N(1.3)	1-16"			282	140	339	380	61		1202		(9)620
E. H. Christensen & Son (8)	1.4N(1.75)	1-15"				NO DIVERSION							
E. H. Christensen (8)	1.4N(3.3)	1-15"			700	733	719	666	310		3128		(10)
E. H. Christensen (8)	1.4N(4.0)	1-24"				NO DIVERSION							
R. E. Hughes #6	*1.5N	1-14"			144		23	238			405	350	
R. E. Hughes #5	*2.9N	1-14"			114	82	32	18			246	320	
R. E. Hughes #4	*4.0N	1-14"		62	362	424	609	425			1882	100	260
R. E. Hughes #3	*4.5N	(11)1-10" 1-14"		90	197	246	574	848	35		1990		(12)600
Ira Mulligan	5.7N	1-16"				NO DIVERSION							
R. E. Hughes #2	*5.9N	(13)1-10" 1-14"		22	320	405	485	545	263		2040		(14)
O. O. Orrick	7.1N	1-6" (15)1-16"			1196	697	917	809	209		3828		410
Ira Mulligan	7.1N	1-16"		373	743	815	783	759	248		3721		275
Crepps and Middleton (2)	8.4N	1-12" 1-16"		1044	432	417	432	432	209		2966		(16)350
--RECLAMATION BOARD DRAINAGE PLANT #2 - MILE 10.0N--													
Crepps and Middleton (17) (8)Opp.10.0N	(8.6N)	1-18"		94	125	651	418	349	55		1692	(18)200	80

*Asterisk indicates area irrigated is within By-Pass area.

(1) Mileage is given northerly from drainage plant of Reclamation District 1500. Mile 9.15 West Borrow Pit is opposite Chandler.
(2) New installation in 1946.
(3) Formerly listed as Sutter Basin Improvement Company.
(4) Combined acreage for this plant and one at Mile 28.4R.
(5) See plant at Mile 25.0R.
(6) Mileage is given northerly or southerly from Chandler.
(7) One 16" unit removed in 1946.
(8) Plant is on drain canal which enters By-Pass at this point. Figure in () indicates distance along drain from By-Pass.
(9) Combined areage this plant and one at Mile 1.4N (3.3).
(10) See plant at Mile 1.4N (1.3)
(11) 10" unit moved to this location from Mile 5.9N.
(12) Combined acreage this plant and one at Mile 5.9N.
(13) Removed in 1946. Placed at Mile 4.5N.
(14) See plant at Mile 4.5N.
(15) Formerly listed as a 14" unit.
(16) Furnished some water to plant at Mile 10.0N.
(17) Formerly listed as R. R. Nusz.
(18) Estimated.

TABLE 121 (CONT'D)

DIVERSIONS AND ACREAGES IRRIGATED - SUTTER BY-PASS AND SACRAMENTO SLOUGH - 1946

Water User	Mile and Bank above Mouth	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
(1)			East Borrow Pit of Sutter By-Pass (Cont'd)										
Spurgeon Gun Club	Opp. *10.0N	1-12"		143	134	234	296	201	107	266	1381		(2)250
Sutter Home Investment Co. (3)	*12.0N	1-12"			377	595	615	615	60		2262		300
Federal Fish and Wildlife Service	*16.3N	1-20"				743	938	771	835	288	3575		(4)470
F. A. Becker Estate (5)	(6) 16.5N(1.0R)	1-10"				70	36	30			136	60	
C. C. Epperson	(6) 16.5N(1.1L)	1-10"				NO DIVERSION							
F. H. Ziegenmeyer (3)	(6) 16.5N(1.35R)	1-12"			151	319	369	369	167		1375		140
A. H. Muns (3)	(6) 16.5N(1.36R)	1-12"			208	326	391	391	341		1657		190
Youill Joaquin	(6) 16.5N(3.0L)	1-10"				NO DIVERSION							
Gilbert Williamson (3)	(6) 16.5N(3.6R)	1-10"			67	155	152	138	60	62	634	150	
--EAST LEVEE OF WADSWORTH CANAL - MILE 16.5N--													
--RECLAMATION BOARD DRAINAGE PLANT #3 - MILE 16.5N--													
Fred S. Betty Estate (7)	(8) 16.5N					NO DIVERSION							
Fred S. Betty Estate (7)	(8) 16.5N	(10)1-10"			87	114	122	122	88		533		60
Fred S. Betty Estate (9)	(8) 16.5N	(10)1-8"box 1-16"			315	350	230	410	270		(11)1575		180
Meyer, Platter, Moorehead, DeWitt Bros. and Epperson and Middleton	19.1N	1-14"			274	565	691	126			1656	590	
--NEW COLUSA-MARYSVILLE HIGHWAY - MILE 19.98N--													
--NORTHERN ELECTRIC RAILROAD CROSSING - MILE 20.0N--													
			Sacramento Slough										
C. Fred Holmes	(12) 0.5R	1-12"				NO DIVERSION							
C. Fred Holmes	1.4R	1-12"				152		54			206	300	
Totals			3	4120	10965	12514	13331	12741	4867	616	59157	9380	4925
Average cubic feet per second			0	69	178	210	217	207	82	10	122		
Monthly use in per cent of seasonal			0	7.0	18.5	21.2	22.5	21.5	8.2	1.1			

* Asterisk indicates area irrigated is within By-Pass area.
(1) Mileage is given northerly or southerly from Chandler.
(2) Received some water from plant at Mile 8.4N.
(3) New installation in 1946.
(4) All duck club lands.
(5) Formerly listed as F. A. Becker.
(6) Plant is on Wadsworth Canal which enters By-Pass at this point. Figure in () indicates distance up canal from By-Pass.
(7) Formerly listed as Fred Betty.
(8) Plant is on Poodle Creek which enters By-Pass at this location.
(9) Formerly listed as Mrs. H. C. and C. H. Epperson.
(10) Removed in 1945.
(11) Partially estimated.
(12) Mileage is given easterly from drainage plant of Reclamation District 1500 which is at head of slough.

TABLE 122

DIVERSIONS AND ACREAGES IRRIGATED - FEATHER RIVER 1946

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
Walter Raymond	0.6R	(1)1-16"				154					(2) 154	(2)1162	(2)530
Henry Rutz	1.55L	1-8"				18					18	(3) 65	
Walter Raymond	2.60R	1-20" (5)1-26"			1113	1842	2029	1649	1339	66	(2)8038	(4)	(4)
Johnston Bros.	3.0L	1-10"		4	120	57	7	90	37	29	(6) 344	(6) 105	(6) 75
Ralph Taylor	5.6L	1-10"				NO DIVERSION							
A. L. Haymore (7)	6.44L	1-10"		42	16	23	33	32	22		(3) 168	(3) 120	
M. Scheiber	7.7L	1-10"			116	86	91	75	71		439	120	
--NICOLAUS GAGING STATION - MILE 9.3--													
--NICOLAUS BRIDGE - MILE 9.4--													
Bercut Richards	9.75R	1-20"		14	127	234	227	100	34	238	974	250	
Garden Highway Mutual W. Co.	13.1R	1-20" 1-24"		927	2829	2364	2842	2227	1098	55	12342	1303	860
Feather River Water Co.	16.35R	1-14"		100	36	251	241	161	73		862	190	
Farm Lands Company (8)	17.5L	1-22"		273	2331	2150	1881	1940	978	243	9796	395	400
G. C. Shannon	18.75R	1-6"				NO DIVERSION							
Oswald Water District	21.4R	1-16"		262	788	959	865	776	1233		4883	(9) 573	
--SHANGHAI BEND - MILE 23.0--													
Reclamation District 784	24.0L	1-20"				NO DIVERSION							
Nevada-California Lands, Inc.	25.2R	1-10"				NO DIVERSION							
--MOUTH OF YUBA RIVER - MILE 27.3L--													
--YUBA CITY-MARYSVILLE BRIDGE - MILE 28.0--													
G. D. Prindiville (10)	33.3R	1-10"				72	47	78	12		209	154	
J. L. Sullivan, Jr.	33.9R	1-10"			56	219	109	33			417	115	
Sutter Butte Canal Co. (Sunset Plant)	38.1R	1-26" 2-42"		800	3743	802	3675	5206	1828		(11)16054	(12)	(12)
Matthews, Sullivan and Prindiville	43.7L (13) (0.4L)	1-18"	47	139	195	144	36	161	214		936	276	
Thomas E. Mathews	43.7L (13)(0.7L)	1-5"				NO DIVERSION							
Mat. Thomes	43.7L (13)(1.2L)	1-8"		18	27	38	51	34	2		170	70	
E. T. Washburn (14)	(13)43.7L (1.25L)	1-8"				NO DIVERSION							
A. P. Barba (10)	47.4L	1-7"					30	25	11		66	40	
A. P. Barba	47.9L	1-12"				67	49	72	66	3	257	230	
Robert S. Biggs	48.3L	1-10"					134	55	27		216	160	
Edward Dunning	49.0L	1-8"			25	17	34	6			82	65	
--GRIDLEY BRIDGE - MILE 49.7--													
Clyne Ranch	51.0R	1-6"			3	35	75	28			141	34	
L. K. Ward (15)	51.1L	(16)1-6"		26	40	67	58	61	16	22	290	82	
Edward Steadman	51.4R	1-10"			32	89	140	106			367	80	
J. F. Fratus	52.1I	1-10"		4	46	49	51	38	18		206	70	
W. F. Shannon (17)	52.5L	1-10"			32	36	90	68			226	66	
F. L. Morris	52.7L	1-8"			21	14	28	14	8	7	92	41	
Frank Dutra	52.9R					NO DIVERSION							
Ruby Chambers (Mrs.)	53.1R	1-6"		12	11	25	14	13	8		83	42	
Hearst Estate	55.1L	1-14"			231	332	247	186	156	18	1170	226	
Lena Philips (Mrs.)	57.0L	1-7"				NO DIVERSION							
Henry Hazelbusch	57.9R	1-9"			42	34	36				112	48	
Sutter Butte Canal Co.	(18)58.1R	Gravity		20348	50168	46251	45851	41204	27420	12551	(19)243793	(20)16091	(20) 9754
Biggs-West Gridley W. Dist.	(18)58.1R	Gravity		12564	30975	28557	28309	25440	16930	7749	(19)150524	4229	7313
Richvale Irr. Dist.	(18)58.1R	Gravity		11958	29481	27180	26945	24213	16114	7375	(19)143266	212	12683
Western Canal Company	59.7R	Gravity		6476	33794	28044	31010	28857	14295	5629	(19)148105	575	(22)19467
--OROVILLE BRIDGE - MILE 65.0--													
--U.S.G.S. GAGING STATION - MILE 71.0--													
Totals			47	53967	156398	140210	145235	132948	82010	33985	744800	27189	51082
Average cubic feet per second			1	907	2544	2356	2362	2162	1378	553	1533		
Monthly use in per cent of seasonal			.1	7.2	21.0	18.8	19.5	17.8	11.1	4.5			

(1) Formerly listed as 15" unit.
(2) Combined acreage plants at Miles 0.6R and 2.6R.
(3) Also received water from a well.
(4) See plant at Mile 0.6R.
(5) Operated 26" unit only in 1946.
(6) Additional water received from wells.
(7) Formerly listed as Capital Company.
(8) Formerly listed as Plumas Mutual Water Company.
(9) Includes approximately 140 acs. outside district.
(10) New installation in 1946.
(11) Supplements the diversion at Mile 58.1R.
(12) See plant at Mile 58.1R.
(13) Plant diverts Feather River water backed into Honcut Slough. Mouth of Slough at Mile 43.6L. Distance from Feather River up slough shown in ().
(14) Formerly listed as Manuel A. Barba.
(15) Formerly listed as John Bettencourt and Son.
(16) Replaces 7" unit listed at this location in 1945.
(17) Formerly listed as Pfeister and Ingram.
(18) This is a common point of diversion for the Sutter Butte Canal Co., Richvale I.D. and Biggs-West Gridley water districts. Diversions are reported separately. The Sutter Butte Canal Co. also operates a pumping plant at Mile 38.1R.
(19) An additional 9121 acre-feet diverted in November with no segregation made of the amounts allotted to different districts. 36,990 acre-feet was purchased from Pacific Gas & Electric Company in 1946 and is included in this total.
(20) Also served from plant at Mile 38.1R.
(21) Includes 3560 acre-feet diverted for duck clubs. In addition 6029 acre-feet were diverted for duck clubs in November.
(22) An undetermined amount of this rice land reflooded for duck club.

TABLE 123

DIVERSIONS AND ACREAGES IRRIGATED - YUBA RIVER - 1946

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
--YUBA RIVER AT MARYSVILLE - GAGING STATION AT SEVENTH STREET BRIDGE - MILE 0.9--													
Iona Davis Ray (1)	1.6L	(2)1-3"				8					8	10	
W. B. Harrington (3)	1.8R	1-5"		3	17	27	18	31	6	2	104	35	
Marysville River Farms Co.	3.0L	1-10"				2	10	48	56	9	125	100	
E. O. Rubke	4.1L	(4)1-14"			152	157	224		161		694	170	
E. O. Rubke (5)	4.3L	1-10"					24	56	25	9	114	40	
Di Giorgio Fruit Corp.	4.75L	1-10"	NO DIVERSION										
Di Giorgio Fruit Corp.	5.3L	1-8"	NO DIVERSION										
Scott Hendricks (6)	5.9L	1-10"			50	51	66	69	12		248	145	
Cordua Irr. Dist. (7)	11.0R	Gravity		1250	4027	4531	4767	5216	4322	4214	(8)28327	(9)3985	(10)817
Hallwood Irrigation Co.(7)	11.0R	Gravity		5969	10985	11069	11973	10936	9358	8776	(11)69066	4387	1139
Yuba Consolidated Gold Field Co.	14.5L	Gravity	NO AGRICULTURAL USE										
Totals			0	7222	15231	15845	17082	16356	13940	13010	98686	8872	1956
Average cubic feet per second			0	121	248	266	278	266	234	212	203		
Monthly use in per cent of seasonal			0	7.3	15.4	16.1	17.3	16.6	14.1	13.2			

* Approximate mileage along river above Highway "99" crossing at Marysville.

(1) Formerly listed as Davis Brothers.
(2) Replaces 10" unit listed at this location in 1946.
(3) Formerly listed as Charles Schinkel.
(4) Replaces 12" unit listed at this location in 1946.
(5) New installation in 1946.
(6) Formerly listed as Marysville River Farms.
(7) Hallwood Irrigation Company and Cordua Irrigation District have a common point of diversion and canal for approximately one-half mile.
(8) An additional 3152 acre-feet in November and 500 acre-feet in December for duck club use.
(9) Includes 450 acres of duck clubs outside of district.
(10) Includes 617 acres of rice outside of district.
(11) An additional 5000 acre-feet in November and there was an undetermined amount of spill returned to river.

TABLE 124

DIVERSIONS AND ACREAGES IRRIGATED - AMERICAN RIVER - 1946

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--													
North Sacramento Lands Co.	2.4R	1-6"				PLANT REMOVED							
Sacramento Stucco Co. (1)	2.4L	1-5"		5	7	8	11	5	8	3	47	12	
North Sacramento Lands Co.	2.55R	1-5"					12	13			25	30	
North Sacramento Lands Co.	2.65R	1-7"					13	13			26	60	
North Sacramento Lands Co.	2.75R	1-5"					15	3			18	30	
--SOUTHERN PACIFIC RAILROAD BRIDGE - MILE 3.5--													
C. Swanston and Sons	4.2R					NO DIVERSION							
C. Swanston and Sons	5.3R	1-10"				NO DIVERSION							
C. Swanston and Sons	5.5R	1-6"				NO DIVERSION							
Carlson and Sanberg	5.7L	1-10"				PLANT REMOVED							
--GAGING STATION - AMERICAN RIVER AT SACRAMENTO - MILE 6.1--													
E. Clemens Horst Co.	6.5R	1-6"			15	50	23				88	50	
E. Clemens Horst Co.	7.5R	1-8"			14	100	58				172	100	
John I. Haas, Inc. (2)	7.8R	1-4"				35	27				62	50	
Hagginbottom Land Co.	8.05R	1-10"				NO DIVERSION							
J. H. Kerby	9.0L	1-6"				42	37				79	45	
Hagginbottom Land Co.	9.2R	1-12"				NO DIVERSION							
J.G. and F.F. Dauenhauer	9.2L	1-8"				13	13	20	5		51	(3) 60	
Ruth Coleman (3)	9.35L	1-5"				NO DIVERSION							
Ruth Coleman (3)	9.5L	1-5"				NO DIVERSION							
Ruth Coleman (3)	9.55L	1-5"				NO DIVERSION							
Dr. J. E. Knauss & Dr. Reiner	10.2R	1-6"				NO DIVERSION							
Guy H. Roddan	10.3L	1-10"				NO DIVERSION							
Gold Nugget Orchard Co.	10.4R	1-5"			16	8	16		20		60	17	
Mucke Sand and Gravel Co.	11.2L	1-6"		5	6	18	9	10	7		55	35	
J. T. Gore	11.5L	1-8"			49	50	81	62	7		249	55	
William A. Meyer	11.7L	1-4"			19	10	12				41	27	
A. Teichert and Sons	11.7L	1-5"				PLANT REMOVED							
H. T. Danielson	13.1R	1-5"			2	2	2	2	2	2	12	6	
Knapp Corporation	13.3R	1-4"				40	32	34	17		123	54	
C.W. Deterding & Mrs. Mary McDonnell (4)	13.9R	1-6"				23	30	27			80	27	
J. R. Deterding (4)	15.1R	1-6"				23	13				36	35	
Carmichael Irr. Dist.	16.0R	1-6" 2-12"			100	600	700	700	700	100	(5) 2900	(6)2200	
Al Goddard Estate	17.1R	1-6"				NO DIVERSION							
--GAGING STATION - "AMERICAN RIVER AT FAIROAKS" - MILE 19.2--													
Totals			0	10	228	1022	1104	889	766	105	4124	2893	0
Average cubic feet per second			0	.2	3.7	17.2	17.9	14.4	12.9	1.7	8.5		
Monthly use in per cent of seasonal			0	.2	5.5	24.8	26.8	21.5	18.6	2.6			

(1) New installation in 1946.
(2) Formerly listed as Haggin Hop Farm.
(3) Served by wells in 1946.
(4) Formerly listed as Chas. Deterding, Jr., J. R. Deterding and M. McDonald.
(5) Acre-feet estimated from use of previous years. Also received water from wells.
(6) Classed as suburban lands. No details of irrigated acreages available.

TABLE 125

DIVERSIONS AND ACREAGES IRRIGATED - OLD SAN JOAQUIN RIVER DELTA UPLANDS - 1946

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	(1) 30.5L		560	758	1511	2236	2675	2009	1349	1241	(2) 12339	(3)	
Leo Fallman	36.4L	1-16"	2	85	116	105	109	104	91	41	653	155	
East Contra Costa I.D.	(4) 36.5L	2-18" 2-24" 2-30"	1370	4409	6840	5674	6047	5300	2850	490	(5)32980	(5)15485	
Augustus Serge (6)	36.5L	(7)2-6"		16	14	15	24	11	6		86	30	
Byron-Bethany Irr. Dist.	(8) 40.9L	1-24" 1-30"	562	2989	3916	3926	4094	4271	2032	1263	23053	5128	
M. R. Furtado	44.8L	1-14"		49	99	84	111	83	91	44	561	400	
George Ray	45.3L	1-12"	NO DIVERSION										
H. Lindeman & Son	47.2L	1-12"		178	315	213	326	357	321	6	1716	(9) 425	
Gus Lindeman	47.2L	1-10"	NO DIVERSION								(10)	(10)	
West Side Irr. Dist.	47.65R	7-15"	2093	4324	3604	3373	4572	4312	2131	1301	(11)25710	(12)8793	
Vance Brown	48.7L	1-12"		37	31	30	13	52			163	60	
Naglee Burke Irr. Dist.	50.4L	1-16" 1-18"	5	1182	1168	1146	1452	1434	916	518	7821	(13)2873	
Freemont Irr. Association	50.9L	(14)1-16"	48	262	92	110	193	220	118	17	1060	(15) 669	
Joe M. Freitas	51.0L	1-8"		11	8	7	8	8		3	45	35	
Attilio Casserini	51.2L	1-8"		20	3	7	8	16			54	40	
Excelsior Ranch #2	52.4L	1-10"		36	7	11	15	17	3		89	110	
A. L. Galli	53.0L	1-8"		15	12	11	15	44	6	3	106	60	
Totals			4640	14371	17736	16948	19662	18238	9914	4927	106436	34263	
Average cubic feet per second			75.5	242	288	285	320	297	167	80.1	219		
Monthly use in per cent of seasonal			4.4	13.5	16.7	15.9	18.5	17.1	9.3	4.6			

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

(1) This is the point of diversion of the U. S. Bureau of Reclamation Contra Costa Canal at head of Rock Slough.
(2) Additional acre-feet diverted as follows: January 894, February 654, November 1148 and December 1171.
(3) Water was used for industrial, municipal and small agricultural diversions--no segregation was made.
(4) At junction of Old River and Indian Slough. Pumping plant is located two and one-half miles west along Indian Slough.
(5) An additional 3952 acre-feet received from wells.
(6) Installed prior to 1946. Not previously listed.
(7) Operated 1-6" unit only in 1946.
(8) At junction of Old River and Italian Slough. Pumping plant is located 2 3/4 miles southwest along Italian Slough and extension cut.
(9) Includes 60 acres of alfalfa irrigated on Gus Lindeman lands.
(10) 60 acres of alfalfa irrigated from H. Lindeman & Son, Mile 47.2L.
(11) Includes 1079 acre-feet delivered to Tracy-Clover Irrigation District to supplement the well pumps supply for that district.
(12) 1211 acres of this acreage was double cropped during the irrigation season.
(13) Includes 4 acres served to plant at Mile 50.9L.
(14) Formerly listed as 14" unit.
(15) An additional 4 acres served from plant at Mile 50.4L.

TABLE 126

DIVERSIONS AND ACREAGES IRRIGATED - TOM PAINE SLOUGH DELTA UPLANDS - 1946

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
Independent Mut. W. Corp. & Co.	0.7S	2-18"	8	610	390	616	385	580	278		2867	(1)1200	
Independent Mut. W. Corp. & Co.	1.5S	1-18"		8	16	24	23	33	14		118	(2)	(2)
Holly Sugar Corporation (3)	2.1S	1-10" 1-12"	54	86	112	144	144	127	68	36	771	(4) 597	
Tracy-Clover Irr. Dist. (3)	2.1S	1-16"				NO DIVERSION						(5) 600	
Pescadero R.D. 2058 #1	2.9S	1-12"	42	80	87	169	111	131	78	47	745	(6)3336	(6) 317
Pescadero R.D. 2058 #3	6.3S	1-12" 1-20" 1-24"	630	1458	1842	1772	2239	2443	1807	618	12809	(7)	(7)
Pescadero R.D. 2058 #5	8.3S	1-12"	80	199	202	273	244	232	151	62	1443	(7)	(7)
Pescadero R.D. 2058 #5a	9.0S	1-12"	60	147	107	147	178	186	94	35	954	(7)	(7)
Totals			874	2588	2756	3145	3324	3732	2490	798	19707	5733	317
Average cubic feet per second			14.2	43.5	44.8	52.9	54.1	60.7	41.8	13.0	40.6		
Monthly use in per cent of seasonal			4.4	13.1	14.0	16.0	16.9	18.9	12.6	4.1			

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

(1) Combined acreage this plant and one at Mile 1.5S.

(2) See plant at Mile 0.7S.

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

(4) Also served by wells.

(5) Acreage estimated--served through West Side Irrigation--Old San Joaquin River, Mile 47.65L.

(6) Acreage combined for plants at Miles 2.9S, 6.3S, 8.3S and 9.0S.

(7) See plant at Mile 2.9S.

