WATER BUDGETS FOR MAJOR STREAMS IN THE CENTRAL VALLEY, CALIFORNIA, 1961-77

By James R. Mullen and Paul Nady

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ILLUSTRATION

CONVERSION FACTORS

For use of readers who prefer to use metric units, conversion factors for terms used in this report are listed below:

Inch-pound	Multiply by	Metric (SI)
foot (ft)	0.3048	meter
mile (mi)	1.609	kilometer
square mile (mi^2)	2.590	square kilometer
acre-foot (acre-ft)	1,233	cubic meter
acre-foot (acre-ft)	.001233	cubic hectometer
cubic foot per second (ft^3/s)	.02832	cubic meter per second

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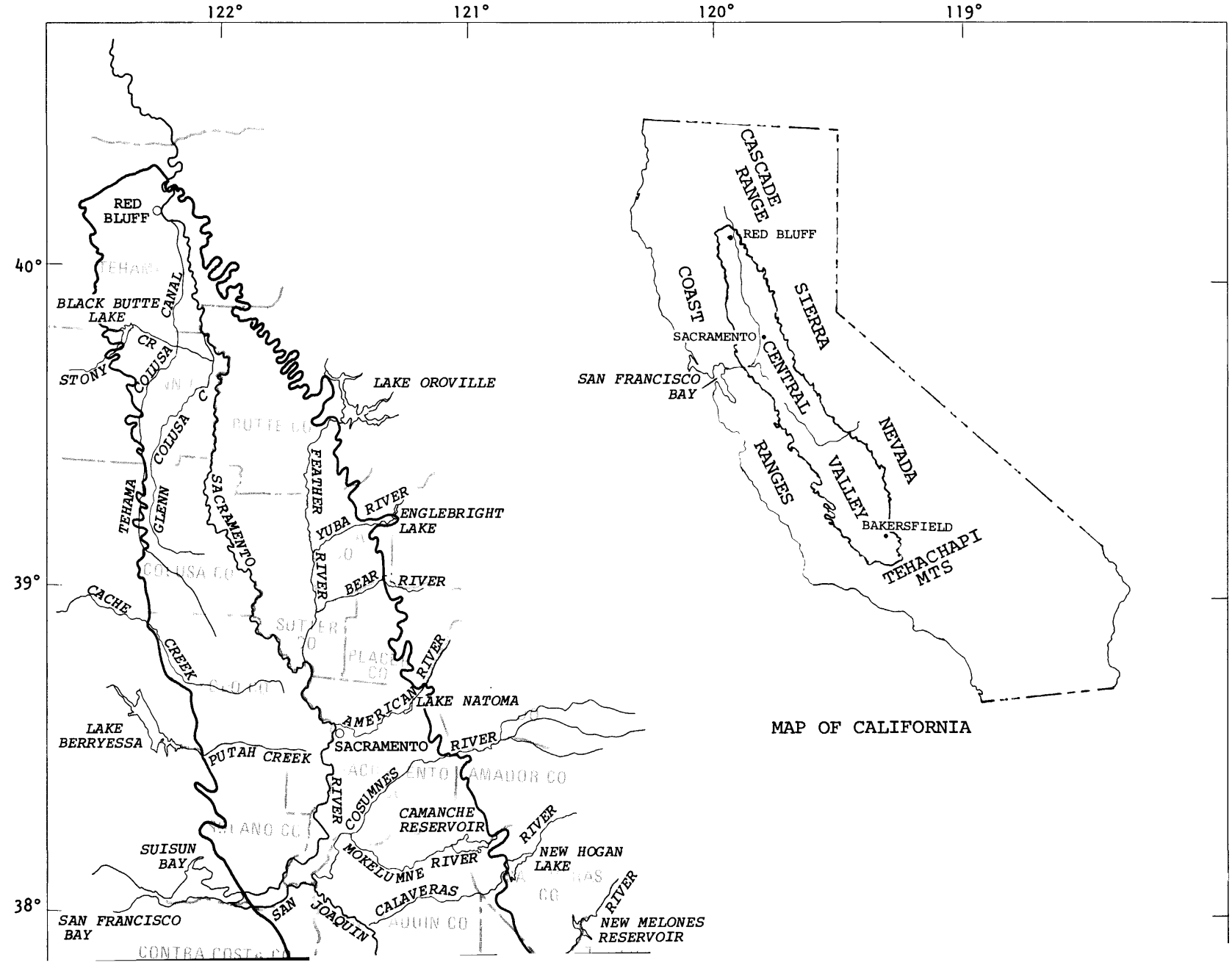
ABSTRACT