TABLE 127

DIVERSIONS AND ACREAGES IRRIGATED - SAN JOAQUIN RIVER DELTA UPLANDS - 1946

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 45.5--													
Flotill Cannery Co. (1)	45.45R	1-8"		6	49	32	56	44	17		204	92	
A. Jury	45.5R	1-6"				1	1	1	1	1	5	5	
C. R. Van Buskirk	45.6R	(2) 1-5" 1-8"			15	6	29	38	7		95	45	
C. R. Van Buskirk (3)	46.0R	1-4"		14	13	5	12	17	1	9	71	40	
Carolyn Weston	46.3R	1-6" 1-10"				NO DIVERSION							
Ivy Rainey (Mrs.)	46.65R	1-4" 1-6"				NO DIVERSION							
Frank West (4)	46.85R	1-10"		52	44	70	94	67	59	35	421	160	
Y. Takashiro (5)	47.2R	1-6"	3	1	9	12	9	15	1	2	52	44	
Wolfinger Bros.	47.3R	1-10"		5	26	6	72	43			152	47	
Alma A. Haack	48.0R	1-14"		120	22	196	143	203	62		746	375	
Lee Young	48.3R	1-4½"		2	8		14	6			30	(6) 32	
Lee Young	48.5R	1-3"		3	4	3	7	4	1	1	23	(7)	
Joe Calcagno, et al.	48.5R	1-6"			45	32	32	40	25		174	140	
F. Piccardo, Dr. Carr and A. Calcagno	48.55R	1-6"	4	26	34	25	29	16	10	6	150	55	
G. B. Figari	48.6R	1-5"				NO DIVERSION							
M. O. Cooper Estate	49.0R	1-10" box				NO DIVERSION							
Herbert Spangenberg and Chapman	49.5R	1-12"		67	43	66	80	52	44	15	367	93	
A. A. Rodgers	50.1R	1-10"		25	27	40	45	58	40	16	251	67	
--BRANDT BRIDGE - MILE 50.2--													
A. Hirata	50.4R	1-8"		37	17	23	26	28	13		144	40	
R.K. and F. Watanabe	50.6R	1-6"	2	3	23	16	32	43	4	2	125	52	
D. Toscano	50.8R	1-6"	2	17	5	18	18	20	4	3	87	30	
Pastorino Bros.	51.0R	1-10"		18	24	52	15	117	26		252	100	
Philip Esteban	51.2R	1-12"	11	16	25	30	29	49	25	14	199	100	
Andrew C. Meyer	51.9R	1-8"				NO DIVERSION							
D. Santini	52.4R	1-5"	1	1	17	12	14	14	11	5	75	25	
Silvia Ranch	52.65R	1-6"				NO DIVERSION							
Silvia Ranch	52.8R	1-8"				NO DIVERSION							
Joe Widmer	53.2R	1-12"	26	63	51	100	116	115	3		474	168	
William Nishimura	53.4R	1-8"		13	5	25	22	24	16	6	111	32	
I. N. Robinson, Jr. and John Stapuk (8)	53.7R	1-12"	10	217	140	175	376	236	116		1270	408	
R. E. Albertson (9)	54.9R	1-10"			3	8	22	6			39	50	
Oakwood Stock Farm	56.0R	1-10"				NO DIVERSION							
--JUNCTION WITH MIDDLE RIVER - MILE 56.2L--													

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

(1) Formerly listed as Katten & Morengo Ranch.
(2) No operation for drainage in 1946.
(3) New installation in 1946.
(4) Formerly listed as Wilhoit and Hammill.
(5) Formerly listed as L. F. Grimsley.
(6) Combined acreage of this plant and one at Mile 48.5R.
(7) See plant at Mile 48.3R.
(8) Formerly listed as Bekins Van & Storage and John Domingo.
(9) Reinstallation at old point of diversion in 1946.

(Continued on next page)

TABLE 127 (CONT'D)

DIVERSIONS AND ACREAGES IRRIGATED - SAN JOAQUIN RIVER DELTA UPLANDS - 1946

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
Oakwood Stock Farm	57.0R	1-14"	152	224	222	246	335	212	245	106	1742	370	
James Tobin	57.15R	1-7"		27	5	42	80	45	3		202	41	
Frank DeWar, et al.	57.38R	1-4"			10	3	19	15	4		51	12	
G. Gardella & Co.	57.5R	1-4"	8	3	4	4	3	3	1	1	27	6	
A. Queirolo (1)	57.65R	1-2⅛				NO DIVERSION							
A. Queirolo (2)	58.6R	1-3"				1	1	1			3	3	
R. Mauro	58.7R	1-4"			1	1	2	1			5	5	
Dell Osso Bros.	58.80L	1-15"	78	112	43	61	76	147	33	9	559	310	
--MOSSDALE BRIDGE - RECORDING GAGE - MILE 58.9--													
C. C. Abersold	59.25R	1-6"	4	17	22	25	31	26	20	12	157	65	
H. A. Neistrath	59.3R	1-15"		207	132	175	220	152	199	101	1186	180	
E. J. Rossi	59.5L	1-10"		76			52	104	17		249	173	
H. A. Neistrath (No. 1) (3)	60.1R	1-6"	1	29	20	31	43	36	23	7	190	40	
Wendler (Mrs.)	60.5L	1-12"	5	64	80	76	94	96	28		443	250	
Wendler (Mrs.)	61.5L	(4) 1-8"			12	27		15	15		69	65	
A. A. Jensen	62.0L	1-12"		17	128		86	49	46	2	328	75	
Paradise Mut. Water Co.	62.2L	1-20"		348	356	357	336	529	152	5	2083	730	
--PARADISE DAM - (HEAD OF PARADISE CUT) - MILE 62.6L--													
Dethlefsen Bros. (4)	62.75L	1-6"			4	3	4	3	4	3	21	12	
Dethlefsen Bros.	63.0L	1-18"	162	269	597	329	728	312	364	93	2854	1350	
Manuel Brazil	66.7L	(5) 1-8"	13	91	60	40	68	112	29		413	100	
Banta-Carbona Irr. Dist.	67.5L	2-20" 3-24" 1-36"	4764	10897	7528	6456	10701	8747	4525	2219	(6)55837	(7)16901	
Bradford S. Crittenden	70.0L	1-6"					77	7	33		117	35	
J. Y. Matsumoto	70.5R	1-10"		28	116	59	97	111			411	50	
Reclamation District 2075	71.0R	1-16"		590	692	331	911	987	375		3886	1140	
H. J. Mortensen, Borges and Whitman	73.2R	1-12"		269		18	90	105	40		522	312	
San Joaquin River Club (4)	75.1L	1-6"							74	136	(8) 210	(9) 80	
San Joaquin River Club (4)	75.25L	1-6"							11	66	(8)(10)77	(11)	
--U.S.G.S. GAGING STATION - SAN JOAQUIN RIVER NEAR VERNALIS - MILE 76.7--													
Totals			5246	13974	10681	9238	15347	13071	6727	2875	77154	24505	0
Average cubic feet per second			85	279	174	155	250	213	113	47			
Monthly use in per cent of seasonal			6.8	18.1	13.8	12.0	19.9	17.0	8.7	3.7			

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

(1) Formerly listed as V. Sanguenetti.
(2) Formerly listed as G. B. Figari.
(3) Up Walthal Slough 0.2 mile and opposite this mileage on River.
(4) New installation 1946.
(5) Previously listed as 10" unit.
(6) This is total amount of water diverted and includes water delivered outside of district.
(7) This figure consists of following: 14,695 acres inside Banta-Carbona I.D., 2206 acres inside Kasson Dist. lands irrigated by contract and 240 acres not in either district irrigated by contract.
(8) This water was diverted for use of fish ponds.
(9) Combined acreage this plant and one at Mile 74.2L.
(10) Additional acre-feet diverted: November--27 acre-feet, December--22 acre-feet.
(11) See plant at Mile 74.05L.

TABLE 128

DIVERSIONS AND ACREAGES IRRIGATED - SAN JOAQUIN RIVER - 1946

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--													
--STANISLAUS RIVER - MILE 79.7R--													
--MAZE ROAD BRIDGE - MILE 81.85--													
W. C. Blewett Estate	81.95L	3-12"	116	156	194	284	322	257	189	140	1658	485	
El Solyo Ranch Co.	82.0L	1-12" 3-18"	982	2434	2938	2728	3198	2823	1732	1089	(1)17924	2921	204
--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"	3395	10869	10360	9749	15648	13894	6762	2195	(2)72872	(3)22160	
J. B. Erkenbrecher (4)	(5)91.8L	1-14"		13	80	5	118	58	9		283	100	
Frank Sarmento (Mr. & Mrs.)	(5)91.8L	2-14"	129	135	205	96	169	231	297	112	1374	(6)1685	
J. B. Erkenbrecher (7)	(5)91.8L	1-16"		24	38	32	62	41	39	14	250	(8) 75	
Dos Rios Ranch (9)	95.8R	1-10"	40	40	50	50	50	50	50	43	373	74	
--LAIRD SLOUGH BRIDGE - GAGING STATION - SAN JOAQUIN RIVER NEAR GRAYSON - MILE 96.05--													
--TUOLUMNE RIVER - MILE 91.0R--													
Rancho El Pescadero	98.9L	1-18"	280		438	358	615	578	393	190	2852	722	
--PATTERSON BRIDGE - MILE 104.4--													
Patterson Water Company	104.4L	1-14" 1-18" (10)3-20" 1-26"	1936	6176	8218	8146	9320	7766	5846	781	48189	13150	300
Silva and Freitas Ranch	104.5R	1-10"			216	65	118	311	135		845	180	
L. W. Long (11)	104.52L	1-5"					6	6			12	8	
Patterson Ranch Company	109.8L	1-12" (11)3-16"		1337	1970	1982	2193	2423	1327	459	11691	810	892
Roy Ustick	112.55R	1-16"	53	123	91	152	83	139	133	70	844	(12)322	
--CROWS LANDING BRIDGE - MILE 113.4--													
Laura C. Johnson	113.5R	1-10"				NO DIVERSION							
A. J. Silveria	113.85R	1-6"				NO DIVERSION							
A. J. Silveria	114.35R	1-8"		12	5	10	14	15	2		58	15	
Stewart C. Galt (11)	114.63R	1-8"	3	16	22	14	25	23	11	2	116	65	
L. B. Crow	116.05L	1-14"	33	10	88	72	54	75	68	34	434	200	
Howard Bell (13)	116.95R	1-12"		54	48	8	7	102	33	15	267	122	
--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--													
--DELTA BRIDGE (TURNER ISLAND) - GAGING STATION - MILE 158.7--													
Totals			6967	21399	24961	23751	32002	28792	17026	5144	160042	43094	1396
Average cubic feet per second			113	360	406	399	520	468	286	84	329		
Monthly use in per cent of seasonal			4.4	13.4	15.6	14.8	20.0	18.0	10.6	3.2			

* Mileage along San Joaquin River from its mouth 4½ miles below Antioch. (Mileage established by War Department Survey of 1913-1915.)

(1) An additional 532 acre-feet diverted in November.
(2) Additional acre-feet diverted: February--768, and November 107.
(3) Includes 1030 acres double cropped and approximately 1800 acres on El Pescadero Ranch.
(4) Formerly listed as El Pescadero #1.
(5) Pump is on cut leading to West Stanislaus Irrigation District plant.
(6) Additional acreage irrigated from West Stanislaus Irrigation District. Includes 1000 acres flooded for leveling.
(7) Formerly listed as El Pescadero Ranch #3.
(8) Additional acreage irrigated from West Stanislaus Irrigation District.
(9) New installation in 1945, recordation started 1946.
(10) Replaces 3-26" units previously listed at this location.
(11) New installation in 1946.
(12) Additional acreage served by controlled drain water from Turlock Irrigation District.
(13) Reinstallation at old point of diversion.

TABLE 129

DIVERSIONS AND ACREAGE IRRIGATED - UPPER SAN JOAQUIN RIVER - 1946
FREMONT FORD TO FRIANT DAM (FREMONT FORD TO GRAVELLY FORD)

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

Water User	Mile and Bank above Mouth	Mile and Bank below Friant *	Number and Size of Pump	Monthly Diversions in Acre-Feet					
				Jan.	Feb.	Mar.	Apr.	May	June
--FREMONT FORD BRIDGE - GAGING STATION - MILE 129.5 ABOVE MOUTH--									
--DELTA BRIDGE - GAGING STATION - MILE 158.7 ABOVE MOUTH--									
Erreca Farms	161.4R	108.2R	(1)1-8"	0	0	0	11	6	17
Erreca Farms	161.9R	107.7R	1-10"	0	0	0	0	42	22
Erreca Farms (East Side Canal)	(2)163.6R	106.0R	Gravity	0	0	0	0	0	0
D. L. McNamara (East Side Canal)	(3)163.6R	106.0R	(4)1-14"	0	0	0	65	14	56
San Luis Canal (Temple Slough)	186.6L	83.0L	Gravity	2364	0	13402	19918	18718	16820
Allan Sapiro	194.83R	73.8R	1-6"	0	0	0	0	0	0
Ivan N. Zaninovich	206.0L	63.62L	1-6"	0	0	0	2	4	0
Antone Zaninovich	206.02R	63.6R	1-4"	0	0	0	0	1	0
--MENDOTA DAM - MILE 208.63 ABOVE MOUTH AND MILE 61.0 BELOW FRIANT--									
Grass Land Water Ass'n - Mendota Pool			Gravity	0	0	0	674	7507	8311
Firebaugh Canal Co. - Mendota Pool			2-24" 2-36" 1-42"	83	3336	8436	10104	10463	10086
San Joaquin Canal Co. - Mendota Pool (8)			Gravity	3267	5432	57148	71038	82758	80654
Sam Hamburg - Mendota Pool (9)			Gravity	0	0	0	0	0	550
James M. Thuesen (Mowry Canal)	217.0L	52.6L	Gravity	0	0	0	0	0	0
Fresno Ranch		(11)	Gravity	0	0	0	0	0	2500
Lone Willow Slough	219.8R	49.8R	Gravity						0
Columbia Canal Co.				1285	736	6133	6795	5768	5322
W. P. Roduner (14)				0	0	0	0	0	0
Joe S. Perry (14)				0	0	0	0	1025	307
Dave Hay (14)				0	0	0	0	5195	579
Ray Flanagan (14)				0	0	3011	2701	3892	2979
Breakwater Duck Club (15)				0	0	0	0	0	0
Aliso Water Ass'n (Aliso Canal)	226.2R	43.4R	Gravity	680	405	1200	5153	14224	3170
R. E. Jones	232.47L	37.16L				PLANT REMOVED			
R. E. Jones	232.65L	36.98L	1-6"			NO DIVERSION			
El Peco Ranch (Gravelly Ford Canal)	232.8R	36.8R	Gravity	0	0	0	0	0	1503
--HEAD OF GRAVELLY FORD CANAL - MILE 231.0R ABOVE MOUTH AND MILE 36.8R BELOW FRIANT--									
Carl Hobe	233.17R	36.46R	1-6" 1-10"			PLANT REMOVED PLANT REMOVED			
William Bucknoff	233.66R	35.97R	1-6"	0	0	0	18	54	35
W. A. Kochergen	234.00R	35.63R	1-6" 1-7"	0	0	0	8	45	33
M. Nazaroff	234.62L	35.01L	1-5"	0	0	0	0	0	0
E. Arata	234.68L	34.95L	1-4"	0	0	0	0	0	0
Wheeler	(17)235.02	(17)34.61	(18)	DOMESTIC USE (INCLUDING FAMILY GARDEN)					
J. A. Kochergen	235.03R	34.60R	1-5"			NO DIVERSION			
G. V. Hart	235.03L	34.60L	1-3"	0	0	1	0	3	0
E. F. Carlson	235.43R	34.20R	1-5"	0	0	0	19	0	3
Morello Winery	237.33L	32.30L	1-8"	0	0	16	175	83	69
Anna E. Beatty	237.43L	32.20L	1-4"			NO DIVERSION			
J. Peterson	237.98R	31.65R	1-6"	0	0	13	19	16	33
---SKAGGS BRIDGE - MILE 238.18 ABOVE MOUTH AND MILE 31.45 BELOW FRIANT--									
D. Verduzco	239.45R	30.18R	1-6"	0	0	0	0	0	12
Scheidt	239.79L	29.84L	(19)			NO DIVERSION			
--BOWSER RECORDER STATION - MILE 242.41L ABOVE MOUTH AND MILE 27.22L BELOW FRIANT--									
G. D. Maneely	242.71L	26.92L	(19)			NO DIVERSION			
P. J. Vincent	243.84R	25.79R	1-6" 1-4"	0	0	31	37	61	28
Lionel Steinberg	244.86L	24.77L	1-7"	0	0	PLANT REMOVED 0	43	4	27

* Mileage below mouth of Cottonwood Creek which is 0.5 mile below Friant Dam.

(1) Replaced 6" pump June 1946.
(2) Diverted through syphon from East Side Canal 0.3 mile below head.
(3) Pump located on East Side Canal 1.4R below head. Major source of water was Sand Slough joining East Side Canal at 1.0 mile below head.
(4) Replaced 8" pump October 1946.
(5) Acreage combined under plants at Miles 161.9R and 163.6R.
(6) Includes some double cropping and interplanting.
(7) Scattered flooding of grazing land and duck ponds.
(8) Includes Main Canal, Outside Canal and Helm Ditch. Excludes diversions by Sam Hamburg during June 15 to September 15.
(9) 2-24" pumps redivert from Outside Canal at 25.75L miles below head; except for June, July, August and September water was received from San Joaquin Canal Co.
(10) Duck ponds.

Water User	Monthly Diversions in Acre-Feet						Total Diversion Calendar Year Acre-Feet	Acreage Irrigated	
	July	Aug.	Sept.	Oct.	Nov.	Dec.		General	Rice
--FREMONT FORD BRIDGE - GAGING STATION - MILE 129.5 ABOVE MOUTH--									
--DELTA BRIDGE - GAGING STATION - MILE 158.7 ABOVE MOUTH--									
Erreca Farms	23	18	12	9	0	0	96	20	
Erreca Farms	105	95	78	260	0	0	602	(5) 500	
Erreca Farms (East Side Canal)	0	0	0	89	0	0	89	(5)	
D. L. McNamara (East Side Canal)	33	44	15	13	0	0	240	60	
San Luis Canal (Temple Slough)	19878	22794	17506	16389	7480	912	156181	(6)31886	
Allan Sapiro	0	18	0	0	0	0	18	60	
Ivan N. Zaninovich	6	7	2	0	0	0	21	35	
Antone Zaninovich	2	2	0	0	0	0	5	10	
--MENDOTA DAM - MILE 208.63 ABOVE MOUTH AND MILE 61.0 BELOW FRIANT--									
Grass Land Water Association - Mendota Pool	10098	6383	7853	29800	9616	0	80242	(7)70000	
Firebaugh Canal Co. - Mendota Pool	11466	11022	6625	2731	2041	1226	77619	(6)19972	1736
San Joaquin Canal Co. - Mendota Pool (8)	85555	82183	55130	24954	9356	3187	560662	(6)117081	6725
Sam Hamburg - Mendota Pool (9)	1365	1300	731	0	0	0	(9)3946	6000	
James M. Thuesen (Mowry Canal)	0	0	0	149	298	69	516	(10) 60	
Fresno Ranch	0	0	0	0	0	0	(12)2500	(12) 2500	
Lone Willow Slough									
Columbia Canal Co.	7616	7115	6183	5506	2390	244	55093	(6)16054	286
W. P. Roduner (14)	0	0	0	0	1047	0	1047	(13)3100	
Joe S. Perry (14)	0	0	0	325	395	71	2123	(13)1050	
Dave Hay (14)	0	0	0	746	730	107	7357	(13)4600	
Ray Flanagan (14)	3650	3358	188	0	0	0	19779	3310	1000
Breakwater Duck Club (15)	0	0	24	288	179	42	533	(10) 90	
Aliso Water Ass'n (Aliso Canal)	627	506	468	1640	793	712	29578	(13)25000	
R. E. Jones									
R. E. Jones									
El Peco Ranch (Gravelly Ford Canal)	0	0	0	186	60	0	1749	(13) 2000	
--HEAD OF GRAVELLY FORD CANAL - MILE 231.0R ABOVE MOUTH AND MILE 36.8R BELOW FRIANT--									
Carl Hobe									
William Bucknoff	0	0	0	15	0	0	122	55	
W. A. Kochergen	29	36	11	0	0	0	162	75	
M. Nazaroff	11	0	0	0	0	0	(16) 11	(16) 30	
E. Arata	5	0	0	5	0	0	(16) 10	(16) 20	
Wheeler								(19) 1	
J. A. Kochergen									
G. V. Hart	0	0	0	0	0	0	4	3	
E. F. Carlson	5	7	8	5	0	0	47	80	
Morello Winery	136	81	0	0	0	0	(16)560	(16) 262	
Anna E. Beatty									
J. Peterson	42	16	6	0	2	0	147	60	
--SKAGGS BRIDGE - MILE 238.18 ABOVE MOUTH AND MILE 31.45 BELOW FRIANT--									
D. Verduzco	32	62	27	0	0	0	133	39	
Scheidt									
--BOWSER RECORDER STATION - MILE 242.41L ABOVE MOUTH AND MILE 27.22L BELOW FRIANT--									
G. D. Maneely									
P. J. Vincent	57	31	20	40	0	0	305	95	
Lionel Steinberg	24	53	11	6	0	0	(16)168	(16)140	

(11) Several points of diversion by overflow from Mile 41.0L to 51.0L (from Friant).
(12) Receives only surplus operational spillage. Diversions and acreage estimated.
(13) Grazing land with scattered flooding.
(14) Delivery is through Chowchilla Canal rediverting from Lone Willow Slough 2.3R Miles below head.
(15) Point of rediversion on Lone Willow Slough 2.2 miles below head.
(16) Additional water received from Fresno Irrigation District.
(17) Point of diversion and place of use on island in midstream.
(18) Size of unit not listed.
(19) Estimated.

TABLE 129 (CONT'D)

DIVERSIONS AND ACREAGE IRRIGATED - UPPER SAN JOAQUIN RIVER - 1946
FREMONT FORD TO FRIANT DAM (FREMONT FORD TO GRAVELLY FORD)

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

Water User	Mile and Bank above Mouth	Mile and Bank below Friant *	Number and Size of Pump	Monthly Diversions in Acre-Feet					
				Jan.	Feb.	Mar.	Apr.	May	June
Josephine Jasper	246.15L	23.48L	1-5"	0	0	0	0	1	0
Josephine Jasper	246.34L	23.29L	1-8"	0	0	0	16	5	0
J. Reed	246.73L	22.90L	1-5"	0	0	0	1	18	8
Mike Jura	246.98L	22.65L	1-4"	0	0	0	11	23	11
Brockway	247.33R	22.30R	(2)			NO DIVERSION			
--HERNDON BRIDGE - MILE 247.38 ABOVE MOUTH AND MILE 22.25 BELOW FRIANT--									
Sam Deandra	247.50R	22.13R	1-5"	0	0	0	16	0	6
Frank, James and Adolph Oberti	247.64R	21.99R	1-5"	0	0	40	17	17	59
Frank, James and Adolph Oberti	247.65R	21.98R	1-4"	0	0	3	0	10	9
San Joaquin Light and Power Co.	247.82R	21.81R	1-3"	0	0	10	9	18	18
--HERNDON RECORDER STATION - MILE 248.31L ABOVE MOUTH AND MILE 21.32L BELOW FRIANT--									
Bud Bradburn	248.51L	21.12L	1-3"	0	0	0	5	12	12
John Danisi	248.72L	20.91L	1-5"	0	0	16	18	11	22
--SANTA FE RAILROAD CROSSING - MILE 249.23 ABOVE MOUTH AND MILE 20.40 BELOW FRIANT--									
Moosios, Moosios and Vlahos	249.51R	20.12R	1-4"	0	0	0	0	4	4
Moosios, Moosios and Vlahos	250.56R	19.07R	1-6"	0	0	0	29	18	28
Moosios, Moosios and Vlahos	250.76R	18.87R	1-7"	0	0	8	2	6	2
H. Jackson	250.88L	18.75L	(2)			NO DIVERSION			
D. M. Fulsom	251.19L	18.44L	1-4"			NO DIVERSION			
Sandstone Land & Cattle Co.	251.46L	18.17L	1-4"			NO DIVERSION			
W. A. McGillivary (4)	251.83L	17.8L	(2)			NO DIVERSION			
W. A. McGillivary (4)	251.93L	17.7L	(2)			NO DIVERSION			
West Coast Life Ins. Co. (4)	252.03L	17.6L	(2)			NO DIVERSION			
Geo. F. Seeman	252.79L	16.84L	1-5"			NO DIVERSION			
West Coast Life Ins. Co.	253.10L	16.53L	1-6"			NO DIVERSION			
West Coast Life Ins. Co.	253.38L	16.25L	1-5"			NO DIVERSION			
Fred Russel	253.79R	15.84R	1-6"	0	0	0	4	5	5
Howard and Epperson	254.57R	15.06R	(2)			NO DIVERSION			
Howard and Epperson	254.82R	14.81R	1-5" 1-6"			NO DIVERSION			
Bullard Ranch	254.98L	14.65L	1-7"	0	0	0	0	20	16
Fresno State College	255.05L	14.58L	1-4"			NO DIVERSION			
McEacherm and Larson	(5) 254.98	(5)14.65	1-5"			NO DIVERSION			
McEacherm and Larson	(5) 255.28	(5)14.35	1-5"			NO DIVERSION			
McEacherm and Larson	(5) 255.33	(5)14.30	1-5"			NO DIVERSION			
McEacherm and Larson	255.34R	14.29R	1-7"	0	0	0	11	12	67
McEacherm and Larson	(5) 255.84	(5)13.79	1-6"	0	0	0	20	35	20
McEacherm and Larson	255.84R	13.79R	1-5"	0	0	0	0	0	3
McEacherm and Larson	256.40R	13.23R	1-5"	0	0	0	0	10	8
McEacherm and Larson	256.52R	13.11R	1-5"	0	0	0	0	9	7

* Mileage below mouth of Cottonwood Creek which is 0.5 mile below Friant Dam.
(1) Additional water received from Fresno Irrigation District.
(2) Size of unit not listed.
(3) Acreage combined under plants at Miles 247.64R and 247.65R.

Water User	Monthly Diversions in Acre-Feet						Total Diversion Calendar Year Acre-Feet	Acreage Irrigated	
	July	Aug.	Sept.	Oct.	Nov.	Dec.		General	Rice
Josephine Jasper	11	8	2	0	0	0	22	15	
Josephine Jasper	14	0	13	0	0	0	(1)48	(1)136	
J. Reed	47	20	31	0	0	0	(1) 125	(1) 90	
Mike Jura	0	0	0	0	0	0	45	30	
Brockway									
--HERNDON BRIDGE - MILE 247.38 ABOVE MOUTH AND MILE 22.25 BELOW FRIANT--									
Sam Deandra	8	1	0	0	0	0	31	10	
Frank, James and Adolph Oberti	73	60	45	21	12	0	344	(3)136	
Frank, James and Adolph Oberti	4	37	32	0	1	0	96	(3)	
San Joaquin Light and Power Co.	23	23	16	8	0	0	125	30	
--HERNDON RECORDER STATION - MILE 248 ABOVE MOUTH AND MILE 21.32L BELOW FRIANT--									
Bud Bradburn	14	12	4	0	0	0	59	20	
John Danisi	23	13	4	0	0	0	107	40	
--SANTA FE RAILROAD CROSSING - MILE 249.23 ABOVE MOUTH AND MILE 20.40 BELOW FRIANT--									
Moosios, Moosios and Vlahos	7	7	0	0	0	0	22	11	
Moosios, Moosios and Vlahos	27	13	0	0	6	0	121	13	
Moosios, Moosios and Vlahos	14	9	0	0	0	0	41	12	
H. Jackson									
D. M. Fulsom									
Sandstone Land & Cattle Co.									
W. A. McGillivary (4)									
W. A. McGillivary (4)									
West Coast Life Ins. Co. (4)									
Geo. F. Seeman									
West Coast Life Ins. Co.									
West Coast Life Ins. Co.									
Fred Russel	11	4	3	1	0	0	33	23	
Howard and Epperson									
Howard and Epperson									
Bullard Ranch	34	24	0	0	0	0	94	39	
Fresno State College									
McEacherm and Larson									
McEacherm and Larson									
McEachern and Larson									
McEacherm and Larson	55	13	0	0	0	0	158	63	
McEacherm and Larson	12	0	0	0	0	0	87	20	
McEachern and Larson	0	0	0	0	0	0	3	(3) 40	
McEacherm and Larson	9	9	0	0	0	0	36	(3)	
McEacherm and Larson	5	7	0	0	0	0	28	(3)	

(4) Plants located on river slough.
(5) Point of diversion and place of use on an island in midstream.

TABLE 129 (CONT'D)

DIVERSIONS AND ACREAGE IRRIGATED - UPPER SAN JOAQUIN RIVER - 1946
FREMONT FORD TO FRIANT DAM (FREMONT FORD TO GRAVELLY FORD)

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

Water User	Mile and Bank above Mouth	Mile and Bank below Friant *	Number and Size of Pump	Monthly Diversions in Acre-Feet					
				Jan.	Feb.	Mar.	Apr.	May	June
W. W. Pitman	256.60R	13.03R	1-5"	0	0	0	16	7	26
Richard Holland	257.09L	12.54L	1-7"	NO DIVERSION					
Richard Holland	257.70L	11.93L	1-8"	0	0	0	14	25	28
L. D. Cobb	258.08R	11.55R	1-7"	0	0	0	22	19	21
--NEW LANES BRIDGE - MILE 258.33 ABOVE MOUTH AND MILE 11.30 BELOW FRIANT--									
R. J. Curtis	258.39L	11.24L	1-7"	0	0	0	0	0	6
Geo. E. Howe	258.50L	11.13L	1-4"	0	0	0	0	0	0
Geo. E. Howe	258.80L	10.83L	1-6"	0	0	0	0	7	4
Geo. E. Howe	258.66L	10.97L	1-5"	0	0	0	0	0	7
--LANES BRIDGE RECORDER STATION - MILE 258.93L ABOVE MOUTH AND MILE 10.70L BELOW FRIANT--									
Geo. E. Howe	259.07L	10.56L	1-8"	NO DIVERSION					
J. E. Cobb	259.30R	10.33R	(2)	NO DIVERSION					
J. E. Cobb	259.39R	10.24R	1-7"	0	0	1	25	41	11
--SITE OF OLD LANE BRIDGE - MILE 259.78 ABOVE MOUTH AND MILE 9.85 BELOW FRIANT--									
J. C. Cobb	259.80L	9.83L	1-5"	NO DIVERSION					
R. C. Arnold	261.53R	8.10R	1-6"	0	0	0	0	20	0
E. G. Rank	(3)262.07	(3)7.56	1-6"	NO DIVERSION					
Isabel Burnham	262.13R	7.50R	1-6"	NO DIVERSION					
D. M. Fulsom	262.27L	7.36L	1-7"	0	0	0	34	51	82
R. W. Fewel	262.43L	7.20L	1-5"	0	0	0	7	34	39
E. G. Rank	262.48L	7.15L	1-5"	0	0	0	2	11	37
Richard Holland	262.66L	6.97L	1-7"	0	0	27	43	55	59
Isabel Burnham	263.40R	6.23R	1-7"	0	0	0	0	0	182
Isabel Burnham	263.42R	6.21R	1-6"	NO DIVERSION					
H. W. Ball	263.63L	6.00L	(2)	GRAVEL PLANT WASH WATER					
H. W. Ball	264.08L	5.55L	1-10"	0	0	18	43	42	42
W. F. Ball	264.83L	4.80L	1-7"	0	0	0	0	2	2
V. D. Roullard	265.40L	4.23L	1-7"	NO DIVERSION					
			1-4"	0	0	0	4	5	18
B. B. Durando	257.56L	2.07L	1-6"	0	0	0	64	64	59
--BELOW FRIANT GAGING STATION - MILE 268.13L ABOVE MOUTH AND MILE 1.50L BELOW FRIANT--									
--FRIANT BRIDGE - MILE 268.88 ABOVE MOUTH - MILE 0.75 BELOW MOUTH OF COTTONWOOD CREEK AND MILE 1.25 BELOW FRIANT DAM--									
Wishon-Watson Co.	269.18	0.45R	1-5"	0	0	0	0	44	58
Wishon-Watson Co.	269.20	0.43R	(2)	NO DIVERSION					
FREMONT FORD TO FRIANT DAM									
Totals				7679	9909	89580	117275	150663	134212
Average cubic feet per second				125	354	1457	1971	2450	2255
Monthly use in % of Seasonal				0.7	1.0	8.9	11.6	15.0	13.3
Madera Canal	270.13								
Madera Irrigation District			(5)	0	0	0	1403	13231	14033
C. L. Floto			(6)	0	0	0	0	0	0
FRIANT DAM - MILE 270.13 ABOVE MOUTH OF SAN JOAQUIN RIVER AND 0.5 MILE ABOVE MOUTH OF COTTONWOOD CREEK.									

* Mileage below mouth of Cottonwood Creek which is 0.5 mile below Friant Dam.

(1) Acreage combined under plants at Miles 10.97L, 10.85L and 11.13L.

(2) Size of unit not listed.

(3) Point of diversion and place of use on an island in midstream.

(4) Additional water received from wells.

(5) Point of delivery from Madera Canal - miles below head of canal, Hildreth Creek Turnout 13.1L, Fresno River Wasteway 18.8L, Dry Creek 24.2L, Berenda Creek 30.4L and Ash Creek 35.6L.

Water User	Monthly Diversions in Acre-Feet						Total Diversion Calendar Year Acre-Feet	Acreage Irrigated	
	July	Aug.	Sept.	Oct.	Nov.	Dec.		General	Rice
W. W. Pitman	24	21	9	6	0	0	109	32	
Richard Holland									
Richard Holland	25	15	16	3	0	0	126	30	
L. D. Cobb	9	0	0	0	0	0	71	35	
--NEW LANES BRIDGE - MILE 258.33 ABOVE MOUTH AND MILE 11.30 BELOW FRIANT--									
R. J. Curtis	19	1	14	0	0	0	40	20	
Geo. E. Howe	27	5	12	2	0	0	46	(1) 15	
Geo. E. Howe	7	13	15	4	0	0	50	(1)	
Geo. E. Howe	8	8	3	0	0	0	26	(1)	
--LANES BRIDGE RECORDER STATION - MILE 258.93L ABOVE MOUTH AND MILE 10.70L BELOW FRIANT--									
Geo. E. Howe									
J. E. Cobb									
J. E. Cobb	29	30	9	2	0	0	148	20	
--SITE OF OLD LANE BRIDGE - MILE 259.78 ABOVE MOUTH AND MILE 9.85 BELOW FRIANT--									
J. C. Cobb									
R. C. Arnold	0	40	0	0	0	0	60	28	
E. G. Rank									
Isabel Burnham									
D. M. Fulsom	102	52	30	0	0	0	(4)351	(4) 185	
R. W. Fewel	44	30	26	0	1	0	181	72	
E. G. Rank	28	29	23	3	4	0	137	22	
Richard Holland	56	73	47	15	0	0	375	96	
Isabel Burnham	116	134	59	0	0	0	491	60	
Isabel Burnham									
H. W. Ball									
H. W. Ball	62	36	12	0	0	0	255	21	
W. F. Ball	0	1	1	0	0	0	6	1	
V. D. Roullard									
	16	6	6	0	0	0	55	13	
B. B. Durando	65	40	34	8	0	0	334	95	
--BELOW FRIANT GAGING STATION - MILE 268.13L ABOVE MOUTH AND MILE 1.50L BELOW FRIANT--									
--FRIANT BRIDGE - MILE 268.88 ABOVE MOUTH - MILE 0.75 BELOW MOUTH OF COTTONWOOD CREEK AND MILE 1.25 BELOW FRIANT DAM--									
Wishon-Watson Co.	69	25	0	0	58	0	254	42	
Wishon-Watson Co.									
FREMONT FORD TO FRIANT DAM									
Totals	142002	136011	95399	83278	34469	6570	1007047	305888	9727
Average cubic feet per second	2309	2212	1603	1354	579	107	1391		
Monthly use in % of Seasonal	14.1	13.5	9.5	8.3	3.4	0.7			
Madera Canal									
Madera Irrigation District	17487	20023	19224	15104	6375	0	(7)106880	(8)142000	
C. L. Floto	0	811	0	0	0	0	811	600	
FRIANT DAM - MILE 270.13 ABOVE MOUTH OF SAN JOAQUIN RIVER AND 0.5 MILE ABOVE MOUTH OF COTTONWOOD CREEK.									

(6) Point of delivery through Hildreth Creek Turnout from Madera Canal.

(7) This diversion serves largely to aid in the replenishment of the ground water supply in Madera area, and little water is used for direct surface irrigation.

(8) Total irrigable acreage in Madera Irrigation District.

TABLE 130

DIVERSIONS AND ACREAGE IRRIGATED - FRESNO SLOUGH AND FRESNO SLOUGH BY-PASS* - 1946

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

Water User	Mile and Bank above Mouth **	Number and Size of Pump	Monthly Diversions in Acre-Feet					
			Jan.	Feb.	Mar.	Apr.	May	June
E. P. Jennings	2.9L	1-10"	0	0	147	0	58	8
Traction Ranch	9.6R	1-12"	0	0	0	0	97	181
Charles Sachs	10.9L	(2)	0	0	0	0	0	137
--CONFLUENCE OF FRESNO SLOUGH BY-PASS AT MILE 11.8R ABOVE MOUTH OF FRESNO SLOUGH--								
Traction Ranch	11.8R	(3)	0	0	463	585	755	1064
Kerman Cattle Co.	(5)11.8R	1-12"	0	0	87	146	203	219
James Irr. Dist., "N" Booster	13.25R	1-24" 1-20" 1-14"	0	0	1782	1009	0	1163
J. W. Wilson	13.5L	1-12"	0	0	47	0	7	15
Tranquillity Irr. Dist., Lift No. 1	14.1L	1-24" (7) (8)1-24"	0	0	1175	676	0	602
Tranquillity Irr. Dist., Lift No. 2	15.9L	1-24" 1-30"	0	0	2216	1008	0	1162
Totals			0	0	5917	3424	1120	4651
Average cubic feet per second			0	0	96	58	18	78
Monthly use in per cent of seasonal			0	0	13	8	3	11

* 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. See Table 71, Flow of Fresno Slough By-Pass.

** 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

(1) Acreage combined under plants at Miles 9.6R and 11.8R.

Water User	Monthly Diversions in Acre-Feet						Total Diversion Calendar Year Acre-Feet	Acreage Irrigated	
	July	Aug.	Sept.	Oct.	Nov.	Dec.		General	Rice
E. P. Jennings	27	30	103	29	0	63	465	265	
Traction Ranch	169	2	0	0	0	0	449	(1) 305	(1)1116
Charles Sachs	2116	539	1354	0	0	0	4146	2700	
--CONFLUENCE OF FRESNO SLOUGH BY-PASS AT MILE 11.8R ABOVE MOUTH OF FRESNO SLOUGH--									
Traction Ranch	1026	995	606	81	0	0	5575	(1)	(1)
Kerman Cattle Co.	228	189	202	292	70	0	1636	(4)2000	
James Irr. Dist., "N" Booster	2144	2355	1493	549	77	0	10572	(6)5246	(6) 215
J. W. Wilson	44	41	0	0	0	0	154	180	
Tranquillity Irr. Dist., Lift No. 1	2524	2225	1056	287	19	0	8664	(6)(9)8449	(6)(9)537
Tranquillity Irr. Dist., Lift No. 2	2547	2522	1744	746	208	0	12153	(9)	(9)
Totals	10825	8898	6558	1984	374	63	43814	19145	1868
Average cubic feet per second	176	144	110	32	6	1	61		
Monthly use in per cent of seasonal	25	20	15	4	1	0			

(2) Three pumps in operation - size not listed.
(3) New turbine pump installed 5/22/46, size not listed.
(4) Scattered flooding of grazing land and duck ponds.
(5) Diverted from Fresno Slough By-Pass 4.5R miles above confluence.
(6) Acreage approximated.
(7) Pump installed 6/27/46 and removed 8/30/46, size not listed.
(8) Pump installed 8/30/46.
(9) Acreage combined under plants at Miles 14.1L and 15.9L.

TABLE 131

DIVERSIONS AND ACREAGES IRRIGATED - MERCED RIVER - 1946

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
Stevinson Water District	1.8R	1-10"				NO DIVERSION							
Stevinson Water District	3.8R	1-15" (1)1-20"				335	441	582	375	253	1986	435	
Milton Gordon	4.0L	1-10"	8	5	5	18	32	22	12	3	105	40	
--GAGING STATION - MERCED RIVER BELOW STEVINSON DRAIN - MILE 4.6--													
Salvador De Angelis	4.8L	1-12"		19	12	6	5	8	5		55	15	
Maria De Angelis	5.8L	1-12"	13	23	35	63	91	43	12	12	292	80	
J. F. Peck	6.1L	1-18"				NO DIVERSION							
Stevinson Water District	6.55L	1-18"				NO DIVERSION							
James F. Corado (2)	8.5L	1-12"		44	9	15	38	13	2		121	35	
Manuel Clemintino	8.85L	1-12"		8	27	46	43	10	1	2	137	74	
Samuel B. McCullagh	9.4L	1-12"		63	70	100	95	101	63	8	500	235	
Joe R. Jacinto	9.6L	1-12"		35	51	56	85	49	54	35	365	104	
R.W. Adams and J.B. Silva Estate (3)	10.35L	1-8" 1-10"	1	216	204	295	355	292	203	101	1667	405	
R. E. Prusso	10.8R	1-6"		1	1	1	21	4			28	30	
Taz La Follette (4)	10.84L	1-12"				8	109	80	65		262	(5)160	
R. E. Prusso and John Vieira (6)	10.85L	1-5" 1-12"		120	156	102	143	128	74	26	(7) 749	209	
Tony Vieira (8)	11.6L	1-8"	21	80	38	132	183	132	92	34	712	160	
J. Regello	11.6L	1-12"		67	45	45	56	71	68		352	76	
--NEW MILLIKEN BRIDGE - MILE 11.65--													
E. & J. Gallo Winery Ranch (9)	12.35L	1-10"		11	6		1				18	(10)100	
Soren Husman (4)	12.36L	1-6"					22	10		4	35	10	
E. & J. Gallo Winery Ranch (9)	12.85L	1-10"	44	40	5	48	86	42			265	160	
E. & J. Gallo Winery Ranch (9)	16.5L	1-10"		42	9	66	200	39	1		357	150	
C. J. Carpenter (11)	17.05L	(4)1-7"			7	4	8	17	12		48	15	
--U.S.G.S. GAGING STATION - MERCED RIVER NEAR LIVINGSTON - MILE 17.1 (REMOVED)													
Sylvia Gotte (12)	17.7L	1-5"		2	4	2	4	3			15	6	
J. H. Thomas	18.4L	1-6"		13	13	30	19	25	15		115	(13)32	
John Reiningheus	20.4L	1-6"		13	19	46	44	35	17	8	182	80	
W. J. Hoskins (4)	20.6R	1-6"		1	6	12	11	9	10	2	51	(14)20	
W. J. Hoskins	20.65R	1-4"	7	9	4	3	4	2	3	1	33	(15)	
--SOUTHERN PACIFIC RAILROAD (MAIN LINE) - MILE 21.05--													
A. C. Jorgensen #1	21.05R	1-6"		14	15	15	14	14			72	25	
A. C. Jorgensen #2	22.2R	1-16"	98	172	66	168	253	197	146	29	1129	240	
A. C. Jorgensen #3a (4)	23.25R	1-6"	2	2	2	3	3	2	2		16	4	
A. C. Jorgensen #3	23.3R	1-12" 1-15"	23	32	123	109	78	87	34		486	130	
A. C. Jorgensen #4	23.6R	1-8"		23	33	4	10	20			90	43	
Manuel A. Bettencourt	23.8R	1-6"		7	16	16	16	8	3		66	33	

(1) This 20" unit replaced 15" unit during the 1946 season.
(2) Formerly listed as Francis Hartman.
(3) Formerly listed as R. W. Adams and J. B. Silva.
(4) New installation in 1946.
(5) Received some water from plant at Mile 10.85L.
(6) Formerly listed as W. D. Adams.
(7) Furnished some water to Mile 10.84L.
(8) Formerly listed as L. E. Milliken and Edna McKinley.
(9) Formerly listed as Valley Agricultural Co.
(10) Additional water received from wells.
(11) Formerly listed as Merced River Farms.
(12) Formerly listed as O. B. Daniels.
(13) Includes 9 acres on C. P. Hockett lands.
(14) Combined acreage this plant and one at Mile 20.65R.
(15) See plant at Mile 20.6R.

TABLE 131 (CONT'D)
DIVERSIONS AND ACREAGES IRRIGATED - MERCED RIVER - 1946

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
Warren F. McConnell	24.5L	1-6"				NO DIVERSION							
T. Nishihara	24.6R	1-6"			3	40	22	7			72	35	
T. Nishihara	25.0R	1-5"		1		4	23	1			29	25	
T. Nishihara	25.5R	1-6"			5	7	9	1	1		23	50	
Merced River Farms Assn.	26.3R	1-8"		109	143	148	134	94	50	33	711	99	
W. C. Magneson	26.55R	1-5"		5	4	5	8	6	4	2	34	25	
W. C. Magneson	27.0R	1-6"				NO DIVERSION							
--SANTA FE RAILROAD CROSSING - MILE 27.05--													
--GAGING STATION - MERCED RIVER AT CRESSEY - MILE 27.6--													
W. C. Magneson	27.6R	1-10"		61	100	57	141	92	63		514	130	
T. Nishihara	27.8R	1-4" 1-6"	14	3	24	16	19	23	8	2	109	33	
M. Uyekubo (1)	28.1R	1-5"		17	16	27	18	5	2		85	20	
John Farie	28.4R	1-5"			3	6	7	5			21	18	
J. Campadonica	28.6R	1-6"					7	8			15	12	
Oliver Alves	28.6R	1-8"			39	53	52	21			165	71	
Anthony Demchille	29.1R	1-7"			16	33	30	38	5		122	50	
Anthony Demchille	29.75R	1-6"		8	28	9	30	21	7		103	48	
Manuel Silva	29.9R	2-6"			66	25	78	99	61	7	336	(2)180	
Rose and Schaefer	30.7L	1-6"		26		13	12	11	4		66	37	
Manuel Silva	30.95R	1-12"			53	60	179	64	80	61	497	200	
Rose and Schaefer	31.1L	1-8"		75	79	71	46	110	151	61	593	(3)100	
T. H. Carlon	31.5R	1-6"				NO DIVERSION							
--SOUTHERN PACIFIC RAILROAD - OAKDALE BRANCH - MILE 32.52--													
Robert J. Ramsey	33.1R	1-6"		6	6	34	145	46			237	(4)200	
Robert J. Ramsey	33.55R	1-6"		7	29	37	132	73			293	(5)	
Reinero Bros.	39.2L	1-24" box					46	17			63	45	
--GAGING STATION - YOSEMITE VALLEY RAILROAD CROSSING - MILE 42.1													
Totals			231	1380	1595	2393	3608	2787	1720	684	14398	4484	0
Average cubic feet per second			4	23	26	40	59	45	29	11	30		
Monthly use in per cent of seasonal			1.6	9.6	11.1	16.6	25.0	19.4	11.9	4.8			

(1) Formerly listed as Y. Tanabe.
(2) Additional water received from wells.
(3) Acreage partially estimated.
(4) Combined acreage for this plant and one at Mile 33.55R.
(5) See plant at Mile 33.1R.