This report is a compilation of annual streamflow data for 20 major stream systems in the Central Valley of California for water years 1961-77. The water-budget tables list gaged and ungaged inflow from tributaries and canals, diversions, and gaged outflow. Theoretical outflow and gain or loss in a reach are computed. A schematic diagram and explanation of the data are provided for each water-budget table.

INTRODUCTION

The Central Valley of California is located between the Coast Ranges on the west and the Sierra Nevada on the east. It is bounded on the north by the Cascade Range and on the south by the Tehachapi Mountains (fig. 1). The valley averages about 50 miles in width and about 400 miles in length. Its northern part is named the Sacramento Valley and its southern part is named the San Joaquin Valley.

This report contains summaries of surface-water data used in computing gains and losses in major river reaches in the Central Valley. These estimates of gains and losses to or from major streams in the valley will be used in a regional ground-water-flow model (A. K. Williamson, U.S. Geological Survey, written commun., 1985). The water-budget tables list gaged and ungaged inflow from tributaries and canals, diversions, and gaged outflow. The ungaged tributary inflows were estimated by multiple-regression methods (Nady and Larragueta, 1982).



MAP OF CALIFORNIA

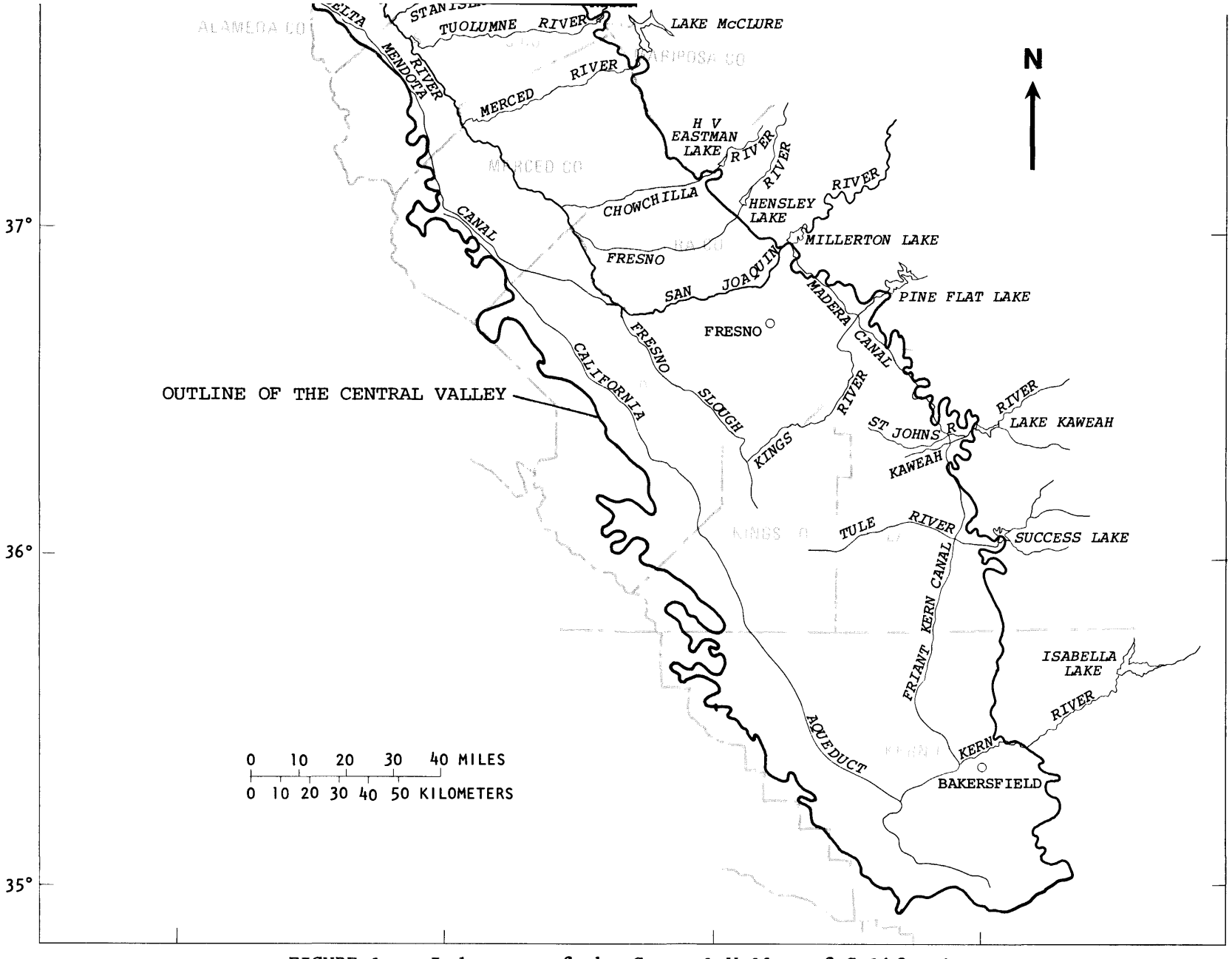


FIGURE 1. - Index map of the Central Valley of California.

Method

The losses or gains in the water-budget tables were computed for selected reaches of rivers as follows:

$$Qt = Qin + T + I - D \quad (1)$$

$$Qloss = Qt - Qout \quad (2)$$

where

Qt is theoretical outflow,
Qin is gaged inflow,
T is tributary inflow,
I is inflow from canals,
D is diversions (canals and pumpage),
Qloss is loss in reach or gain (-), and
Qout is gaged outflow.

The tables reflect losses caused by evaporation, transpiration, and measurement error; however, these are not identified specifically. These losses are included in the losses or gains shown in the tables. Twenty major stream systems are summarized. The general format for each stream is:

(1) Schematic diagram of the stream system,