TABLE 132

DIVERSIONS AND ACREAGES IRRIGATED - TUOLUMNE RIVER - 1946

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"	70	175	117	142	215	242	169	118	(1) 1248	(2)2100	
J. DeSouza and J. B. Silva	2.2R	1-6"			5	8	5	6	11		35	11	
Katheiser Bros. (3)	3.1R	1-16"box		12		6	4				22	(4) 30	
--GAGING STATION - TUOLUMNE RIVER AT TUOLUMNE CITY - MILE 3.35--													
Bancroft Fruit Farms	4.1R	1-12"		60	62	102	45	61	24	37	391	100	
Bancroft Fruit Farms	5.0R	1-10"	25	59	115	98	139	115	59	59	669	140	
Eugene Boone, Galen Hartwich and William Podesto (5)	7.1R	1-10"		56	102	59	66	52	44		379	90	
W. F. Duffy	7.2R	(6)1-5" 1-7"	50	10	14	6	9	15	35	8	147	(7) 150	
Ella T. Rahilly (Miss)	7.8L	1-10"			15	50	74	25			164	63	
W. F. Duffy	8.4R	1-10"	71	76	142	75	175	70	37	3	649	(7)	
Harley Hise	9.4L	1-12"		43	44	50	50	50			237	95	
Tuolumne Cooperative Farms, Inc. (8)	10.2R	1-10"		20	26	10	19	25	13	9	122	42	
Kenneth H. Durand (9)	15.25R	1-6"			2	8	6	4	6		26	20	
G.B. and L.D. Podesto	15.75R	1-3"			3	4	3	3	2		15	17	
--GAGING STATION - TUOLUMNE RIVER AT MODESTO - MILE 15.75--													
--SOUTHERN PACIFIC RAILROAD (MAIN LINE) - MILE 15.8--													
--DRY CREEK CONFLUENCE - MILE 16.5R--													
W. L. Bowron	20.1R	1-8"		7	10	14	9	11	11	3	65	16	
L. R. Hughson (Mrs.)	20.3R	1-8"			11	8	15	34	20	9	97	35	
Ray L. Heimann (10)	20.5R	1-10"		8	25	18	20	29	11		111	62	
--SANTA FE RAILROAD - MILE 21.6--													
L. DeMartini Co.	29.6L	1-7"		24	24	24	24	24	24	8	152	78	
L. Firpo	30.2L	1-10"			19	35	31	21	21		127	95	
--SOUTHERN PACIFIC RAILROAD (OAKDALE BRANCH) - MILE 31.5--													
--GAGING STATION - TUOLUMNE RIVER AT HICKMAN BRIDGE - MILE 31.7--													
George H. Sawyer	39.8L	1-6"		15	29	17	31	102	72		266	(11)420	
--GAGING STATION - TUOLUMNE RIVER AT ROBERTS FERRY BRIDGE - MILE 39.9--													
Total			216	565	765	734	940	889	559	254	4922	3564	
Average cubic feet per second			3.5	9.5	12.4	12.3	15.3	14.5	9.4	4.1	10.13		
Monthly use in per cent of seasonal			4.4	11.5	15.5	14.9	19.1	18.0	11.4	5.2			

(1) Also served by drainage water from Modesto Irrigation District.
(2) This acreage partially estimated.
(3) Formerly listed as E. B. Henry.
(4) Also served from Modesto Irrigation District.
(5) Formerly listed as Boone, Hardwick and Podesto.
(6) 5" unit removed in 1946.
(7) Combined acreage plants at Mile 7.2R and Mile 8.4R.
(8) Formerly listed as Dr. Benson.
(9) Formerly listed as A. M. Deslauriers.
(10) Formerly listed as W. S. Leckron.
(11) Also receives water from wells.

TABLE 133

DIVERSIONS AND ACREAGES IRRIGATED - STANISLAUS RIVER - 1946

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
Chris Baron (1)	1.1R	1-6"					3	2			5	27	
E. W. Hawkins (Mrs.)	1.8R	1-6"		9		26	12	26	18		91	35	
A. J. Chisholm	2.9R	1-8"		2	40	3	114	26			185	60	
C. M. Carroll (2)	3.1R	1-5"			10	17	10	19	12	4	72	20	
R. D. March (3)	4.0R	1-5"			2	1					3	6	
--GAGING STATION - STANISLAUS RIVER NEAR MOUTH - MILE 4.3-(4)													
Winfield S. Overton Estate	5.25L	1-12"	28	78	163	119	164	155	110	113	930	(6) 225	
--GAGING STATION - STANISLAUS RIVER AT BRET HARTE PUMP - MILE 5.9--(7)													
Reclamation District 2064	5.9R	1-16"	78	514	585	916	768	781	435	240	4317	(8) 922	
McMullin R.D. 2075	5.95R	2-16"	606	1442	1268	1563	1883	1638	1068	678	10146	(9)2110	
Henry Pelucca	6.7L	1-15"		119			65	54			238	(10) 70	
C. C. Updike (Mrs.)	8.2L	1-12"		2	15		14				31	120	
Caswell Bros.	9.8R	(11)1-16"	54	283	286	365	409	380	205	159	2141	(12)419	
N. E. Cannon (13)	10.0R	1-10"	23	185	225	243	223	278	158	56	1391	200	
D. F. Koetitz	10.1L	1-10"	51	158	187	205	280	199	250	152	1482	308	
Joseph Hertle	10.5L	1-10"	15	26	24	21	21	26	9		142	60	
--SOUTHERN PACIFIC RAILROAD BRIDGE - (MAIN LINE) - MILE 15.9--													
--GAGING STATION - STANISLAUS RIVER NEAR RIPON - MILE 16.0--													
A. Girardi	17.0L	1-12"			55	13	82	119	40	9	318	(14)170	
Edward B. Regan (15)	18.5R	1-10"			29	110	90	86	33		348	120	
Allen Ranch (Dr. Rollin Reeves)	20.75R	1-14"		413	635	550	500	516	200	126	2940	(12)375	
Heath Ranch	20.9L	1-5"	7	10	4						21	16	
B. Bonora	21.75R	1-10"			80	99	10	240	56	49	534	75	
Riverside Ranch	22.3R	1-10"				15	22				37	11	
--MODESTO-ESCALON BRIDGE - MILE 28.15--													
--SANTA FE RAILROAD CROSSING - MILE 31.85--													
--GAGING STATION - STANISLAUS RIVER AT RIVERBANK - (BURNEYVILLE BRIDGE) - MILE 32.0--													
Oakdale I.D.(Riverbank Pump) (16)	32.9L	1-12"	NO DIVERSION										
Oakdale I.D. (Crawford Pump) (16)	35.9L	1-14"		55	132	188	266	175	100	27	943	(16)457	
Oakdale I.D. (Brady Pump) (16)	37.0L	1-12"		20	40	109	110	112	60	42	493	(16)536	
--SOUTHERN PACIFIC RAILROAD (OAKDALE BRANCH) - MILE 39.0--													
--GAGING STATION - STANISLAUS RIVER AT ORANGE BLOSSOM BRIDGE - MILE 44.7--													
Totals			862	3316	3780	4563	5046	4832	2754	1655	26808	6343	0
Average cubic feet per second			14	56	62	77	82	79	46	27	55		
Monthly use in per cent of seasonal			3.2	12.4	14.1	17.0	18.8	18.0	10.3	6.2			

(1) Formerly listed as Frank Coker.
(2) Formerly listed as Joe Costa.
(3) Formerly listed as D. G. Beale.
(4) Installed August 16, 1946, replaces station (Bret Harte Pump) at Mile 5.9.
(5) Formerly listed as Winfield S. Overton.
(6) Excludes 20 acres served from plant at Mile 6.7L.
(7) Replaced on August 16, 1946 by station established at Mile 4.3.
(8) Excludes 160 acres served by plant at Mile 5.95R.
(9) Includes 160 acres on Reclamation District 2064 lands at plant at Mile 5.9R.
(10) Includes 20 acres on Overton lands at Mile 5.25L.
(11) Replaces 16" unit listed at this location in 1945.
(12) Partially estimated.
(13) Formerly listed as Pacific States Savings and Loan Company.
(14) Also served from Modesto Irrigation District.
(15) Formerly listed as American Trust Company.
(16) Oakdale Irrigation District for season 1946 maintained plants at Miles 35.9L and 37.0L to supplement District gravity supply.

TABLE 134

ANNUAL COMPARATIVE MONTHLY DIVERSIONS IN ACRE-FEET 1924 TO 1946
SACRAMENTO RIVER - SACRAMENTO TO REDDING

Year	March	April	May	June	July	August	September	October	Seasonal Diversions
1924	7324	102511	184043	186073	189081	163677	97976	22088	952773
1925	1200*	11177	87709	184151	211788	194888	134442	18108	843463
1926	4000*	34326	195052	258889	259777	226874	98632	30220	1107770
1927	600*	31327	206864	234116	260018	241876	139469	44993	1159263
1928	1900*	52335	207747	229261	227058	214549	92114	29574	1054538
1929	5600*	138283	204360	167378	207785	191346	107103	43954	1065809
1930	3100*	74236	198836	221852	217698	199875	107577	32681	1055855
1931	30199	222932	257156	227158	242076	209351	101822	44572	1335266
1932	4661	123973	176667	194500	197849	171122	99657	51571	1020000
1933	4452	118677	188004	189852	197452	185945	105071	52267	1041720
1934	2599	109638	204710	193469	202843	191488	107885	44331	1056963
1935	1524	18598	157817	203562	206813	195215	112498	30137	926164
1936	7320	76534	203802	194110	216217	206858	104203	45925	1054969
1937	3459	32727	210339	210927	235304	217924	133271	26510	1070461
1938	5285	29942	121847	199745	218572	208414	118177	30248	932230
1939	63636	202428	227491	233319	230319	209735	90708	43412	1301048
1940	1802	18073	182534	218505	249012	228765	119951	43988	1062630
1941	1883	5274	157567	228387	265229	259557	177189	55029	1150115
1942	1991	11727	187657	268091	286655	278848	186708	61298	1278975
1943	1769	61409	257673	276759	288930	288024	190456	51915	1416935
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
Average Acre-Feet	7289	84189	207781	228676	245117	228330	129827	43516	1174725
Average c.f.s.	119	1415	3379	3843	3986	3713	2182	708	2417
Monthly diversion in per cent of Seasonal	0.6	7.2	17.7	19.5	20.9	19.4	11.0	3.7	

* Estimated.

TABLE 135

ANNUAL COMPARATIVE MONTHLY DIVERSIONS IN ACRE-FEET 1924 TO 1946
FEATHER RIVER - OROVILLE TO MOUTH

Year	March	April	May	June	July	August	September	October	Seasonal Diversions
1924	2652	36440	75741	60132	58418	67365	41618	12980	355346
1925	0*	9506	70947	88956	90047	81340	63395	8829	413020
1926	0*	16528	83297	104100	105255	101623	54446	4083	469332
1927	0*	17522	96458	107706	114211	102251	71514	18669	528331
1928	0*	19912	101655	109875	104359	97452	46986	12040	492279
1929	1500*	48450	97295	83570	87061	82177	37711	12711	450475
1930	0*	31719	78154	91418	93250	89300	40912	20811	445564
1931	5887	67203	98054	85024	81941	71953	39288	14788	464138
1932	2158	50002	85950	94140	99640	93180	49359	22284	496713
1933	5388	31219	91529	91635	94231	85891	54515	23918	478326
1934	2245	34217	92225	82379	81467	72334	44121	19020	428008
1935	214	1538	51974	89713	92372	85835	51342	17885	390873
1936	768	14136	92675	92002	99147	90575	56374	33416	479093
1937	620	5647	92614	99882	109850	103248	65946	29958	507765
1938	0	3512	76975	98534	108039	104846	77969	42725	512600
1939	3583	71539	99567	90960	92044	83292	37752	22620	501357
1940	188	2207	84408	95502	105337	93454	59182	33695	473973
1941	0	2448	70513	72971	103334	100433	78451	47090	475240
1942	0	0	61352	113416	125530	122146	86814	30435	539693
1943	0	13290	101599	125318	131210	123282	93309	35495	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
Average Acre-Feet	1107	26124	92212	99024	104622	97864	61386	25559	507898
Average c.f.s.	18	439	1500	1664	1702	1592	1032	416	1045
Monthly diversion in per cent of Seasonal	0.2	5.1	18.1	19.5	20.6	19.3	12.1	5.1	

* Estimated.

TABLE 136

ANNUAL COMPARATIVE MONTHLY DIVERSIONS IN ACRE-FEET 1925 TO 1946
YUBA RIVER - SMARTVILLE TO MOUTH

Year	March	April	May	June	July	August	September	October	Seasonal Diversions
1925	-	-	617	1594	985	586	249	14	4045
1926	0	0	4681	6825	8893	10785	4604	120	35908
1927	-	304	6492	9761	9808	8733	4220	432	39750
1928	0	0	7329	8759	9651	8816	2245	0	36800
1929	0	3972	10808	8843	9376	8710	7308	4237	53254
1930	0	4803	9234	10293	11752	10825	7137	4477	58521
1931	0	10471	12111	10427	8991	8986	6468	5866	63320
1932	0	8778	10151	9973	9525	9188	6371	4215	58201
1933	0	7617	11048	10516	10917	10920	7724	4627	63369
1934	0	7112	11137	10985	11235	8454	3496	232	52651
1935	0	525	9034	11008	11313	10013	6674	283	48850
1936	0	9709	11579	10513	10330	10009	7908	4010	64058
1937	0	8093	9913	10055	9749	9815	8835	2703	59163
1938	0	360	4807	9371	9982	9433	8284	1020	43257
1939	176	8986	13174	12890	12889	12739	8304	3955	73113
1940	0	1326	9377	14114	15190	11798	10780	7383	69968
1941	0	2624	10589	13076	13574	13419	10672	9576	73530
1942	0	36	5703	14736	14955	14841	13086	11349	74706
1943	0	1903	10622	15237	17203	16972	16610	15252	93799
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
* Average Acre-Feet	84	4341	9423	11177	11559	10944	8240	5252	61020
* Average c.f.s.	1	73	153	188	188	178	138	85	126
* Monthly diversion in per cent of Seasonal	0.1	7.2	15.4	18.4	18.9	17.9	13.5	8.6	

* Analysis covers only period 1926 to 1946, inclusive.

TABLE 137

ANNUAL COMPARATIVE MONTHLY DIVERSIONS IN ACRE-FEET 1925 TO 1946
AMERICAN RIVER - FAIROAKS TO MOUTH

Year	March	April	May	June	July	August	September	October	Seasonal Diversions
1925	10*	66	261	985	1233	1198	458	142	4353
1926	0*	5	390	1162	1519	894	480	156	4606
1927	5*	16	317	1028	1754	1577	529	410	5636
1928	10*	121	580	1406	1263	965	832	458	5635
1929	50*	482	812	936	1539	1280	864	361	6324
1930	30*	317	436	1250	1302	976	504	140	4955
1931	46	469	1127	916	1237	1027	510	288	5620
1932	39	390	598	1116	1317	1164	556	301	5481
1933	0	106	471	1070	1317	924	424	303	4615
1934	63	431	896	1078	1281	806	624	326	5505
1935	5	338	663	893	1289	824	603	200	4815
1936	44	312	355	786	1208	1005	667	350	4727
1937	3	119	329	1082	1518	1252	797	281	5381
1938	0	100	267	824	1256	1117	635	88	4287
1939	73	380	932	1616	1699	1151	557	246	6654
1940	44	339	488	1216	1785	1038	686	456	6052
1941	150	253	379	836	1531	1202	673	285	5309
1942	0	0	13	678	1395	1187	789	104	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
Average Acre-Feet	26	194	447	1033	1393	1082	648	245	5068
Average c.f.s.	0.4	3	7	17	23	18	11	4	10
Monthly diversion in per cent of Seasonal	0.5	3.9	8.8	20.4	27.5	21.3	12.8	4.8	

* Estimated.

TABLE 138

ANNUAL COMPARATIVE MONTHLY DIVERSIONS IN ACRE-FEET
AND GROSS SEASONAL DUTY OF WATER 1924 TO 1946
OLD SAN JOAQUIN RIVER - DELTA UPLANDS

Year	March	April	May	June	July	August	September	October	Seasonal Diversion	Acreage Irrigated General	Acreage Irrigated Rice	Gross Seasonal Duty, Acre-Feet per Acre
1924	10320	10311	12600	12434	12460	10845	8277	3633	80880	29190	0	2.8
1925	100*	1737	7330	13233	16264	13962	9404	2347	64377	34677	0	1.9
1926	500*	4440	15526	17420	16690	15283	12376	2151	84386	37480	0	2.3
1927	80	1815	16312	14758	14252	12651	9398	2504	71770	35351	0	2.0
1928	500*	3430	16895	15037	14526	13701	9185	2679	75953	39924	0	1.9
1929	2000*	12977	13170	8894	14735	13143	9465	3389	77773	37359	0	2.1
1930	400*	5624	15152	14488	15289	12958	8535	3019	75465	36480	0	2.1
1931	5735	17099	10400	9245	14125	10854	3522	389	71369	34232	0	2.1
1932	296	5460	9318	9343	9803	8379	5718	2636	50953	27942	0	1.8
1933	488	10114	10351	10092	10938	10414	6082	3463	61942	27851	0	2.2
1934	3204	14687	10321	8708	12827	9946	5817	3019	68529	29792	0	2.3
1935	10	30	11027	13473	12973	10171	6933	2082	56699	28307	0	2.0
1936	420	5310	12235	8621	14492	9994	6958	5239	63269	30232	0	2.1
1937	3	2621	13418	11093	13590	11934	7100	4853	64612	31913	0	2.0
1938	0	1313	8628	11989	9806	8841	6250	3560	50393	29658	0	1.7
1939	7728	12880	8746	12055	13453	9855	4977	1669	71363	34956	0	2.0
1940	0	1015	9527	10943	14091	10217	6148	3306	55247	29009	0	1.9
1941	0	447	5492	11541	13087	10009	7382	2909	50867	28842	0	1.8
1942	0	516	7175	11077	13143	11425	6740	2878	52954	28749	0	1.8
1943	0	2048	11293	12463	13745	11945	7568	3104	62166	40607	0	1.5
1944	2921	11827	13918	13224	16911	15667	10753	4694	89915	32331	0	2.8
1945	595	7544	16791	17092	19809	14818	10873	4433	91955	32139	0	2.9
1946	4640	14371	17736	16948	19662	18238	9914	4927	106436	34263	0	3.1
Average	1734	6422	11885	12354	14206	11964	7797	3174	69534	32663	0	2.0
Average c.f.s.	28	108	193	208	231	195	131	52	143			
Monthly diversion in per cent of Seasonal	2.5	9.2	17.1	17.8	20.4	17.2	11.2	4.6				

* Estimated.

TABLE 139

ANNUAL COMPARATIVE MONTHLY DIVERSIONS IN ACRE-FEET
AND GROSS SEASONAL DUTY OF WATER 1924 TO 1946
TOM PAINE SLOUGH - DELTA UPLANDS

Year	March	April	May	June	July	August	September	October	Seasonal Diversion	Acreage Irrigated General	Acreage Irrigated Rice	Gross Seasonal Duty, Acre-Feet per Acre
1924	1126	1926	2529	2696	2238	2419	1474	1242	15650	2810	0	5.6
1925	0*	500*	1672	3491	3027	3058	2205	933	14886	7441	0	2.0
1926	100*	926	3676	3095	3238	2903	2507	693	17138	4973	0	3.4
1927	0*	94	3700	2911	3099	3166	2630	1655	17255	6157	0	2.8
1928	200*	785	2111	2589	2456	2353	2497	1649	14640	4906	0	3.0
1929	500*	1554	2376	1642	3028	2814	2100	1154	15168	5195	0	2.9
1930	100*	764	2081	2132	2326	2124	1752	960	12239	4987	0	2.5
1931	530	2109	1324	1602	2325	2286	1981	523	12680	5322	0	2.4
1932	67	1809	926	1883	1952	2068	1894	775	11374	5040	0	2.3
1933	0	1306	1608	1775	1715	1898	1543	1351	11196	4450	0	2.5
1934	70	2069	1272	1433	1936	1616	1578	972	10946	4549	0	2.4
1935	0	0	1593	1917	1797	1826	1241	556	8930	3226	0	2.8
1936	38	990	1680	1670	2489	2373	1709	1308	12237	4450	0	2.7
1937	0	112	1545	1864	2173	2041	1426	503	9664	3302	0	2.9
1938	0	432	1219	1364	1296	1497	1062	427	7297	2887	0	2.5
1939	763	1620	1218	1703	1414	1789	1015	645	10167	3911	0	2.6
1940	0	159	1509	1974	2129	1612	1133	873	9389	4007	0	2.3
1941	0	0	1406	1972	2163	1788	1704	529	9562	3963	0	2.4
1942	0	0	1292	1852	2434	1930	1158	278	8944	4357	0	2.0
1943	0	891	2526	2728	2629	2578	2041	589	13982	5058	150	2.7
1944	84	1630	2186	2466	3046	2852	2487	1019	15770	14676	235	2.8
1945	34	539	2527	2792	2891	3153	2144	377	14427	5165	221	2.7
1946	874	2588	2756	3145	3324	3732	2490	798	19707	5733	317	3.3
Average	194	991	1945	2204	2395	2342	1814	860	12747	5070	40	2.8
Average c.f.s.	3	17	32	37	39	38	30	14	26			
Monthly Diversion in per cent of Seasonal	1.5	7.8	15.3	17.3	18.8	18.4	14.2	6.7				

* Estimated.

TABLE 140

ANNUAL COMPARATIVE MONTHLY DIVERSIONS IN ACRE-FEET
AND GROSS SEASONAL DUTY OF WATER 1928 TO 1946
SAN JOAQUIN RIVER - FREMONT FORD BRIDGE TO VERNALIS

Year	March	April	May	June	July	August	September	October	Seasonal Diversion	Acreage General	Irrigated Rice	Gross Seasonal Duty, Acre-Feet per Acre
1928	*	*	*	*	11854	10574	8925	*	*	*	*	*
1929	*	*	*	*	12814	11021	10790	*	*	*	*	*
1930	*	12970	15632	15951	16472	16921	10860	1654	90460	*	*	*
1931	8084	18145	14765	14752	19847	15593	9607	5203	105996	34894	500	3.0
1932	3510	16745	11018	11802	15571	14886	11562	5010	90104	39813	80	2.3
1933	5496	14431	11244	11762	19043	18373	11437	3795	95581	35036	0	2.7
1934	5935	21809	17152	12615	24787	22392	12880	3123	120693	41696	290	2.9
1935	595	1228	14156	18502	23647	22541	13284	5211	99164	37320	155	2.6
1936	4511	12744	15608	21854	23594	15879	10614	3729	108533	41862	160	2.6
1937	212	3100	17198	16112	25933	21963	12183	3295	99996	41542	230	2.4
1938	69	4378	17054	15089	21991	17576	10842	2767	89766	42226	200	2.1
1939	7044	17485	17212	18955	25161	21288	10366	2505	120016	42379	420	2.8
1940	555	4547	15524	18950	26396	17707	10769	3365	97813	39373	470	2.5
1941	0	302	13633	15486	26484	20840	12725	3947	93417	39866	484	2.3
1942	573	2044	14158	17059	28352	25384	12575	4235	104380	41934	580	2.5
1943	0	4417	20849	20115	29913	25046	16595	4789	121724	41143	342	2.9
1944	4790	21177	22013	20102	27066	24430	14554	4128	138260	42196	1464	3.2
1945	1327	14036	21325	21383	30463	25540	15202	2087	131363	41601	849	3.1
1946	6967	21399	24961	23751	32002	28792	17026	5144	160042	43094	1396	3.6
Average**	3104	11124	16742	17393	25016	21139	12639	3896	111050	40936	476	2.7
Average** c.f.s.	67	187	272	292	407	344	212	63	229			
Monthly Diversion in 2.8 per cent of Seasonal**		10.0	15.1	15.7	22.5	19.0	11.4	3.5				

* No record.
** Analysis covers only the period 1931 to 1946 inclusive.
NOTE: No records prior to 1928.