(2) An explanation of each line of the water-budget table, and
(3) Water-budget table.

The schematic diagram of the stream system emphasizes the major features; significant data points have been included. The number in the left margin is the line number for the data on the table and the explanation page. The river mileage (rm) numbers on the schematic diagram are a reference distance upstream from the mouth of the stream or the lowest point in the stream system.

The explanation page for the tables provides the reader with the source of the data. Use of the U.S. Geological Survey station number system (such as 11452000) indicates that the data on that line were either collected or reviewed by the Geological Survey and published in the annual report (U.S. Geological Survey Water Resources Data for California). Use of the California Department of Water Resources (DWR) number system (such as AO-1200) indicates that the data on that line were either collected or reviewed by DWR and published in the annual report (California Department of Water Resources Bulletin 130). The remainder of the lines list the source. Abbreviations of an agency's name are used on subsequent lines on the same page. The data in the tables were rounded to the nearest 100 acre-ft/yr to compress the data into a manageable format area. Therefore, the totals derived from the addition and subtraction of lines as indicated in the explanations do not agree exactly with the sum of the components. The mean represents average discharge for 1961-77.

Water budgets for the Sacramento River are not included in this report because estimates of losses (and gains) to ground water are subject to larger errors than on other streams. This is because there are substantial unmeasured surface-water inflows and the higher ratio of main-channel flow to

loss causes a magnification of the effect of measurement error. In addition, some of the data are available only from April to October. The California Department of Water Resources (Donald H. Taylor, DWR, written commun., 1977) has tabulated monthly water budgets for the summer season for 1960-77 in addition to tabulations previously reported for 1948-59.