TABLE 141

ANNUAL COMPARATIVE MONTHLY DIVERSIONS IN ACRE-FEET
AND GROSS SEASONAL DUTY OF WATER 1924 TO 1946
SAN JOAQUIN RIVER - VERNALIS TO STOCKTON

Year	March	April	May	June	July	August	September	October	Seasonal Diversion	Acreage General	Irrigated Rice	Gross Seasonal Duty, Acre-Feet per Acre
1924	614	1126	1760	1889	2175	1819	1385	206	10974	4335	0	2.5
1925	0*	6	276	1149	1530	1694	1040	39	5734	3224	0	1.8
1926	2000*	5657	8800	7696	8251	7693	6308	1577	47982	11196	0	4.3
1927	0*	713	8530	8224	8927	9378	4317	746	40835	12870	0	3.2
1928	1000*	3075	7915	7523	9141	8159	4604	1849	43266	17579	0	2.5
1929	2000*	6747	9600	5497	10594	7624	4498	2586	49146	16941	0	2.9
1930	2000*	6823	11848	7555	12899	11800	4227	1357	58409	18486	0	3.2
1931	3009	9378	8007	5475	12617	11759	4141	2126	56512	17021	0	3.3
1932	1452	8519	5767	5133	9972	7349	4365	1704	44261	19088	0	2.3
1933	767	9174	6089	5799	10703	7581	3165	2099	45377	18025	0	2.5
1934	3744	10633	7861	5411	12805	8682	4068	1965	55169	19372	0	2.8
1935	12	1691	6790	8950	10353	7785	3637	1714	40932	16571	0	2.5
1936	1483	7467	6838	4166	11651	8629	3575	1865	45674	18993	0	2.4
1937	3	5355	6512	4285	12542	7737	2824	1970	41228	19648	0	2.1
1938	1	3062	6753	4154	9943	6622	3004	991	34530	17582	0	2.0
1939	4012	9394	5398	6901	11721	8744	3862	1178	51210	18672	0	2.7
1940	4	4638	6974	7011	12805	7978	3300	1932	44642	18457	0	2.4
1941	4	1086	6162	5944	12007	8735	4384	1762	40084	19298	0	2.1
1942	188	2232	5210	6602	12203	9651	4014	2085	42185	17932	0	2.4
1943	0	3169	10172	8940	11617	10886	5142	1793	51719	19685	0	2.6
1944	1110	10346	8439	8039	11349	11489	6261	2275	59308	20547	0	2.7
1945	7	6476	12035	9658	13109	12537	7090	1793	62705	19935	0	3.2
1946	5246	13974	10681	9238	15347	13071	6727	2875	77154	24545	0	3.1
Average	1246	5684	7322	6316	10620	8583	4171	1673	45610	16957	0	2.7
Average c.f.s.	20	96	117	106	173	140	70	27	94			
Monthly Diversion in 2.7 per cent of Seasonal		12.5	16.1	13.8	23.3	18.8	9.1	3.7				

*Estimated.

TABLE 142

ANNUAL COMPARATIVE MONTHLY DIVERSIONS IN ACRE-FEET
AND GROSS SEASONAL DUTY OF WATER 1928 TO 1946
MERCED RIVER - YOSEMITE VALLEY RAILROAD CROSSING TO MOUTH

Year	March	April	May	June	July	August	September	October	Seasonal Diversion	Acreage General	Irrigated Rice	Gross Seasonal Duty, Acre-Feet per Acre
1928	*	*	*	*	3451	3027	2343	*	*	*	*	*
1929	*	*	*	*	3420	2965	1942	*	*	*	*	*
1930	*	1062	2319	2750	2716	2253	1242	474	12816	*	*	*
1931	778	2836	3298	2902	3553	3232	2128	765	19492	3623	0	5.4
1932	524	1334	1808	2261	2539	2292	1787	711	13256	3299	0	4.0
1933	320	1406	1757	1990	2372	1900	1600	645	11990	3229	0	3.7
1934	627	2627	2989	2637	3202	2673	2018	826	17599	5091	0	3.5
1935	0	70	1612	2684	2764	2472	1607	632	11841	3305	0	3.6
1936	26	486	2192	2149	2426	2705	1623	411	12018	3662	0	3.3
1937	0	108	1341	2514	3114	2876	1671	387	12011	4155	0	2.9
1938	0	123	858	1523	2213	1933	1018	458	8126	3072	0	2.6
1939	38	951	1791	2162	2520	1803	808	236	10309	3478	0	3.0
1940	2	220	1541	2275	2206	1597	949	317	9107	3123	0	2.9
1941	0	0	870	1644	1995	1537	1306	236	7588	3570	0	2.1
1942	0	14	475	1619	2716	2005	1207	363	8399	3302	0	2.5
1943	0	198	1782	2249	3077	2258	1680	474	11718	3680	0	3.2
1944	84	1117	1845	2535	2564	2466	2071	820	13501	4509	0	3.0
1945	30	558	1696	2292	3058	2500	1552	132	11818	4403	0	2.7
1946	231	1380	1595	2393	3608	2787	1720	684	14398	4484	0	3.2
Average**	166	839	1716	2239	2745	2315	1546	506	12073	3749		3.2
Average** c.f.s.	3	14	28	38	45	38	26	8	25			
Monthly Diversion in per cent of Seasonal	1.4	6.9	14.2	18.6	22.7	19.2	12.8	4.2				

* No record.
** Analysis covers only period 1931 to 1946, inclusive.
NOTE: No records prior to 1928.

TABLE 143

ANNUAL COMPARATIVE MONTHLY DIVERSIONS IN ACRE-FEET
AND GROSS SEASONAL DUTY OF WATER 1928 TO 1946
TUOLUMNE RIVER - LA GRANGE BRIDGE TO MOUTH

Year	March	April	May	June	July	August	September	October	Seasonal Diversion	Acreage General	Irrigated Rice	Gross Seasonal Duty, Acre-Feet per Acre
1928	*	*	*	*	327	277	79	*	*	*	*	*
1929	*	*	*	*	477	338	189	*	*	*	*	*
1930	*	173	388	480	523	473	224	59	2320	*	*	*
1931	128	585	560	585	673	585	363	88	3567	894	0	4.0
1932	37	234	260	281	438	331	181	95	1857	653	0	2.8
1933	72	222	213	380	451	411	266	205	2220	855	0	2.6
1934	108	334	396	368	325	349	219	150	2249	845	0	2.7
1935	7	47	326	422	438	375	257	120	1992	770	0	2.6
1936	41	125	387	345	422	442	295	121	2178	736	0	3.0
1937	41	120	540	339	451	409	255	57	2212	752	0	2.9
1938	0	12	135	222	245	201	127	38	980	594	0	1.7
1939	160	149	414	501	455	558	193	104	2534	864	0	2.9
1940	3	19	577	415	642	436	335	151	2578	1072	0	2.4
1941	0	122	519	685	603	607	438	173	3147	1295	0	2.4
1942	7	75	443	462	645	683	343	112	2770	1619	0	1.7
1943	0	116	354	541	542	520	360	183	2616	1826	0	1.4
1944	80	304	517	665	778	801	656	300	4101	3161	0	1.3
1945	33	463	535	630	748	723	376	47	3555	3259	0	1.1
1946	216	565	765	734	940	889	559	254	4922	3564	0	1.4
Average*	58	218	434	473	550	520	326	137	2716	1422	0	2.0
Average** c.f.s.	1	4	7	8	9	8	5	2	6			
Monthly** Diversion in per cent of Seasonal	2.1	8.0	16.1	17.4	20.3	19.1	12.0	5.0				

* No records.
** Analysis covers only period 1931 to 1946, inclusive.
NOTE: No records prior to 1928.

TABLE 144

ANNUAL COMPARATIVE MONTHLY DIVERSIONS IN ACRE-FEET
AND GROSS SEASONAL DUTY OF WATER 1928 TO 1946
STANISLAUS RIVER - ORANGE BLOSSOM BRIDGE TO MOUTH

Year	March	April	May	June	July	August	September	October	Seasonal Diversion	Acreage Irrigated General	Rice	Gross Seasonal Duty, Acre-Feet per Acre
1928	*	*	*	*	1248	1277	1089	*	*	*	*	*
1929	*	*	*	*	1059	807	605	*	*	*	*	*
1930	*	625	1057	1495	1336	1167	730	115	6525	*	*	*
1931	108	2023	1692	2773	2855	2449	1308	706	13914	2261	0	6.2
1932	431	1142	1529	1994	1780	1678	1216	471	10241	2522	0	4.1
1933	103	1046	1158	1355	1350	1176	684	316	7188	2021	0	3.6
1934	240	1620	1274	1687	1697	1683	780	402	9383	2122	0	4.4
1935	0	250	1177	1702	1855	1745	759	304	7792	2076	0	3.8
1936	0	727	838	1256	1952	1407	943	429	7552	2313	0	3.3
1937	0	508	1816	2248	2530	2429	1756	650	11937	3849	75	3.0
1938	0	327	735	1239	1690	1748	997	309	7045	3198	0	2.2
1939	198	1848	2201	2873	3222	3310	1752	827	16231	6331	0	2.6
1940	217	682	2143	3330	3858	2924	1741	851	15746	6902	0	2.3
1941	12	392	2696	3173	3413	3228	2466	1280	16660	6940	110	2.4
1942	240	356	2533	4242	4590	3972	2721	1360	20014	7095	130	2.8
1943	3	873	3439	4241	4458	3935	3518	1598	22065	7360	0	3.0
1944	186	2013	3266	3565	4246	4292	2659	1603	21830	7915	0	2.8
1945	0	2664	3013	3869	4431	4136	2866	681	21660	6872	0	3.1
1946	862	3316	3780	4563	5046	4832	2754	1655	26808	6343	0	4.4
Average**	163	1237	2080	2757	3061	2809	1808	840	14754	4751	21	3.4
Average** c.f.s.	3	21	34	46	50	46	30	14	30			
Monthly Diversion in per cent of Seasonal	1.1	8.4	14.1	18.7	20.7	19.0	12.3	5.7				

* No record.
** Analysis covers only the period 1931 to 1946 inclusive.
NOTE: No records prior to 1928.

TABLE 145

COMPARATIVE SEASONAL DIVERSIONS AND ACREAGES IRRIGATED - SACRAMENTO RIVER 1939-1946

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	10.5	7.9	6.6	6.5	6.4	8.6	5.7	7.3
	Average 1939 - 1946								
	Seasonal diversion acre-feet	139190	605500	52800	341630	121650	29540	127350	1417700
	Average cubic feet per second	286	1246	109	703	250	61	262	2917
	Per cent of total reach	9.8	42.7	3.7	24.1	8.6	2.1	9.0	
	Acreage irrigated - rice	0	46000	3310	30020	9270	1150	10010	99800
	Acreage irrigated - general	13660	46660	5960	35280	8370	1780	9570	121300

TABLE 146

MONTHLY DIVERSIONS, DIVERSION PERCENTAGES AND ACREAGE IRRIGATED
SACRAMENTO RIVER REACHES - 1946

River Reach	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Seasonal Draft	Per cent Total Draft	Acreage Irrigated		Acre-Feet per Acre
											General	Rice	
REDDING TO RED BLUFF													
Diversions in Acre-feet	167	11963	27268	26791	27421	26508	24036	19771	163925	9.5	15373	0	(1)10.5
Average Diversion in c.f.s.	3	201	443	450	446	431	404	322	337				
Monthly use in % of seasonal	0.1	7.2	16.7	16.3	16.7	16.3	14.6	12.1					
RED BLUFF TO BUTTE CITY													
Diversions in Acre-feet	5278	75834	131175	129699	129460	128000	83444	46716	729606	41.0	38934	53195	7.9
Average Diversion in c.f.s.	86	1275	2130	2180	2170	2140	1400	759	1501				
Monthly use in % of seasonal	0.7	10.4	18.0	17.8	17.7	17.6	11.4	6.4					
BUTTE CITY TO COLUSA													
Diversions in Acre-feet	19	12770	16123	21497	20983	18331	8458	772	98953	5.5	8719	6445	(2) 6.5
Average Diversion in c.f.s.	1	215	262	359	340	297	142	13	203				
Monthly use in % of seasonal	0.1	12.9	16.3	21.7	21.2	18.5	8.5	0.8					
COLUSA TO WILKINS SLOUGH													
Diversions in Acre-feet	357	47605	84881	76846	84320	78711	28652	650	402022	22.6	30861	30828	6.5
Average Diversion in c.f.s.	6	800	1380	1291	1371	1280	482	11	827				
Monthly use in % of seasonal	0.1	11.7	21.1	19.1	21.2	19.7	7.0	0.1					
WILKINS SLOUGH TO KNIGHTS LANDING													
Diversions in Acre-feet	0	18807	33355	30621	33344	30320	12451	179	159077	8.9	10923	13995	6.4
Average Diversion in c.f.s.	0	316	542	515	542	493	209	3	327				
Monthly use in % of seasonal	0	11.8	21.1	19.3	20.9	19.0	7.8	0.1					
KNIGHTS LANDING TO VERONA													
Diversions in Acre-feet	3	2536	6969	8095	7973	8069	4848	187	38680	2.2	2024	2485	8.6
Average Diversion in c.f.s.	0	43	113	136	130	131	81	3	80				
Monthly use in % of seasonal	0	6.5	18.0	20.9	20.7	20.9	12.5	0.5					
VERONA TO SACRAMENTO													
Diversions in Acre-feet	2144	17752	34220	34959	38451	37017	17782	3391	185716	10.3	10722	17187	(3) 5.7
Average Diversion in c.f.s.	35	298	555	586	623	600	298	54	382				
Monthly use in % of seasonal	1.2	9.6	18.4	18.8	20.7	19.9	9.6	1.8					
- - REDDING TO SACRAMENTO - -													
TOTAL DRAFT IN ACRE-FEET	7968	187267	333991	328508	341952	326956	179671	71666	1777979		117556	124135	7.3
AVERAGE CUBIC FEET PER SECOND	1538	3147	5432	5518	5560	5316	3020	1166	3659		241691		
MONTHLY USE IN % OF SEASONAL	0.5	10.5	18.8	18.5	19.2	18.4	10.1	4.0					

(1) Acre-feet diverted by City of Redding has been excluded as it is municipal. Principal diversion in this section of River is Anderson-Cottonwood Irrigation District diverting 97.3% of total in this reach.
(2) Principal diversion in this section of the River is Glenn-Colusa Irrigation District and its associated Irrigation Districts diverting 93.9% of the total in this reach.
(3) Acre-feet diverted by City of Sacramento have been excluded as it is municipal.

TABLE 147

COMPARATIVE SEASONAL RETURN WATER PERCENTAGES 1924-1946
SACRAMENTO AND SAN JOAQUIN RIVER AREA

Year	Sacramento River			San Joaquin River and Tributaries						
	Seasonal Run-off at Red Bluff in per cent of Normal*	Return Water in per cent of Diversions		Seasonal Run-off in per cent of normal S. J. River and Tributaries**	Return Water in per cent of Diversions					Aug.-Sept. Return in per cent of July-Aug. Diversions
		June-Sept. inc.	July-Sept. inc.		June Sept. inc.	July Sept. inc.	Aug. Sept. inc.	July Oct. inc.	Aug. Oct. inc.	
1924	38	33	33	24		35	41			29
1925	92		55(1)	86			38			23
1926	65	49	45	56		28	32			22
1927	125	66	59	104			32			23
1928	87	49	46	70		28	28			23
1929	50	42	39	46		19	21			16
1930	70	55	47	53	20	21	22			17
1931	38	33(2)	32	27	23(3)	27	40			18
1932	58	56	47	106			26		29	21
1933	52	56	48	54		22	20	25	25	17
1934	51	45	41	37	20(4)	21	28	25(5)	33	16
1935	86		62	103		30	24	34	31	19
1936	81	56	47	104		31	25	35	32	20
1937	68		48	105		35	28	38	35	22
1938	168		64	180			41		47	29
1939	50	38	36	46	20	20	23	24	29	17
1940	120	55	40	105		25	25	27	29	19
1941	164	69	56	127	27	32	28	35	33	21
1942	129	74	56	118	22	28	26	31	31	20
1943	97	55	53	117	30	28	28	31	32	23
1944	53	50	49	62	20	19	20	21	22	17
1945	76	45	43	106	23	25	24	31	32	19
1946	92	49	51	92	23	21	23	24	27	18

* 50-year mean (1889-1939) of natural run-off. For comparison of 40 and 50 year means see Table 7.
** 50-year mean (1889-1939) of natural run-off at foothill stations of San Joaquin, Merced, Tuolumne and Stanislaus Rivers. For comparison of 40 and 50 year mean, see Table 7.
(1) July-October, inclusive, 59.
(2) May-September, inclusive, 34.
(3) May-September, inclusive, 19.
(4) May-September, inclusive, 20.
(5) June-October, inclusive, 23; May-October, inclusive, 21.

TABLE 148

MONTHLY RETURN FLOW TO THE SACRAMENTO RIVER ABOVE SACRAMENTO
AS MEASURED AT DEFINITE RETURN FLOW CHANNELS
1946

Return Flow Channel	Table No.	Acre-Feet												June to Sept.	July to Sept.
		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		
Butte Slough (1)	30	0	20040	26960	22940	19460	28310	14880	16260	31960	12100	3640	43280	91410	63100
R.D. 70 Drain	32	2204	708	121	1797	1515	1817	1662	1694	1254	375	163	539	6427	4610
R.D. 108 Drain	33	7050	2360	1930	6440	24800	17500	19830	22900	18100	1520	1120	3910	78330	60830
Colusa Basin Drainage(2)	38	0	15470	9400	12210	34230	22100	17630	29140	53610	24580	22490	21850	122480	100380
Sycamore Slough	39	0	0	0	0	137	264	244	1980	750	0	0	0	3238	2974
Sacramento Slough (3)	43	(5)	54870	36150	35670	57320	47130	43280	52080	57730	16900	25180	41890	200220	153090
R.D. 1001 Drain (4)	53	1250	442	375	333	571	383	46	0	0	0	22	292	429	46
R.D. 1000 Drain #3	55	3730	2280	1290	742	1030	677	89	607	2830	918	239	532	4203	3526
R.D. 1000 Drain	56	1490	0	133	121	541	0	0	0	1430	1040	264	861	1430	1430
Totals		--	96170	76360	80250	139600	118200	97660	124700	167700	57430	53120	112900	508200	390000

(1) This flow except during high water periods is practically all of Feather River origin.
(2) A portion of the water which normally would return to the Sacramento River at this point is diverted to the Knights Landing Ridge Cut and is not included. (See Table
(3) This is the measured flow and includes return flow from Feather River diversions.
(4) Discharged to main drain between Reclamation Districts 1000 and 1001, thence to Sacrmento River at Mile 19.6L.
(5) Flow not confined to slough channel.

TABLE 149

RELATION OF MONTHLY MEASURED RETURN WATER FLOW TO DIVERSIONS - SACRAMENTO RIVER, RED BLUFF TO SACRAMENTO
(USING ONLY RETURN WATER WHICH ENTERED THROUGH DEFINITE RETURN CHANNELS*) - 1946

Return Flow Channel	Acre-Feet												January to December	June to Sept.	July to Sept.
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.			
R.D. 70 Drain	2204	708	121	1797	1515	1817	1662	1694	1254	375	163	539	13849	6427	4610
R.D. 108 Drain	7050	2360	1930	6440	24800	17500	19830	22900	18100	1520	1120	3910	127460	78330	60830
Colusa Basin Dr. (1)	0	15470	9400	12210	34367	22364	17874	31120	54360	24580	22490	21850	266085	125720	103350
R.D. 1500 Drain (2)	13570	4560	2460	4750	28920	25170	27050	29270	27580	3590	1620	5140	173680	109070	83900
R.D. 1000 Drain	5220	2280	1423	863	1571	677	89	607	4260	1958	503	1393	20844	5633	4956
Total Return	28040	25380	15330	26060	91170	67530	66510	85590	105550	32020	25900	32830	601910	325180	257650
Diversions (Red Bluff to Sacramento)	--	--	7801	175300	306700	301700	314500	300400	155600	51900	--	--	1613800	1072200	770500
Return in per cent of diversions	--	--	197	15	30	22	21	28	68	62	--	--	--	30	33

NOTE: In order to show return water from Sacramento River irrigation only, the discharge to the river of Butte Slough and the discharge from Reclamation District 1001 are excluded.
* As distinguished from use of all accretions as indicated in Table
(1) Including Sycamore Slough.
(2) Returned to Sacramento River via Sacramento Slough.

TABLE 150

RELATION OF RETURN WATER FLOWS TO DIVERSIONS - SACRAMENTO RIVER REACHES - 1946
(INCLUDING ALL ACCRETIONS)*.

River Reach	Acre Feet						Return Flow Acre-Feet		Red Bluff to Lower End of Reach (Accumulative)					
									Return Flow Acre-Feet		Diversions Acre-Feet		Return Flow in % of Diversion	
	May	June	July	Aug.	Sept.	Oct.	June to Sept.	July to Sept.	June to Sept.	July to Sept.	June to Sept.	July to Sept.	June to Sept.	July to Sept.
Red Bluff to Butte City	77100	34300	14600	12700	39800	25700	101400	67100	101400	67100	470600	340900	22	20
Butte City to Colusa	-3500	5000	-1100	-5800	7800	400	5900	900	107300	68000	539900	388700	20	17
Colusa to Wilkins Slough	-2000	12100	3400	7400	-4200	4300	18700	6600	126000	74600	808400	580400	16	13
Wilkins Sl. to Knights Ldg.	109700	66300	60300	67400	72000	29700	266000	199700	392000	274300	915100	656500	43	42
Knights Ldg. to Verona	19800	23100	59900	38700	11500	900	133200	110100	525200	384400	944100	677400	56	57
Verona to Sacramento**	1600	700	100	600	4300	2000	5700	5000	530900	389400	1072200	770500	49	51
Total Diversions (Red Bluff to Sacramento)	202700	141500	137200	121000	131200	63000	530900	389400						
	306700	301700	314500	300400	155600	51900	1072200	770500						
Return in % of diversion	66	47	44	40	84	122	49	51						

NOTE: In the return water here shown, the discharge to the Sacramento River of the Feather and American rivers is excluded, as is also the discharge of the Feather River contributions of Butte Slough and Wadsworth Canal. Also inflow from Mill, Antelope and Deer Creeks between Red Bluff and Butte City has been excluded. The diversion to the Ridge Cut from Colusa Basin Drainage has been credited as return flow. See Table
* As the return water in this table between any two stations is computed as the difference in discharge between the upper and lower station, making due allowance for the intervening diversions, the results include both those accretions entering from definite return channels which have been measured and accretions due to seepage, groundwater return, etc., which cannot be directly measured. Unmeasured accretions also include minor accretions from outside sources occurring in each tributary channel between the lowest measuring point and its confluence with the Sacramento River.
** See discussion in text, page

TABLE 151

COMPARATIVE RETURN WATER FLOWS FOR PERIOD JULY-SEPTEMBER 1936 TO 1946
SACRAMENTO VALLEY

ACRE-FEET

	1946			1946	1945	1944	1943	1942	1941	1940	1939	1938	1937	1936
	July	Aug.	Sept.											
1 - Inflow (1)														
Sacramento River at Red Bluff	532300	528400	369200	1429900	1435800	858700	756100	877500	933000	675400	557500	855800	595400	590600
Feather River at Oroville	146100	140600	113900	400600	390900	364000	357200	466800	406800	358800	276600	487900	321200	396100
Yuba River at Smartville	45900	35800	28800	110500	111300	76930	105080	144600	143600	62400	38900	136500	65700	71900
American River at Fairoaks	46300	17800	22400	86500	97300	65370	114530	203470	130400	93300	23100	193500	90600	137400
1 - Total inflow (1)	770600	722600	534300	2027500	2035300	1365000	1332910	1692370	1613800	1189900	896100	1673700	1072900	1196000
2 - Outflow														
Sacramento River at Sacramento	424300	416700	500100	1341100	1296900	691900	753500	1155600	1135000	713700	376100	1371200	588400	743700
Yolo By-Pass opp. Sacramento	2810	2820	4030	9660	6890	8540	9340	13170	13400	5900	3800	800	3700	8300
2 - Total outflow	427110	419520	504130	1350760	1303790	700440	762840	1168800	1148400	719600	379900	1372000	592100	752000
3 - Diversions														
Sacramento River	314451	300368	155635	770454	873617	837500	767410	680130	630500	533000	467500	482900	523800	462700
Colusa Trough	15757	16129	9052	40938	28702	31550	27130	18760	19600	21300	16300	3100	14200	15500
Back Borrow Pit	15757	13862	5410	35029	20475	34310	41630	25100	14500	11300	16000	9600	13100	9700
Lower Butte Creek and Slough	6938	6999	9230	23167	20710	16550	20020	17410	14400	18100	16500	23300	15000	13600
By-Pass and Drainage Channels	20191	18610	8889	47690	51357	49760	33470	20310	28200	21100	30400	9300	92200	29900
Feather River	145235	132948	82010	360193	368009	361200	347800	334490	282100	258000	213100	290900	279000	246100
Yuba River	17082	16356	13940	47378	41006	45630	50780	42890	37700	37800	33900	27700	28400	28200
American River	1104	889	766	2759	2671	3567	3490	3380	3100	3500	3400	3000	3600	2900
3 - Total Diversions	536500	506200	284900	1327600	1406547	1380100	1291730	1142470	1030100	904100	797100	849800	899300	808600
Return flow (2 + 3 - 1)	193010	203120	254730	650860	675000	715540	721660	618900	564700	433800	280900	548100	418500	364600
Total Return in % of diversions	36	40	89	49	48	52	56	54	55	48	35	64	47	45

(1) Only major flows considered. Flows of tributary creeks negligible during late summer months.

TABLE 152

RELATION OF MONTHLY MEASURED RETURN WATER FLOWS TO DIVERSIONS IN COLUSA TROUGH AT COLUSA-WILLIAMS HIGHWAY
AND
THE PRINCIPAL DIVERSIONS FROM WHICH THE RETURN WATER WAS DERIVED - 1946

Diversion	Acre-Feet										Acreage Irrigated		
	Mile and Bank	Apr.	May	June	July	Aug.	Sept.	Oct.	June to Sept. (Inc.)	July to Sept. (Inc.)	General	Rice	Gun Club
Sacramento River (Table 115)													
Glenn Colusa Irr. Dist.	154.8R	58425	92388	98101	90379	94828	64207	41611	347515	249414	21749	35960	
Jacinto Irr. Dist.	154.8R	2033	5544	5226	4423	2360	3828	1488	15837	10611	8096		
Compton-Delevan Irr. Dist.	154.8R	1299	4126	3808	3570	3570	2003	0	12951	9143		2800	
Provident Irr. Dist. (1)	154.8R	7012	16683	9267	17512	14055	4266	0	45100	35833	2867	8207	
Princeton-Codora Glenn I.D. (2)	154.8R	8060	14376	13884	12373	12890	8354	3584	47501	33617	2204	3458	
Maxwell Irr. Dist.	154.8R	595	1517	1636	1230	1230	496	0	4592	2956		550	160
Colusa Trough Diversions (Table 116)	--	2035	10171	15363	15757	16129	9052	2712	56301	40938	3030	3694	
Totals		79460	144800	147300	145200	145100	92210	49400	529800	382510	37946	54669	160
Return Flow													
Colusa Tr. at Colusa-Williams Highway (Table 34)		18990	46630	36820	34940	43950	49650	16010	165360	128540			
Colusa Tr. diversions (Table 116)		2035	10171	15363	15757	16129	9052	2712	56301	40938			
Total return (Acre-feet)		21030	56800	52180	50700	60080	58700	18720	221670	169480			
Total return (Av. c.f.s.)		353	924	877	825	977	987	305					
Return in % of diversions		27	39	35	35	41	64	38	42	44			

(1) Includes diversion from Sacramento River at Mile 124.2R.
(2) Includes diversion from Sacramento River at Miles 123.9R and 112.4R.

TABLE 153

MONTHLY RETURN WATER FLOWS IN SAN JOAQUIN VALLEY STREAMS - 1946
BY RIVER SECTIONS
(ACRE-FEET)

River Section	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
SAN JOAQUIN RIVER												
Fremont Ford Bridge to Vernalis												
Fremont Ford Bridge to Newman	31000	7300	7700	-2900	-13500	-2600	2400	600	-800	200	2300	5700
Newman to Grayson	17300	18300	22700	18600	41900	43600	27800	26500	22700	17400	10400	10800
Grayson to Hetch Hetchy Crossing	10700	-4300	13400	5000	-5000	11700	9300	4200	7600	6100	-3000	0
Hetch Hetchy Crossing to Vernalis	-13700	2300	-4900	-9400	17100	5900	2600	6200	5800	4800	5300	3400
Total return flow*	45300	23600	38900	11300	40500	58600	42100	37500	35300	28500	15000	19900
Total diversions (1)	0	0	7000	21400	25000	23800	32000	28800	17000	5100	0	0
STANISLAUS RIVER												
Orange Blossom Bridge to Mouth												
Orange Blossom to Riverbank	2000	2700	500	-9100	-7500	5600	4700	4100	4300	4600	5400	300
Riverbank to Ripon Bridge	4200	11400	9500	5000	20800	14200	9200	8300	6900	5200	2700	5900
Orange Blossom to Ripon Bridge	6200	14100	10000	-4100	13300	19800	13900	12400	11200	9800	8100	6200
Ripon Bridge to Mouth	New station established at Mile 4.3 in August 1946								3000	2700	-600	3200
Total return flow** (2)	6200	14100	10000	-4100	13300	19800	13900	12400	11200	9800	8100	6200
Total diversions (2)	0	0	7	498	975	1084	1080	1248	489	255	0	0
TUOLUMNE RIVER												
La Grange Bridge to Tuolumne City												
La Grange Br. to Roberts Ferry Br.	4100	100	6400	-2500	5300	4200	3700	3800	3300	1900	-5700	4300
Roberts Ferry Br. to Hickman Br.	-1700	5600	600	300	-12900	4200	3800	2700	3500	5500	15300	3400
Hickman Br. to Modesto	18900	8500	13500	16200	32700	17800	14200	12300	10600	9000	5800	11700
Modesto to Tuolumne City	1000	3300	1600	-900	-7700	2300	7400	8200	6500	2800	3200	-1000
Total return flow**	22300	17500	22100	13100	17400	28500	29100	27000	23900	19200	18600	18400
Total diversions (1)	0	0	146	378	643	578	716	641	379	136	0	0
MERCED RIVER												
Yosemite Valley Railroad to Stevinson Drain												
Yosemite Valley Railroad to Cressey	-4900	-4400	3400	-700	8100	2800	6100	5100	5800	5500	5500	7800
Cressey to Stevinson Drain	1800	3700	8700	-500	4800	13000	12100	11000	9900	7500	4400	3900
Total return flow**	-3100	-700	12100	-1200	12900	15800	18200	16100	15700	13000	9900	11700
Total diversions (1)	0	0	223	1375	1590	1940	3135	2183	1333	428	0	0

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

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

(1) Total diversions in river reach.

(2) Return flow and diversions shown are for Orange Blossom Bridge to Ripon Bridge.

TABLE 154

RELATION OF COMBINED MONTHLY RETURN WATER FLOWS TO DIVERSIONS - SAN JOAQUIN VALLEY - 1946
Quantities in Acre-Feet

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.-Dec.
1 - Inflow													
San Joaquin River below Friant	143300	67100	111400	128800	283200	204100	172200	161400	113000	90300	32500	32400	1539700
Fresno Slough By-Pass	17900	0	0	5400	18400	1900	0	0	0	0	8200	11400	63200
Merced R. at Yosemite V. R.R. Crossing	82100	72100	34800	59600	135700	41000	7400	7400	6900	6100	6100	9600	468800
Tuolumne River at La Grange	123200	68400	36000	105400	264000	90000	1000	1500	800	31800	74900	67800	864800
Stanislaus River at Orange Blossom	140700	36300	54900	159800	222000	43300	2700	2500	1800	2300	13300	32200	711800
Total inflow	507200	243900	237100	459000	923300	380300	183300	172800	122500	130500	135000	153400	3648300
2 - Outflow (a)													
San Joaquin River Diversions(b)	7679	9909	96547	138674	175624	157963	174004	164803	112425	88422	34469	6570	1167089
Merced River Diversions	0	0	231	1380	1595	2393	3608	2787	1720	684	0	0	14398
Tuolumne River Diversions	0	0	216	565	765	734	940	889	559	254	0	0	4922
Stanislaus River Diversions	0	0	862	3316	3780	4563	5046	4832	2754	1655	0	0	26808
Fresno Slough and By-Pass (c)	0	0	5917	3424	1120	4651	10825	8898	6558	1984	374	63	43814
Total valley diversions	7679	9909	103773	147359	182884	170304	194423	182209	124016	92999	34843	6633	1257031
San Joaquin River near Vernalis	584800	330700	229600	357900	802900	344100	90100	75200	88300	111600	158100	220600	3393900
Total outflow	592500	340600	333400	505300	985800	514400	284500	257400	212300	304600	192900	227200	4650900
3 - Diversions (d)													
Merced Irrigation District (e)	0	0	26013	68743	88986	89212	104051	89448	70097	7305	0	0	543855
Turlock Irrigation District (f)	540	500	39550	83250	102100	94080	94650	78570	59730	22520	2030	17030	594550
Modesto Irrigation District (f)	16950	389	23550	58360	82950	62870	62050	49460	32360	23290	476	492	413197
So. S.J. and Oakdale I.D. (f)	180	14520	9930	47050	54100	51420	46440	41570	17960	7620	130	6900	297820
Oakdale I.D. Canal (f)	0	0	2860	17780	23720	23530	23200	20280	8870	3180	0	0	123420
Valley Diversions (see 2)	7679	9909	10773	147359	182884	170304	194423	182209	124016	92999	34843	6633	1257031
Total Diversions	25300	25300	205700	422500	534700	491400	524800	461500	313000	156900	37500	31100	3229800
4 - Return flow (2 - 1)	85300	106700	96300	46300	62500	134100	101200	84600	89800	74100	57900	73800	1012600
5 - Return in % of Diversions 4/3	--	--	47	11	12	27	19	18	29	47	--	--	

(a) Valley diversions shown here are those diversions below the inflow stations.

(b) Includes all diversions between Friant and Vernalis with the exception of Fresno Slough.

(c) These diversions are differentiated from the San Joaquin River diversions because the water in Fresno Slough is derived from Kings River as well as from San Joaquin River.

(d) Total diversions from which the return flow was derived comprise both the valley diversions and those above the inflow stations which serve areas adjacent to the valley streams.

(e) Does not include minor canal diversions between measuring section and head of canal.

(f) United States Geological Survey station.

TABLE 155

RICE ACREAGE IN CALIFORNIA

A Comparison of Rice Acreage Served from Stream Channels in Sacramento-San Joaquin Valleys with Rice Acreages in California from all Sources

Rice Acreage							
Year	Served from all Sources*	Served from Stream Channel in Sacramento-San Joaquin Valleys	in Sacramento-San Joaquin Valley in per cent of Total of State	Year	Served from all Sources*	Served from Stream Channel in Sacramento-San Joaquin Valleys	in Sacramento-San Joaquin Valley in per cent of Total of State
1924	90000	89000	99	1936	138000	104000	75
1925	103000	95000	92	1937	132000	109000	82
1926	149000	129000	87	1938	125000	95000	76
1927	160000	123000	77	1939	120000	104000	87
1928	132000	101000	76	1940	118000	94000	80
1929	95000	74000	78	1941	153000	120000	78
1930	110000	88000	80	1942	207000	159000	77
1931	125000	126000	100	1943	237000	186000	77
1932	110000	91000	83	1944	246000	200000	81
1933	108000	87000	80	1945	249000	187000	75
1934	108000	92000	85	1946	253000	200000	79
1935	100000	78000	78				
* As reported by Federal-State crop reporting service. ** From reports of Sacramento-San Joaquin Water Supervision.				Average 1924-1946	146000	119000	82

TABLE 156

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

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

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

* Includes estimated additional use by weeds during these months.

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

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

TABLE 157

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

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

* Annual census omitted for years 1933 to 1937, inclusive.
(1) Total includes interior and exterior water surface, bare and weed lands which consume seepage water, willow and tule areas, etc.
(2) Includes water used by crops and vegetation during the composite growing season and by evaporation for the entire year.
(3) Includes in additional to seasonal use, the use of water on the cropped area during the non-growing or dormant season.
NOTE: Prior to 1929 the annual census was not complete with respect to water consuming areas other than irrigated crop lands.

TABLE 158

MAXIMUM RECORDED SALINITY AT PRESENTLY INDICATIVE BAY AND DELTA STATIONS
1936 - 1946, INCLUSIVE*

Year	1936	1937	1938	1939	1940	(1)1941	1942	1943	1944	1945	1946
Sacramento-San Joaquin Runoff in per cent of Normal**	96	80	170	43	115	137	129	114	56	86	92
Station (1)	Maximum Recorded Salinity in Parts of Chlorine per 100,000										
San Francisco, San Pablo and Suisun Bays											
Point Orient	1740	1700	1700	1920	1840				1730	1800	1740
Point San Pedro											1630
Point Pinole											1530
Hercules											1510
Point Davis	1440	1460	(2)1460	1840	1760				1520	1340	1660
Grand View									1530	1430	1500
Dowrelios										1250***	1070
Crockett											1400
Benicia									1390	1230	1200
Martinez										1000***	1110
Bullshead Point	1340	1270	1160	1640	1340						
West Suisun											1020
Port Chicago											950
Nichols											800
O & A Ferry	580	660	256	1180	720				730	260	350
Innisfail Ferry	580	700	330	1360	790				790	440	450
Pittsburg										160	210
Sacramento River Delta											
Collinsville	300	490	86	1040	450	195	190	340	470	114	170
Emmaton	54	102	7	580	140						
Three Mile Slough Bridge	57	120		590					161	7	8
Rio Vista Bridge	8	33		405					55	4	5
Isleton Bridge				250					5	3	5
San Joaquin River Delta											
Winter Island										123	133
Antioch	270	350	51	920	440	158	140	312	400	96	109
Millers Harbor										64	93
Jersey	78	102	9	500							
Opposite Jersey		136							164	6	
Webb Pump	16	25	8	265	27				52	5	8
Opposite Central Landing		11	10	138	15				20	5	8
Dutch Slough	21	28	11	225	42				69	8	13
Rock Slough West of Dam	11	13	9	94	15				21		
Rock Slough East of Dam	11	12	11	71	18				15		
East Contra Costa Irr. Dist.									14	11	20
Victoria				32							11
Mossdale	14	12	12	16	14				13	10	12

* For maximum salinities recorded 1924-1935 see previous reports.
** Normal taken as 50-year mean (1889-1939) of natural runoff at foothill stations of major tributaries.
*** Estimated
(1) For location and description see Table
(2) Sampling by State discontinued in 1941 and resumed in 1944 in cooperation with the U. S. Bureau of Reclamation.

TABLE 159

DESCRIPTION OF ACTIVE SALINITY OBSERVATION STATIONS - 1946

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

STATION	Miles from Golden Gate (1)	Time Interval (2)		LOCATION
		Hours	Mins.	
				SAN FRANCISCO, SAN PABLO AND SUISUN BAYS
Point Orient	12.3	2	20	North end of San Francisco Bay, East Shore, one-half mile south of Point San Pablo Wharf of Standard Oil Company.
Point San Pedro	15.0	2	30	South end of San Pablo Bay, West Shore of San Pedro Strait, one-quarter mile north of Point San Pedro.
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.
Dowrelios	26.6	3	20	West end of Carquinez Strait, South Shore, 0.2 mile west of Carquinez Bridge.
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.
				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.
East Contra Costa 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
Mossdale Bridge	108.5	10	50	San Joaquin River at Lincoln Highway Crossing about 3 miles southwest of Lathrop.

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

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

TABLE 160

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 - 1946							
	2	6	10	14	18	22	26	30
	San Francisco, San Pablo and Suisun Bays							
Point Orient				ab920			690	1140
Hercules*								610
Point Davis				350	410	340		
Grand View	137	b110	115	160	200	200	260	470
Dowrelios	88		156		270		520	
Benicia	17	3	103	280	180	130		510
Martinez	30	1	40	172	100	180	a200	148
Innisfail	23	19	b22	18	16	30	31	39
O & A Ferry	2	bkn	1	1	2	3	a3	a5
Pittsburg	2	3	3	2	3	3	3	2
	Sacramento River Delta							
Collinsville	1	a2	1	1	2	1	2	1
3 Mile Slough Bridge	1	1	1	1	2	1	2	1
Rio Vista Bridge	1	1	1	1	1	1	1	2
Isleton Bridge	a1	1	1	ab1	1	1	2	2
	San Joaquin River Delta							
Winter Island			2	2	2	3	2	a3
Antioch	2	2	4	4	3	2	5	2
Millers Harbor	2	3	4	2	3	a3	b2	2
Webb Pump		a3						
Opposite Central Landing	1	a1	2	1	a2	a2	1	1
Dutch Slough	5	a4	4	6	4	7	3	4
East Contra Costa I.D.	5			5				
Victoria	3	3	ab3	4	3	3	3	4
Mossdale	a2	a3	2	2	a2	4	3	3
	FEBRUARY - 1946							
	San Francisco, San Pablo and Suisun Bays							
Point Orient	1290	1250	1130	1120	1310	1280		
Point Pinole**				920	870		860	
Hercules	980	660	730	900	790	790	770	
Point Davis	860		660	800	690	660		
Grand View	580	530	560	590	b580	560	580	
Dowrelios				650	500	570		
Benicia	490	160	500	390	120	430	410	
Martinez	370	100	240	420	260	290	470	
Innisfail Ferry	15	36	31	bkn	38	b43	45	
Nichols*				64	20	32	31	
O & A Ferry	8	21	3	7	5	4	3	
Pittsburg	b3	3	2	4	4	5	4	
	Sacramento River Delta							
Collinsville	1	2	1	2	a1	1	1	
3 Mile Slough Bridge		1	1	1	1	1	2	
Rio Vista Bridge	1	a2	1	1	1	1	1	
Isleton Bridge		1	1	1	1		1	
	San Joaquin River Delta							
Winter Island	3	3	2	3	4	a4	3	
Antioch	3	3	2	2	2	4	3	
Millers Harbor	2	2	2	3	3	a3	2	
Webb Pump		3					4	
Opposite Central Landing	1	1	1	ab1	2	2	1	
Dutch Slough	a5	5	5	4	5	5	5	
East Contra Costa I.D.		5	6	6	a7		6	
Victoria	4	3	4	5	4	5	4	
Mossdale	a3	4	5	3	a5	3	5	

* New station established January 26, 1946.
** New station established in February, 1946.
(a) Taken at Low High Tide.
(b) Taken on following day.

TABLE 160 (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 - 1946							
	2	6	10	14	18	22	26	30
San Francisco, San Pablo and Suisun Bays								
Point Orient	1160	1090	1380	1300	1180	1240	1330	1370
Point San Pedro*			1200	1150	a1080	1030	700	1160
Point Pinole	c810	a930	b840	760	a900		670	
Hercules	850	740	940	830	a750	690	750	
Point Davis	780	620					680	
Grand View	650	780	820	620	880	840	800	
Dowrelios	700	a510		510		a490	650	
Benicia	500	300	630	320	d110	310	380	560
Martinez	540	a120	380	230	120	220	420	580
Innisfail	47	49	27	44	a45	37	44	43
Nichols	26	12	7		a12	a11	18	155
O & A Ferry	11	a4	6	4	a4	3	16	9
Pittsburg	a3	4	3	3	a12	1	2	3
Sacramento River Delta								
Collinsville	1	1	2	2	2	1	2	2
3 Mile Slough Bridge	2	1		1			1	
Rio Vista Bridge	1	2	1	2	2	1	1	1
Isleton Bridge	1	1	1	1	1	1	1	1
San Joaquin River Delta								
Winter Island		3	4		a2	2	2	3
Antioch	3	3	3	3	a3	2	2	1
Millers Harbor		8	ab4	3	3	3	7	9
Webb Pump		5		5	a2		4	
Opposite Central Landing		2	3	1	a1	2	1	1
Dutch Slough	5	3	5	4	5	a5	5	
East Contra Costa I.D.					6	7	8	
Victoria	4	5	7	5	10	8	7	6
Mossdale	ab4	6	5	9		7	6	7
	APRIL - 1946							
San Francisco, San Pablo and Suisun Bays								
Point Orient	b1280	1310	1160	b1370	bkn	1230	1190	1300
Point San Pedro	a1060	a1020	970	1100	1040	a790	a1010	1140
Point Pinole	a820		660	ab930	a960		a670	a730
Hercules	a750	750	500	ab930	a810	490		810
Point Davis			850		630	e500	bkn	720
Grand View	b750	730	740	b740	670	710	710	810
Dowrelios			270					
Benicia	b310	340	260	b350	450	158	b390	340
Martinez	a22	a180	110	b140	190	130	b200	200
Innisfail	a46	29	39	a37	a36	38	a31	a36
Nichols	b12	18		b18	a6	2	b16	8
O & A Ferry	bkn	2	2	a3	a2	2	a2	a4
Pittsburg	a1	1	2	a2	a2	a2	a3	a3
Sacramento River Delta								
Collinsville	a2	2	2	a2	1	1	a2	a4
3 Mile Slough Bridge	2	1	a2	ab2	1			
Rio Vista Bridge	b1	1	1	b1	1	1	b2	1
Isleton	b1		1	a1	1	f1	b1	a3
San Joaquin River Delta								
Winter Island	a3	a2		a3		2	a1	a4
Antioch	2	2	3	a3	2	2	a3	a3
Millers Harbor	b2	5	3	b10	4	2	b3	
Webb Pump		4				4	a4	
Opposite Central Landing	a1	2	1	a1	1	1	a1	a2
Dutch Slough	5	6	5	a5	4	4	a5	a5
East Contra Costa I.D.	b9	8	5		4	5	a3	
Victoria	bkn	ab5	2	b4	4	2	b2	1
Mossdale	4	2	3	b6	3	1	b1	2

* New station established in March, 1946.
(a) Taken at Low High Tide.
(b) Taken on following day.
(c) Taken two days later.
(d) Over one hour off schedule.
(e) Taken on preceding day.
(f) Taken two days earlier.