Base Period

A base period of water years 1961-77 was selected for this study because this timespan reflects the cyclical characteristics of water supplies in the Central Valley. In addition, this particular period was selected to determine gains and losses to be used in a regional ground-water-flow model (A. K. Williamson, U.S. Geological Survey, written commun., 1985). This 17-year period includes reliable records of measureable water supply and use during a series of wet and dry years. The beginning and the end of the base period were preceded by a series of dry years so that errors of analysis resulting from percolating water in transit to aquifers were minimized.

Acknowledgments

Data presented in this report were obtained from many sources. Organizations that supplied data are acknowledged in the explanations for the water-budget tables. The principal organizations are:

Bakersfield City Water Department (BCWD)
California Department of Water Resources (DWR)
Chowchilla Water District
East Bay Municipal Utility District (EBMUD)
El Solyo Water District
Kaweah Delta Water Conservation District (KDWCD)
Kings County Water District
Kings River Water Association (KRWA)
Lakeside Irrigation District
Lower Tule Irrigation District
Madera Irrigation District (MaID)
Merced Irrigation District (MeID)
Modesto Irrigation District (MoID)
Patterson Water District
South San Joaquin Irrigation District
Tulare Irrigation District
Tule River Association (TRA)
Turlock Irrigation District (TID)
U.S. Army Corps of Engineers
U.S. Bureau of Reclamation (USBR)
U.S. Geological Survey (USGS)
West Stanislaus Irrigation District
Waterford Irrigation District
Yolo County Flood Control District (YCFC)

SELECTED REFERENCES

California Department of Water Resources, 1963, Surface-water flow for 1961: California Department of Water Resources Bulletin 23-61, 307 p.

-----1965, Surface-water flow for 1962: California Department of Water Resources Bulletin 23-62, 401 p.

-----1974, Evaluation of ground-water resources; Sacramento County: California Department of Water Resources Bulletin 118-3, 141 p.

-----1977, Kaweah River flows, diversions, and storage, 1961-1970: California Department of Water Resources Bulletin 49-D, 276 p.

Chrisman, L. J., 1976, Annual report to the Kaweah River Association and St. John's River Association, 303 p.

Hubbart, Max, 1968, Hydrologic balance of Kings River supply, surface water supply, coordinated statewide planning water-demand study, study area 2, San Joaquin District Office report, 62 p.

Leake, R. E. Jr., 1974, Watermaster report for water year 1971, 329 p.

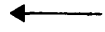
Nady, Paul, and Larragueta, L. L., 1982, Estimating average annual streamflow to the Central Valley: U.S. Geological Survey Hydrologic Investigations Atlas HA-657, scale 1:500,000.

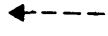
U.S. Army Corps of Engineers, 1975, Hydrology: Design memorandum No. 1, Merced County Streams, March 1975.