TABLE 160 (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 - 1946							
	2	6	10	14	18	22	26	30
San Francisco, San Pablo and Suisun Bays								
Point Orient	b1030		820	b1250	1150	980	1240	1260
Point San Pedro	960	900	ab870	1040	a980	960	a960	1100
Point Pinole	a870		a830	1010	e900		790	a800
Hercules	690	600	b620	b860	b690	480		a860
Point Davis	b720		540		450	340		b780
Grand View	b890	830	780	b710	b660	650	610	790
Dowrelios					a310			
Benicia	b380	240	b260	b310	b260	110	b470	b500
Martinez		80	b140	a60	b130	90	b230	b350
Innisfail	a21	14				16	a21	
Nichols	24	3	b3		b3	2	b7	b7
O & A Ferry	a3	a3	3	a2	a2	a1	a3	a5
Pittsburg	ab1	2	a2	a2	b1	1	1	a4
Sacramento River Delta								
Collinsville	a2	1	a1	a1	b1	2	a1	a4
3 Mile Slough Bridge		1	b1		b3	2		
Rio Vista	b1	1	b1	b1	b1	1	b2	b1
Isleton		1			b1	2	b1	b3
San Joaquin River Delta								
Winter Island	a2	2	a2	a3	a1	ab3	a2	a3
Antioch	b3	1	a1	a2	a2	1	a2	a3
Millers Harbor	b2	1	b2	ab3	b5	2	b2	2
Webb Pump	b3	2		a2	ab2		1	
Opposite Central Landing	a1	2	a1	a1	b1	a2	bkn	1
Dutch Slough	b3	2	a3	a2	a2	1	a1	a1
East Contra Costa I.D.	b2	2	ab1	ab1	b1	2	a2	b3
Victoria		ab2	a1	a2	2	2	b3	2
Mossdale	b1	1	b1	b2	bkn	1	b1	b2
	JUNE - 1946							
San Francisco, San Pablo and Suisun Bays								
Point Orient	1260	960	1270	b1370	1450	1330	1490	1610
Point San Pedro	a1160	1070	1150	a1100	1200	a1330	a1440	ae1420
Point Pinole		700	a920	*			a1220	
Hercules			730	b880	940	1110		
Point Davis		660	b600	b830	640	1020	1110	1110
Grand View	790	920	940	b910	980	bkn	c1140	1130
Dowrelios		330		a670			a1010	
Benicia	510	370	b520	b590	600	710	b930	
Martinez	380	240	b390	ab470		780	b760	940
Innisfail	b9		a20		19	22	32	125
Nichols	65	11	b102	b159	a97	a285	b460	530
O & A Ferry	4	a2	a5	a9	a26	a24	a37	a73
Pittsburg	4	a3	a3	a4	4	a16	ae33	ae38
Sacramento River Delta								
Collinsville	1		a1	a1	2	a3	a11	52
3 Mile Slough Bridge	1	b2	ab1	b1	2	b1	b3	4
Rio Vista Bridge	1	b2	b1	b2	1	b1	b2	2
Isleton	bkn	b1	b1		2		b2	2
San Joaquin River Delta								
Winter Island	a4	b2	a8		5	a7	b27	ae21
Antioch	4		a2	a3	3	a4	a6	30
Millers Harbor	4	b1	b1	b3	3	b2	b9	14
Webb Pump		a1	a2		2	a3	a3	
Opposite Central Landing		a2	a2	a3	2	a2	a1	ae2
Dutch Slough	a2	a1	a1	a2	b4	a1	a2	ae3
East Contra Costa I.D.	b3	2	a2	b3	3		b4	bkn
Victoria	1	b1	b1	b1	2	b4	4	3
Mossdale	bkn	1	1	b3	4	b6	b10	10

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

TABLE 160 (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 - 1946							
	2	6	10	14	18	22	26	30
San Francisco, San Pablo and Suisun Bays								
Point Orient	1630	1580	1700	b1590	1590	1580	1610	1530
Point San Pedro	1480	a1450	ab1390	a1470	1510	b1550	ab1510	1610
Point Pinole			ab1350			a1460		
Hercules	1250	1360	b1290	b1250		1390		1510
Point Davis							b1320	1330
Grand View	1180	1180	b1120	b1140	1200	a1210	b1210	1250
Dowrelios			ab1070					
Benicia			b970	b980	950			1120
Martinez		710	b980	b900	770	720		940
Innisfail	a133	a132	ac167	210	a240		b310	330
Nichols	90	530	b380	470	530	670	b760	410
O & A Ferry	143	a75	ab163	a160	ab260	200	ab210	a230
Pittsburg	a57	50	ab62	a77	a187	a100	ab101	120
Sacramento River Delta								
Collinsville	42	a31	ab43	a15		69	ab102	130
3 Mile Slough Bridge	2		b3	b4	4	4		8
Rio Vista Bridge		b2	b2	b2	3	b2	b3	3
Isleton	2	b2	b3			b2		2
San Joaquin River Delta								
Winter Island	54			a51	ab91	71	ab89	ab81
Antioch	27	b28	a18	a27	bkn	71	a35	a65
Webb Pump	3		ab3		5	a3	ab6	5
Opposite Central Landing	2	a3	ab3	a1	2	a3	ab4	4
Dutch Slough	4	a3	b3	a6	4	a4	b6	7
East Contra Costa I.D.			b8	b10	10		ab8	a8
Victoria		b7	b9	b9	ab9	b8	b7	8
Mossdale	10	b9	b9	b10	12	a3	14	10
	AUGUST - 1946							
San Francisco, San Pablo and Suisun Bays								
Point Orient		1660	1720	b1690	1520	1660	1710	1660
Point San Pedro	1510	1520	ab1620	1600	d1550	1630	b1560	1580
Point Pinole		ab1450		ab1510		ab1490	a1530	
Hercules	1390	1450	b1450	bkn	1490	1460	b1490	1450
Point Davis	1200	1350	b1410		1380	1380	ab1430	1250
Grand View	1250	1300	b1270	b1340	1340	1320	b1350	1340
Benicia	1000	980	b1200	b1050	1040	1180	b1140	920
Martinez	760	1040	b960	b950	b880		990	1110
West Suisun*	720	930	b1000	b850	950	1020	840	
Innisfail		ab340	ab360	a400	a450	ab410	a430	440
Port Chicago*	740	830	b820	b820	770	950	900	690
Nichols	610	690	b750	b500	670	b800		590
O & A Ferry	a290	ab240	b260	310	a230	ab270	a350	340
Pittsburg	130	ab140	b170	a190	a210	ab210	a160	150
Sacramento River Delta								
Collinsville	114	ab101	ab137	ab170	87	b122	a144	a117
3 Mile Slough Bridge	6	bkn		b8		b7	b8	
Rio Vista Bridge	3	b2	b4	b2	2	b3	b2	3
Isleton			b3	b2	a3	b2		4
San Joaquin River Delta								
Winter Island	a97	ab96	ab109	a133	a118	ab108	a118	
Antioch**	a69	109	a61	a87	99	a58	a75	82
Millers Harbor		b12	b37	b72	ab31	b93	30	43
Webb Pump		ab5	ab8	b8		ab8		
Opposite Central Landing	a4	ab4	b4	4	a5	ab2	ab3	a4
Dutch Slough	a6	ab6	ab10	a13	a11	ab12	a11	11
East Contra Costa I.D.		b9	11	b11		a13		
Victoria	b8	b9	b6	10	b9	10	a9	11
Mossdale	a11		b11	b12	a11	14	b10	a10

* New station established August 1, 1947.
** Additional measurements were made by the U. S. Bureau of Reclamation at Antioch during August as follows: August 9--135, August 16--105, August 22--145 and August 30--96.
(a) Taken at Low High Tide.
(b) Taken on following day.
(c) Taken two days later.
(d) Taken over one hour off scheduled time.
(e) Taken on preceding day.

TABLE 160 (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	SEPTEMBER - 1946							
	2	6	10	14	18	22	26	30
San Francisco, San Pablo and Suisun Bays								
Point Orient	e1550	1630	b1680	1680	1640	1680	1700	e1570
Point San Pedro	a1500	1630	b1620	b1610	1560	ab1590	1590	e1600
Point Pinole		a1490			b1400	ab1470	1450	
Hercules	1320	1430	b1420	1480	1300	b1470	*1420	e1390
Point Davis	1250		b1310	1260	1290	b1350	1330	*1280
Grand View		e1360	b1380	1360	1370	b1370	1380	e1360
Crockett**							1270	e1240
Benicia	980	1070	b1090	1000	1050	b1110	1070	e780
Martinez		1020	b900		980		810	e860
West Suisun	940	e930	980	900	750	950	790	920
Innisfail	440	e430		b400	420	ab410	430	430
Port Chicago	b640	660	810	820	*700	a620	680	
Nichols	410		b570	680	640	b640	610	e430
O & A Ferry	a200	a220	ab220	250	ab160	ab250	260	ae180
Pittsburg	a90	a121	ab109	120	ab82	ab150	130	e107
Sacramento River Delta								
Collinsville	a62		ab83	a78	a66	ab68	ab78	
3 Mile Slough Bridge		6	*5	5	ab5	5	a6	e5
Rio Vista Bridge	3		b5	3	4	b4	*3	*3
Isleton				a3	2	b2		e2
San Joaquin River Delta								
Winter Island			ab76	a89	81	ab76	91	
Antioch	76	86	a45	69	73	73	61	67
Millers Harbor	51	29	b42	40	35	b41	ab31	e36
Webb Pump			b6			ab9		
Opposite Central Landing	a5	a5	b5	8	ab6	ab3	4	ae4
Dutch Slough	a8	a8	ab9	9	ab7		9	e8
East Contra Costa I.D.		a12		a12		b11		
Victoria	b12	11	b10	10	ab9	b11	10	e10
Mossdale	a9	10	b9	a9	ab10	b10	ab10	ae11
	OCTOBER - 1946							
San Francisco, San Pablo and Suisun Bays								
Point Orient	b1570	1580	b1640	1680		b1650	1450	1460
Point San Pedro	1540	ac1440	b1480	1640	ab1430	a1570	1550	1510
Point Pinole	a1260	ab1420	b1360			1380		
Hercules		1300	b1440	1420	1280	b1360	1340	1280
Point Davis	1240	1280	b1360	1660	1170	b1230	b1210	1190
Grand View	1340	1500	b1380	1400	1370	b1330	b1380	1340
Crockett	1090	1100	b1240	1400	1150		a1230	1110
Benicia	1020	b1000	b980	1080	970	*890	1000	810
Martinez		b960		930	880	b660	a1020	760
West Suisun	710	720	b680	990	730	670	850	650
Innisfail	410	ac390	380	380	a380	a340	330	370
Port Chicago	560	a530	a750		ab510	a660	690	ab520
Nichols		b500	*b580	590		480	500	
O & A Ferry	210	ab150	b200	a230	ab230	a190	200	a160
Pittsburg	120	ab47	88	177	ab50	a46	110	60
Sacramento River Delta								
Collinsville	a53	ab56	b42	68	ab20	a39	65	a18
3 Mile Slough Bridge	4	b3	b4	3	3		3	bkn
Rio Vista Bridge	ab5	b2	b5	*5	b1	b2	5	2
Isleton	2		b2	a4	b1	b2		
San Joaquin River Delta								
Winter Island	ab47		b52	a50	ab41	a45	54	a31
Antioch	53	bkn	26	80	31	a25	34	30
Millers Harbor	29	b16	b20	40	b19	b16	b22	17
Webb Pump			ab8	a8	ab6		8	
Opposite Central Landing	ab4	a3	b4	a4	ab5	a2	a4	a3
Dutch Slough	ab10	ab8	b7	8	ab8	a7	7	a9
East Contra Costa I.D.	ab11	ab13	14			a16	a15	
Victoria	b10	b10	b9	9	b8	b8	8	10
Mossdale	ab9	b9	ab9	a8	ab8	b8	a10	a9

* No tide given.
** New station established September 24, 1946, to supersede former station "Dowrelios Harbor."
(a) Taken at Low High Tide.
(b) Taken on following day.
(c) Taken two days later.
(e) Taken on preceding day.

TABLE 160 (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 - 1946							
	2	6	10	14	18	22	26	30
San Francisco, San Pablo and Suisun Bays								
Point Orient	b1320	b1560	1740	1520	b1640	b1500	1500	1510
Point San Pedro		b1530	1590	ab1550	b1600	*1550	1380	e1200
Point Pinole		b1370		ab1400	1400		1220	
Hercules	b1100	b1350	1340	1330	b1340	b1290	1070	e960
Point Davis	b1210	a1280		*1320	b1280	b1200	920	e1040
Grand View	1370	b1310	1280	1270	b1280	b1200	1230	e1220
Crockett		b1030	1270	1120	b1150		840	e790
Benicia	b800	b1030	1190	1130	b1080	b920	670	e500
Martinez	b720	b1090		980	b900		480	e530
Innisfail	c360	b350	370	ab380	b370	b350	170	a220
Nichols	b450	b700	700	650		470	200	
O & A Ferry	b70	b180	270	ab240	b160	b157	30	e31
Pittsburg	b23	b110	120	200	b180	b72	a10	e10
Sacramento River Delta								
Collinsville	b14	b130	83	ab41	b75	b31	a6	4
3 Mile Slough Bridge			6		b3	b2	2	e2
Rio Vista Bridge	2	b3	a1	1	b1	b1	*1	e2
Isleton	b1	b1	1	ab2	b2		5	e2
San Joaquin River Delta								
Winter Island	24		87	ab50		45	a10	
Antioch	a15	21	36	63	29	31	7	5
Millers Harbor	b13	b13	27	29	*b27	b18	7	ae4
Webb Pump						b7		
Opposite Central Landing	b3	b4	7	5	b3	ab3	a1	e4
Dutch Slough	b7	b6	a8	6	b6	ab7	6	e8
East Contra Costa I.D.	20		ab10	11				
Victoria	b8		a7	9	b6	b6	7	e6
Mossdale	b7	ab7	a6	ab7	ab7	ab7	a6	a5

Station	DECEMBER - 1946							
San Francisco, San Pablo and Suisun Bays								
Point Orient	b1500	1510	1520	b1440		1330	1470	b1450
Point San Pedro	b1220	b1440	1280	b1000	b1150	1050	1320	b1130
Point Pinole	b1220		1210		b1110		1220	b1060
Hercules	b1160	b1200	1050		b1060	1090	1000	b1020
Point Davis	b1110	1010	840	b890	b1090	990	930	b970
Grand View	b1230	b1110	960	b940	b1040	910	b890	b870
Crockett	b950	620	880	b770	b910		840	b880
Benicia	b850	b900	*550	b470	b640	750	690	b610
Martinez	b740	b650	490	b410	b490	c420		b590
West Suisun	c600	770	340	*180	360	470	*390	330
Innisfail	b240	b250	120	b138	b156	b160	b180	b180
Port Chicago	c620	630	230	e120	360	b520	b330	b240
Nichols	b400	*b330	240	b210	*280		b340	
O & A Ferry	b124	b121	35	b19	39	71	64	b19
Pittsburg	b8	b24	12	b6	b7	11	16	b7
Sacramento River Delta								
Collinsville		b3	2	3	b3	3	5	b4
3 Mile Slough Bridge	b2	b1	2	b2	b3	ab2		b3
Rio Vista Bridge	*2	b1	*1	b2	b2	2	*2	b1
Isleton	b2	b1	2		b1	5		b1
San Joaquin River Delta								
Winter Island		b14				ab9	a9	a7
Antioch	7	11	7	5	5	6	8	5
Millers Harbor	b5	b7	9	b4	b4	8	7	b5
Webb Pump		b5	a5		b6	6		b6
Opposite Central Landing	b2	b6	a2	b2	b2	5	a3	b4
Dutch Slough	b7	ab8	a8	b7	b7	6	a7	ab6
East Contra Costa I.D.	b9		12	b7	b10	8	a9	b10
Victoria	ab7	b6	*4	b4	b7	6	6	b6
Mossdale	b5	ab5		b3	ab4	ab5	a5	b4

* No tide given.
(a) Taken at Low High Tide.
(b) Taken on following day.
(c) Taken two days later.
(e) Taken on preceding day.

TABLE 161

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

* Normal = 50 year mean (1889-1939). For comparison of 40 and 50 year means, see Table 7.
(1) For minimum daily flow see Tables 3 and 5. For minimum 10-day flow see Tables 4 and 6.
(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.

TABLE 162

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

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Filing	Time of Sample*	Draw Down or G.H.	Depth or c.f.s.	Parts per Million										
				Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	B	NO_3	Total Solids
				SACRAMENTO RIVER BELOW SHASTA DAM										
1/14/46	8:00	584.4	15664					0.0	67	4.4	4.2			93
2/11/46	9:00	580.4	8318					0.0	61	4.8	3.2			91
3/11/46	8:00	579.0	5304					0.0	64	4.8	1.1			86
4/8/46	10:00	578.05	5170					0.0	61	4.2	5.3			98
5/13/46	10:40	578.77	6764					0.0	62	4.6	1.6			84
6/10/46	3:00	580.14	7505					0.0	63	4.5	3.4			81
7/8/46	8:30	580.65	8500					0.0	66	4.4	3.4			86
8/12/46	1:30	580.90	9000					0.0	64	4.4	4.5			87
9/11/46	8:30	579.63	6498					0.0	62	3.6	2.2			79
10/14/46	9:00	579.27	5674					0.0	62	2.8	3.9			83
11/12/46	10:00	579.31	5691					0.0	68	3.8	4.5			89
12/17/46	10:00	579.30	5748					0.0	71	4.3	3.9			94
				SACRAMENTO RIVER AT COLUSA BRIDGE										
1/9/46	4:15	62.63	33250					0.0	61	8.0	2.0			99
2/6/46	3:30	47.69	12500					0.0	73	8.8	4.2			120
3/4/46	11:55	45.83	10440					0.0	74	8.0	4.2			110
4/1/46	2:00	45.81	11150					0.0	63	6.2	2.1			110
5/7/46	3:45	42.19	6761					0.0	68	6.7	2.6			99
6/4/46	8:30	41.74	6150					0.0	71	6.0	5.1			94
7/8/46	3:50	41.53	6140					0.0	74	5.2	5.6			100
8/2/46	3:45	41.72	6145					0.0	70	5.6	6.2			99
9/5/46	11:30	40.80	5522					0.0	71	5.1	4.5			94
10/2/46	8:10	40.46	5154					0.0	74	4.5	5.6			93
11/7/46	10:25	41.60	6210					0.0	76	5.3	5.1			110
12/5/46	9:00	49.55	14660					0.0	68	6.1	6.7			110
				COLUSA TROUGH AT STATE HIGHWAY 20										
1/9/46	1:10	3.88	630					0.0	250	170	80			600
2/6/46	1:15	0.85	130					15	300	260	130			890
3/4/46	11:00	0.52	88					0.0	330	270	130			890
4/1/46	9:45	1.80	262					0.0	160	110	51			420
5/7/46	1:40	--	517					0.0	170	69	28			310
6/4/46	11:10	4.20	515					0.0	190	54	37			300
7/8/46	3:30	3.20	477					0.0	200	55	37			310
8/2/46	3:12	3.69	58					0.0	200	51	38			300
9/5/46	10:50	5.15	812					0.0	200	46	31			290
10/2/46	10:30	2.35	343					0.0	180	39	28			250
11/7/46	10:10	0.78	121					0.0	230	99	57			430
12/5/46	9:20	3.78	575					0.0	170	130	73			460
				COLUSA TROUGH AT KNIGHTS LANDING										
1/10/46	9:10	28.29		Not Shipped										
2/7/46	9:33	24.89						32	290	270	140			910
3/8/46	9:45	23.15						0.0	330	300	160			980
4/3/46	9:50	25.90						0.0	310	250	150			900
5/8/46	10:45	24.58						0.0	170	71	33			340
6/4/46	1:00	24.40						0.0	200	59	44			330
7/9/46	9:20	24.55						0.0	220	66	46			370
8/5/46	10:05	24.60						0.0	220	65	47			370
9/5/46	2:10	24.60						0.0	210	57	42			330
10/3/46	9:30	23.32						0.0	180	46	31			270
11/7/46	9:35	19.56						0.0	200	94	64			410
12/5/46	10:35	20.80						9.8	240	140	90			560
				SACRAMENTO RIVER AT KNIGHTS LANDING										
1/10/46	9:40	36.66						0.0	68	11	4.0			110
2/1/46	10:00	24.78						3.6	86	7.9	4.2			140
3/8/46	10:10	23.02						0.0	79	9.2	3.2			110
4/3/46	10:10	25.82						0.0	63	7.9	4.8			100
5/8/46	10:40	22.03						0.0	87	25	13			160
6/4/46	1:10	18.85						0.0	88	16	12			140
7/9/46	9:45	16.25						0.0	89	17	10			130
8/5/46	10:20	16.60						0.0	89	18	12			140
9/5/46	2:35	16.87						0.0	93	15	11			140
10/3/46	9:45	17.34						0.0	84	4.8	6.2			100
11/7/46	9:45	17.58						0.0	74	5.5	6.2			99
12/5/46	11:00	20.78	9400					0.0	78	6.7	7.9			110

* All samples taken between 6:00 A.M. and 6:00 P.M.

TABLE 162 (CONT'D)

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

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Filing	Time of Sample*	Draw Down or G.H.	Depth of c.f.s.	Parts per Million										
				Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	B	NO_3	Total Solids
SACRAMENTO SLOUGH DRAIN														
1/10/46	10:00	34.70						0.0	77	10	15			130
2/7/46	10:20	20.79						0.0	170	9.2	15			220
3/8/46	10:30	19.69						0.0	160	7.6	16			190
4/3/46	10:25	23.05						0.0	87	5.5	14			130
5/8/46	11:40	20.93						0.0	76	4.8	9.5			110
6/4/46	2:00	16.64						0.0	210	22	97			390
7/9/46	10:00	13.30						0.0	250	27	120			450
8/5/46	10:35	13.60						0.0	230	17	76			360
9/5/46	3:00	14.45						9.4	220	14	57			310
10/3/46	10:50	14.10						0.0	210	5.8	27			240
11/7/46	10:53	13.80						0.0	190	7.5	30			220
12/5/46	11:20	17.08						0.0	210	9.9	42			260
FEATHER RIVER AT NICOLAUS														
1/10/46	2:50	36.43	24000					0.0	42	5.0	1.0			66
2/7/46	11:00	28.52	9650					0.0	50	6.0	2.1			76
3/8/46	12:00	28.36	9100					0.0	50	4.9	2.1			68
4/3/46	1:00	30.88	13450					0.0	41	4.4	1.1			78
5/8/46	4:25	31.25	14250					0.0	30	2.7	1.1			50
6/4/46	3:20	25.82	6700					0.0	39	2.8	3.4			57
7/9/46	11:00	21.10	1060					0.0	66	5.9	3.9			93
8/5/46	12:15	20.80						0.0	76	7.0	4.5			98
9/5/46	3:50	21.40	780					0.0	71	6.7	3.1			95
10/3/46	12:20	22.27	1470					0.0	75	4.7	5.1			80
11/7/46	12:20	21.92	1170					0.0	72	4.9	4.5			83
12/5/46	12:35	26.38	9000					0.0	55	9.7	5.6			86
SACRAMENTO RIVER AT VERONA														
1/10/46	1:40	33.58	58200					0.0	45	5.0	1.0			70
2/7/46	11:36	19.90	2350					0.0	51	4.2	1.1			76
3/8/46	12:30	18.87	21000					0.0	51	5.4	2.1			74
4/3/46	1:30	22.16	2900					0.0	41	3.9	1.1			75
5/8/46	4:10	19.90	23500					0.0	30	2.6	1.1			48
6/4/46	4:00	15.44	16800					0.0	45	4.3	5.1			64
7/9/46	11:30	11.97						0.0	99	13	20			150
8/5/46	12:35	11.98						0.0	110	15	21			170
9/5/46	4:15	12.51	850					0.0	120	15	21			170
10/3/46	12:50	13.16	950					0.0	83	5.7	9.0			98
11/7/46	12:47	12.92	9000					0.0	76	6.1	6.2			95
12/5/46	1:05	16.28	15000					0.0	54	7.1	5.6			84
AMERICAN RIVER AT FAIR OAKS BRIDGE														
1/9/46	8:35	5.95						0.0	31	3.0	4.0			50
2/7/46	3:00	3.84						0.0	33	2.6	2.1			55
3/7/46	3:41	4.46						0.0	24	1.0	2.1			47
4/5/46	8:54	5.53						0.0	26	3.3	2.1			60
5/7/46	1:55	9.00						0.0	20	1.1	2.8			36
6/21/46	2:45							0.0	23	1.9	2.8			38
7/19/46	4:10	1.68						0.0	35	3.6	1.7			55
8/19/46	5:00							0.0	39	3.2	7.3			58
9/11/46	4:00							0.0	40	3.9	6.2			61
10/9/46	3:30							0.0	32	3.2	6.2			53
11/6/46	3:20							0.0	29	3.3	4.5			48
SACRAMENTO RIVER AT SACRAMENTO (M STREET BRIDGE)														
1/8/46	8:20	21.40						0.0	46	4.0	5.0			76
2/7/46	12:45	8.82						0.0	73	12	7.4			110
3/7/46	8:10							0.0	54	7.8	4.2			94
4/5/46	9:55	.75						0.0	63	9.2	5.8			110
6/19/46	10:30							0.0	73	13	15			120
7/18/46	11:30							0.0	110	17	24			170
8/13/46	10:15	6.00						0.0	110	17	23			170
9/13/46	10:25	3.60						0.0	120	19	21			190
10/10/46	10:10	6.50						0.0	93	8.7	11			120
11/6/46	2:30	6.00						0.0	82	7.4	10			120
12/13/46	2:15	6.40						0.0	86	16	16			140

* All samples taken between 6:00 A.M. and 6:00 P.M.

TABLE 162 (CONT'D)

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

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Filing	Time of Sample*	Draw Down or G.H.	Depth or c.f.s.	Parts per Million										
				Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	B	NO_3	Total Solids
SACRAMENTO RIVER AT HEAD OF SNODGRASS SLOUGH														
1/8/46	9:25	15.29						0.0	47	4.4	4.0			90
2/7/46	8:45	7.90						0.0	68	7.7	8.5			120
3/7/46	9:18	7.70						0.0	67	6.7	8.5			110
4/4/46	1:35	8.00						0.0	60	7.4	5.8			94
5/7/46	8:40	9.30						0.0	34	4.2	7.3			61
6/19/46	9:06	6.19						0.0	82	13	18			130
7/18/46	9:30	5.90						0.0	100	15	24			170
8/13/46	8:30	5.90						0.0	110	17	24			170
9/13/46	8:30	5.95						0.0	120	18	25			190
10/10/46	8:00	5.50						0.0	98	15	16			140
11/6/46	1:00	5.65						0.0	76	7.3	9.5			110
12/13/46	9:00	6.70						0.0	79	15	16			140
SACRAMENTO RIVER AT COLLINSVILLE														
1/7/46	9:50	4.83						0.0	65	11	10			130
2/7/46	10:45	4.01									13			
3/6/46	9:40	2.96									8.5			
4/4/46	10:00	2.18									8.5			
5/7/46	10:50	4.20									12			
6/19/46	6:43	5.30									20			
7/18/46	7:00	4.90									860			
8/13/46	5:12	5.35									2000			
9/12/46	6:00	4.95									850			
10/10/46	4:35	2.95									300			
11/6/46	9:45	4.10									39			
12/13/46	11:20										18			
SAN JOAQUIN RIVER BELOW FRIANT DAM														
1/21/46	12:30	5.84						0.0	15	0.4	1.1			36
2/21/46	8:50	4.57						0.0	16	0.5	3.7			36
3/22/46	9:20	5.34						0.0	17	0.5	3.2			34
4/18/46	7:15	6.01						0.0	20	0.4	3.2			36
5/17/46	1:00	7.30						0.0	14	0.9	3.9			32
6/13/46	6:40	6.76						0.0	11	1.1	2.8			25
7/19/46	2:25	6.08						0.0	9.5	1.1	1.7			25
8/21/46	9:35	5.89						0.0	11	0.3	3.9			23
9/18/46	11:00	5.38						0.0	11	0.8	3.4			29
10/16/46	10:05	4.84						0.0	14	1.7	3.9			28
11/20/46	11:15	3.35		2.8	0.8	3.2	0.5	0.0	14	0.8	3.9		0.4	31
12/23/46	2:35	3.43						0.0	17	2.2	4.2			34
SAN JOAQUIN RIVER AT MENDOTA POOL														
1/21/46	11:10	9.75						0.0	22	1.3	3.2			42
2/18/46	10:30	10.85						0.0	22	0.9	4.2			42
3/25/46	10:35	14.07						0.0	19	1.0	3.2			39
4/22/46	10:20	13.35						0.0	20	1.0	3.7			42
5/20/46	9:20	13.94						0.0	17	1.2	2.8			30
6/17/46	11:05	14.06						0.0	16	1.0	2.2			33
7/22/46	10:40	3.78		1.5	0.7	2.6	0.3	0.0	12	1.3	1.1		0.5	31
8/19/46	12:25	14.08						0.0	12	0.3	4.5			23
9/23/46	10:45	14.31						0.0	14	0.8	3.4			29
10/21/46	10:20	13.82						0.0	15	1.2	3.9			30
11/18/46	11:00	13.48						0.0	27	1.4	5.6			45
12/23/46	10:10	6.71						0.0	29	6.3	4.7			59
SAN JOAQUIN RIVER AT TEMPLE SLOUGH														
1/21/46	3:10	8.50						0.0	18	1.2	7.4			39
2/18/46	1:30	6.00						0.0	24	2.6	4.8			43
3/25/46	12:50	2.19						0.0	25	3.4	7.9			51
4/22/46	2:50	2.31						0.0	29	3.3	6.3			64
5/20/46	2:20	7.81						0.0	17	1.2	2.8			32
6/17/46	2:35	5.24						0.0	17	0.9	3.4			36
7/22/46	2:40	1.72	2.5					0.0	23	1.9	5.1			46
8/19/46	4:45	1.56						0.0	35	2.1	5.6			46
9/23/46	2:20	1.49	0.5					0.0	21	1.5	5.1			40
10/21/46	1:10	1.49 est	0.5					0.0	22	1.4	5.6			37
11/18/46	3:10	1.74 est	0.5					0.0	39	3.2	11			66
12/23/46	3:15	4.06						0.0	29	5.1	3.3			55

* All samples taken between 6:00 A.M. and 6:00 P.M.

TABLE 162 (CONT'D)

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

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Filing	Time of Sample*	Draw Down or G.H.	Depth or c.f.s.	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														
1/22/46	10:45	6.79						0.0	27	0.8	2.0			41
2/19/46	9:35	4.35						0.0	22	1.3	4.8			50
3/26/46	9:30	0.50						0.0	41	2.1	6.4			66
4/22/46	5:15	0.72						0.0	40	11	6.9			70
5/20/46	6:25	6.16						0.0	17	1.3	2.8			33
6/18/46	8:30	3.56						0.0	18	1.1	3.4			32
7/23/46	11:10	0.25						0.0	68	2.3	7.9			94
8/20/46	11:30	0.13	10.1					0.0	77	2.3	10			110
9/23/46	3:30	0.13						0.0	68	2.4	7.3			90
10/22/46	9:40	0.17						0.0	61	3.0	7.9			79
11/19/46	9:00	-0.09						0.0	99	3.2	11			120
12/24/46	11:20	2.65						0.0	33	3.8	5.6			54
SAN JOAQUIN RIVER AT FREMONT FORD BRIDGE														
1/22/46	12:00	66.25						0.0	40	16.0	20.0			110
2/19/46	5:00	65.39						0.0	49	22.0	24.0			160
3/26/46	12:35	61.01						0.0	94	60.0	100			370
4/23/46	12:50	60.78						0.0	85	50.0	94.0			320
5/21/46	1:30	65.44						0.0	33	8.5	12.0			73
6/18/46	1:20	62.93						0.0	40	14	24.0			110
7/23/46	10:00	59.69						0.0	93	67	150.0			460
8/20/46	10:35	59.73						0.0	100	41	81.0			290
9/24/46	10:40	60.01		22	10	57	3.9	0.0	100	45	71.0		0.1	290
10/22/46	1:45	59.53						0.0	90	70	120			380
11/19/46	1:40	59.36						9.8	130	120	210			630
12/24/46	11:10	62.92						0.0	63	40	43			200
SAN JOAQUIN RIVER ABOVE MOUTH OF MERCED RIVER														
1/23/46	11:00			12	5.4	41	5.2	0.0	65	45	38		0.4	210
2/20/46	9:10			16	8.1	47	1.7	0.0	65	56	51		0.7	210
3/27/46	9:45			37	19	140	4.5	0.0	110	140	160		0.7	610
4/24/46	9:00			19	23	120	6.2	0.0	95	130	150		0.4	570
5/22/46	12:10			6.6	2.9	13	2.8	0.0	31	12	13		0.1	79
6/19/46	7:00							0.0	45	19	28			120
7/24/46	11:40							0.0	110	140	220			700
8/21/46	9:25							0.0	110	85	130			440
9/25/46	8:40							0.0	110	78	100			390
10/23/46	9:10							0.0	100	130	180			590
11/20/46	9:20			48	33	170	5.8	0.0	150	180	250		1.0	810
12/26/46	9:45							0.0	94	61	66			280
MERCED RIVER AT STEVINSON DRAIN														
1/22/46	8:20	6.46						6.0	29	5.7	10			77
2/19/46	7:05	8.05						0.0	44	3.6	5.3			87
3/26/46	3:05	3.22						0.0	75	5.4	14			120
4/23/46	4:00	3.21						0.0	69	4.1	6.9			98
5/21/46	6:20	9.80						0.0	24	2.0	2.8			36
6/18/46	4:10	4.26		9.3	3.2	16	1.5	0.0	58	3.9	11		0.7	89
7/23/46	2:10	2.66						0.0	76	4.6	9.3			120
8/20/46	2:00	2.74						0.0	74	3.1	17			120
9/24/46	4:30	2.32						0.0	96	4.5	13			130
10/22/46	3:59	1.90						0.0	130	7.6	19			180
11/19/46	4:20	2.00						0.0	130	7.6	30			200
12/24/46	9:20	1.92						0.0	120	9.6	19			170
SAN JOAQUIN RIVER BELOW MOUTH OF MERCED RIVER (AT HILLS FERRY BRIDGE)														
1/23/46	9:05	8.61						0.0	52	25	23			140
2/20/46	11:20	7.71						0.0	57	35	34			190
3/27/46	12:25	3.42						0.0	110	140	150			620
4/24/46	9:15	3.15						0.0	84	71	84			350
5/22/46	11:55	9.08						0.0	28	11	13			78
6/19/46	9:45	4.82						0.0	51	15	24			120
7/24/46	10:50	2.23						0.0	100	120	200			620
8/21/46	11:50	2.20		21	11	58	2.7	0.0	93	47	71		0.8	280
9/25/46								0.0	100	49	70			290
10/23/46	9:40	1.89						0.0	110	85	120			430
11/20/46	10:20	1.95						0.0	140	140	200			660
12/26/46	1:15	3.78						0.0	110	46	47			240

* All samples taken between 6:00 A.M. and 6:00 P.M.

TABLE 162 (CONT'D)

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

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Filing	Time of Sample*	Draw Down or G.H.	Depth or c.f.s.	Parts per Million										
				Ca	Mg	Na	K	CO_3	HCO_3	SO_4	Cl	B	NO_3	Total Solids
SAN JOAQUIN RIVER NEAR LAIRD SLOUGH BRIDGE														
1/24/46	12:55	35.70						0.0	58	32	31			180
2/21/46	4:30	34.32						0.0	66	40	38			210
3/28/46	10:45	29.24						0.0	110	110	130			510
4/25/46	10:25	28.97						0.0	110	95	110			460
5/23/46	10:25	37.60						0.0	32	7.1	11			68
6/20/46	11:30	30.95						0.0	74	32	46			190
7/25/46	9:45	7.82						0.0	130	99	130			480
8/22/46	10:25	27.94						0.0	120	70	95			370
9/26/46	10:00	27.99						14	120	73	93			380
10/24/46	10:55	27.34						0.0	160	120	150			580
11/21/46	11:00	27.91						0.0	160	110	150			570
12/26/46	11:35	30.28						0.0	99	46	60			280
TUOLUMNE RIVER AT TUOLUMNE CITY														
1/24/46	11:30	31.51						0.0	61	5.0	35			150
2/20/46	2:05	31.32						0.0	51	3.6	29			120
3/28/46	11:00	29.42						0.0	59	4.1	48			170
4/25/46	11:15	33.39	2983					0.0	33	2.1	15			74
5/23/46	11:05	38.72						0.0	17	1.2	7.9			38
6/20/46	12:40	29.25						0.0	140	6.6	92			310
7/25/46	11:55	28.60						0.0	140	6.7	120			380
8/22/46	10:50	28.38		37	12	74	3.6	0.0	160	4.2	120		0.1	390
9/26/46	10:15	28.27						0.0	180	4.9	140			430
10/24/46	11:35	30.86						0.0	58	4.7	45			150
11/21/46	12:05	31.56						0.0	44	2.5	33			120
12/26/46	3:25	29.69						0.0	79	5.3	62			210
SAN JOAQUIN RIVER AT EL SOLYO PUMPS														
1/24/46	11:05	25.15						0.0	61	26	32			170
2/21/46	3:40	24.20						0.0	62	30	37			190
3/29/46	11:15	20.92						0.0	94	59	96			360
4/26/46	11:45	24.28						0.0	49	17	30			130
5/24/46	11:15	29.52						0.0	30	5.7	12			63
6/21/46	11:10	21.10						0.0	93	29	65			240
7/26/46	10:40	18.85						0.0	140	50	150			470
8/23/46	3:00	18.74						0.0	140	44	130			410
9/27/46	2:50	18.94						0.0	140	49	130			420
10/25/46	10:50	19.92						0.0	93	44	90			300
11/22/46	9:35	21.22						0.0	84	39	79			260
12/27/46	9:30	21.17						0.0	100	37	66			250
STANISLAUS RIVER AT BRET HARTE PUMP														
1/25/46	10:25	25.70						0.0	46	4.3	2.0			70
2/21/46	10:50	23.99						0.0	48	3.6	4.2			71
3/29/46	10:40	24.75						0.0	40	3.3	3.2			66
4/26/46	11:15	30.04						0.0	26	1.4	2.1			48
5/24/46	10:40	29.31						0.0	35	1.3	2.8			44
6/21/46	10:45	22.74						0.0	100	4.9	9.0			130
7/26/46	10:15	22.15						0.0	110	4.7	12.0			140
8/23/46	10:30	21.89						0.0	110	3.9	11.0			140
9/27/46	10:15	22.47						0.0	130	5.5	12.0			170
10/25/46	10:20	21.56						0.0	130	5.1	10.0			160
11/22/46	8:40	22.91						0.0	76	5.9	6.7			100
12/27/46	9:00	22.27						0.0	100	11	13			140
SAN JOAQUIN RIVER NEAR VERNALIS														
1/25/46	2:45	13.35						0.0	57	21	26			150
2/21/46	2:30	12.17						0.0	58	25	31			170
3/29/46	3:00	9.50						0.0	73	46	66			260
4/26/46	1:05	13.22						0.0	37	8.7	16			96
5/24/46	11:45	18.33						0.0	31	4.3	10			60
6/21/46	3:10	9.33						0.0	81	23	62			230
7/26/46	2:50	7.31						0.0	130	39	120			370
8/23/46	1:15	7.03						0.0	140	35	100			350
9/27/46	1:35	7.19		23	16	71	4.5	0.0	140	40	110		0.5	370
10/25/46	12:20	7.73						0.0	100	37	83			280
11/22/46	10:00	9.10						0.0	78	30	59			230
12/27/46	10:45	8.93						0.0	97	30	62			230

* All samples taken between 6:00 A.M. and 6:00 P.M.

TABLE 162 (CONT'D)

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

DATA COPIED FROM UNITED STATES BUREAU OF RECLAMATION COMPILATION

Date of Filing	Time of Sample*	Draw Down or G.H.	Depth or c.f.s.	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														
1/7/46	2:50	9.10						0.0	45	15	20			130
2/6/46	1:25	6.92						0.0	54	25	30			180
3/5/46	1:03	4.93						0.0	73	36	52			230
4/3/46	1:23	5.60						0.0	67	14	31			160
5/6/46	2:20	9.50						0.0	41	4.3	7.9			59
6/20/46	12:43	8.20						0.0	87	19	53			190
7/19/46	12:15	3.50						0.0	120	44	120			390
8/12/46	11:25	2.93						0.0	130	35	120			370
9/11/46	12:00	2.65						0.0	120	26	79			300
10/9/46	10:30	2.60						0.0	130	32	81			310
11/7/46	1:25	1.95						0.0	81	31	64			230
STOCKTON SHIP CHANNEL AT BURNS CUT-OFF														
1/8/46	12:20	7.25						0.0	57	21	29			160
2/6/46	2:30							0.0	53	23	41			190
3/5/46	11:27							0.0	72	30	47			230
4/3/46	2:11							0.0	78	42	67			270
5/8/46	11:30							0.0	38	4.8	12			73
6/21/46	12:00							0.0	73	13	39			160
7/19/46	10:00	5.78						0.0	120	30	98			320
8/12/46	10:15	3.70						0.0	150	32	120			380
9/11/46	10:40	3.92						0.0	150	30	110			370
10/9/46	9:53	4.30						0.0	150	34	120			400
11/7/46	2:10	4.95						0.0	99	35	91			320
12/11/46	10:05	6.10						0.0	74	20	46			190
MOKELUMNE RIVER AT CENTRAL LANDING														
1/8/46	10:30	4.05		13	3.3	7.8	2.8	0.0	47	13	7.4		0.4	110
2/7/46	9:40	4.20		16	6.8	7.3	2.4	0.0	75	11	8.5		0.3	120
3/7/46	10:27	2.90		13	6.1	15	2.8	0.0	64	15	18		0.5	130
4/4/46	9:55	3.20		16	8.7	17	3.9	0.0	63	22	28		0.4	160
5/7/46	9:45			12	4.3	10	2.2	0.0	53	9	13		0.4	91
6/19/46	8:00	4.30		11	6.6	16	2.2	0.0	58	11	19		1.2	120
7/18/46	8:15	4.00		15	9.1	26	2.0	0.0	84	18	25		0.3	150
8/19/46	12:15	2.85		17	11	28	1.3	0.0	100	21	35		0.4	180
9/13/46	7:30	3.75		18	12	27	1.9	0.0	120	19	30		0.4	190
10/10/46	6:45	3.20		18	11	23	2.6	0.0	110	18	30		0.6	170
11/6/46	11:30	2.60		15	8.8	16	2.1	0.0	84	11	20		1.0	140
12/14/46	11:30			13	7.7	16	4.2	0.0	73	17	17		1.1	130
OLD RIVER AT CLIFTON COURT FERRY														
1/7/46	1:50							0.0	50	17	20			130
2/6/46	12:45							0.0	51	22	26			150
3/5/46	2:05							0.0	71	37	49			220
4/3/46	12:00							0.0	68	28	44			190
5/6/46	1:05							0.0	33	4.9	9.5			64
6/20/46	11:00							0.0	68	14	33			150
7/19/46	10:20							0.0	120	37	91			330
8/14/46	9:30							0.0	130	46	120			380
9/12/46	9:15							0.0	130	34	91			330
10/3/46	4:45			34	15	72	5.1	0.0	150	41	110		0.5	380
11/7/46	12:30							0.0	86	38	74			260
12/11/46	12:00													
SAN JOAQUIN RIVER AT ANTIOCH														
1/7/46	11:00	1.56						0.0	46	21	24			140
2/6/46	10:40	0.65									21			
3/6/46	11:07	5.40									26			
4/3/46	9:51	0.50									30			
5/6/46	10:20	1.30									20			
6/20/46	7:38	2.55									34			
7/19/46	8:00	2.30									560			
8/14/46	5:27	2.75									1400			
10/11/46	5:20	5.50						0.0	120	52	260			620
11/7/46	10:15	1.10									100			
12/11/46	1:45	2.42									52			

* All samples taken between 6:00 A.M. and 6:00 P.M.

TABLE 163

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

Name of Station	Operated by*	Location	Date Installed
		SACRAMENTO DELTA	
Sacramento	D.W.R.	Left bank of Sacramento River at Southern Pacific Railroad Bridge	1920
Clarksburg	D.W.R.	Right bank of Sacramento River at American Crystal Sugar Company dock	1936
Snodgrass Slough	D.W.R.	Left bank, Sacramento River; about 0.1 mile above Hollister Landing about 1/4 mile above head of Snodgrass Slough (now leveed off).	Aug. 1939
Walnut Grove	D.W.R.	Left bank of Sacramento River at head of Georgiana Slough; lower end of town of Walnut Grove.	Feb. 1929
Rio Vista	U.S.E.D.	Right bank of Sacramento River at U. S. Engineers depot below Rio Vista; about 1½ miles below Rio Vista Bridge.	Apr. 1908
Three Mile Slough (Sac.)	D.W.R.	On Brannon Island side of Slough. Pile dolphin about 0.1 mile from Three Mile Slough Bridge.	Apr. 1929
Mayberry Slough	U.S.E.D.	Right bank of Sacramento River about four miles above Collinsville.	Prior to 1929
Collinsville	D.W.R.	Right bank of Sacramento River. On pile dolphin about 0.1 mile upstream from junction of mainstreet and river.	June 1929
		MOKELUMNE DELTA	
New Hope Bridge	D.W.R.	Right bank of the south fork of Mokelumne River just below New Hope Bridge.	Aug. 1920
Terminous	U.S.B.R.	On highway bridge over Potato Slough between Terminous Tract and Bouldin Island.	July 1940
Georgiana Slough	D.W.R.	On Andrus Island near junction of Georgiana Slough and Mokelumne River. At former location of Golden State Asparagus Company plant.	June 1929
		SAN JOAQUIN DELTA	
Mossdale Bridge	D.W.R.	Right bank of San Joaquin River just below U. S. 40 crossing.	1920
Grant Line	U.S.B.R.	Right bank of Grant Line canal at Tracy Road crossing.	Oct. 1940
Brandts Bridge	U.S.B.R.	Right bank of San Joaquin River at Brandts Bridge between Roberts Island and mainland.	July 1940
Stockton	U.S.E.D.	At Head of McLeod Lake; El Dorado Street.	Dec. 1927
Burns Cut-off	U.S.B.R.	On Stockton ship canal at East Bay Municipal Utility District Crossing Northwest corner of Rough and Ready Island.	May 1940
Rindge	D.W.R.	At southeast corner of Rindge Tract, on Fourteen Mile Slough at Junction with Ship Canal.	July 1939
Middle River (Borden)	D.W.R.	Left bank of Middle River just below Borden Highway Bridge. On Victoria Island.	July 1939
Old River (Mansion House)	D.W.R.	Right bank of Old River at Mansion House. On Victoria Island. On timber dolphin.	Aug. 1939
Old River (Near Rock Slough)	D.W.R.	Left bank of Old River 1 mile north of Rock Slough. On American Island.	Mar. 1945
Mandeville	U.S.B.R.	South side of Mandeville Island. On Mandeville cut at beet dump about one mile west of Bacon-Mandeville ferry.	July 1940
Rock Slough	U.S.B.R.	North bank of Rock Slough near head of slough. About 1½ miles east of Knightsen.	May 1936
Venice Island	U.S.E.D.	On Stockton ship canal near Venice Island headquarters of Blakes Landing.	Jan. 1928
Three Mile Slough (S.J.)	D.W.R.	On Sherman Island at R.D. 341 drainage plant. Near junction of slough with San Joaquin River. On pile dolphin.	June 1929
Antioch	D.W.R.	On wharf of Antioch Water Works.	June 1929
		SUISUN BAY	
Benicia	D.W.R.	North side of Suisun Bay. On Benicia Arsenal wharf.	Apr. 1940 (1)
		YOLO BY-PASS	
Lisbon	D.W.R.	Left bank of Yolo By-Pass below north end of San Francisco and Sacramento Railroad trestle.	1920
Liberty Island	D.W.R.	Right bank of dredger cut separating Little Holland and Liberty Island. One-half mile north of Yolo-Solano County line.	1930
Lindsay Slough	D.W.R.	South bank of Lindsay Slough 1/2 mile west of Wright Cut. At Monetzuma Ranch headquarters of California Packing Corporation.	Jan. 1942

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

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


STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF WATER RESOURCES
SACRAMENTO-SAN JOAQUIN WATER SUPERVISION
1946
LEGEND
SACRAMENTO-SAN JOAQUIN DELTA

PLATE 3

SION