SCHEMATICS, EXPLANATIONS, AND WATER-BUDGET TABLES

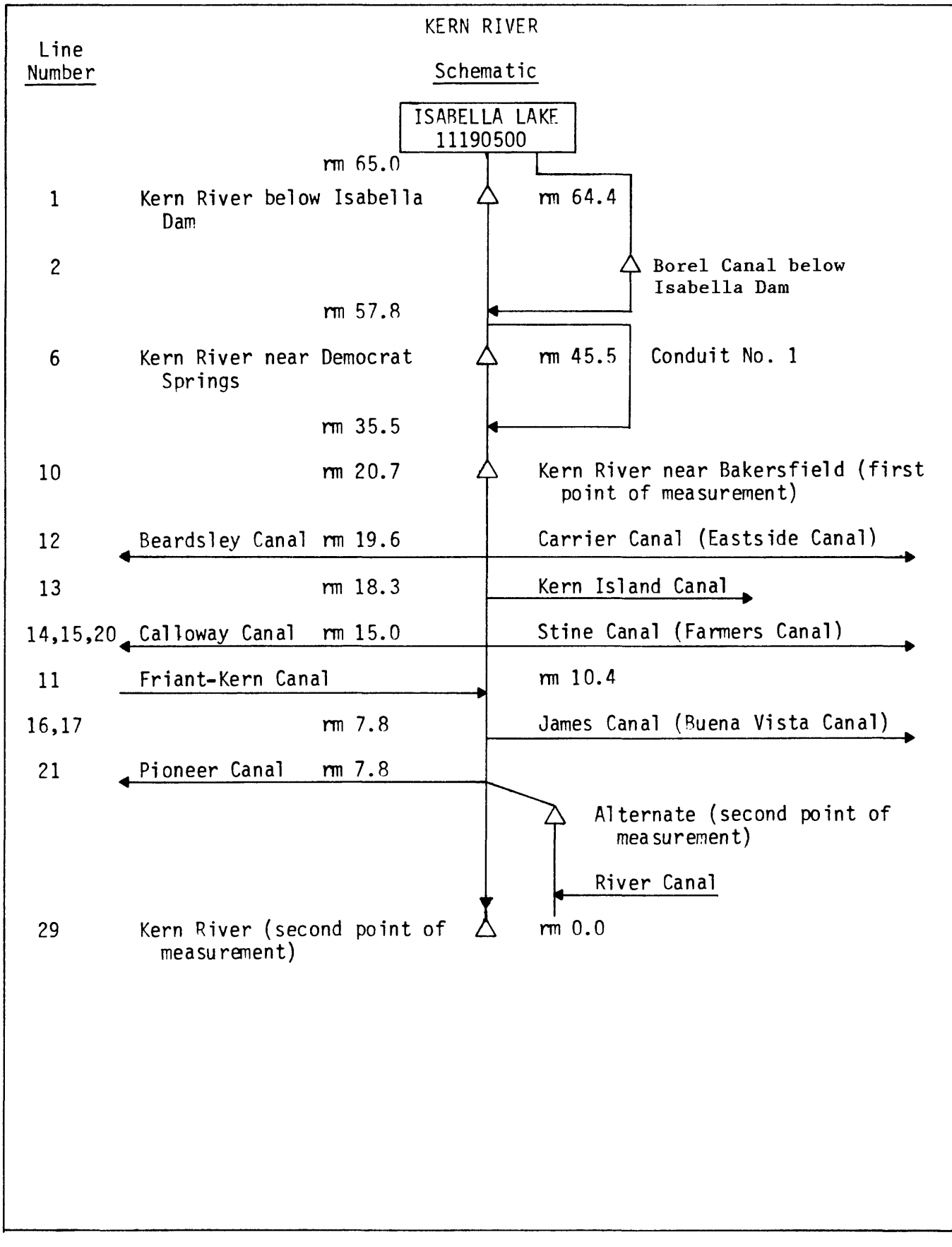
EXPLANATION FOR SCHEMATICS

△ GAGING STATION


STREAM, OPEN FLUME, OR CANAL--
Arrow indicates direction of flow


PENSTOCK, TUNNEL, CLOSED FLUME, OR PIPE--
Arrow indicates direction of flow

3 LINE NUMBER--Number corresponds to water-budget table and explanation


KERN RIVER
Line Number
Schematic
ISABELLA LAKE
11190500
rm 65.0
1
Kern River below Isabella Dam
rm 64.4
2
Borel Canal below Isabella Dam
rm 57.8
6
Kern River near Democrat Springs
rm 45.5
Conduit No. 1
rm 35.5
10
rm 20.7
Kern River near Bakersfield (first point of measurement)
12
Beardsley Canal
rm 19.6
Carrier Canal (Eastside Canal)
13
rm 18.3
Kern Island Canal
14,15,20
Calloway Canal
rm 15.0
Stine Canal (Farmers Canal)
11
Friant-Kern Canal
rm 10.4
16,17
rm 7.8
James Canal (Buena Vista Canal)
21
Pioneer Canal
rm 7.8
Alternate (second point of measurement)
River Canal
29
Kern River (second point of measurement)
rm 0.0

KERN RIVER

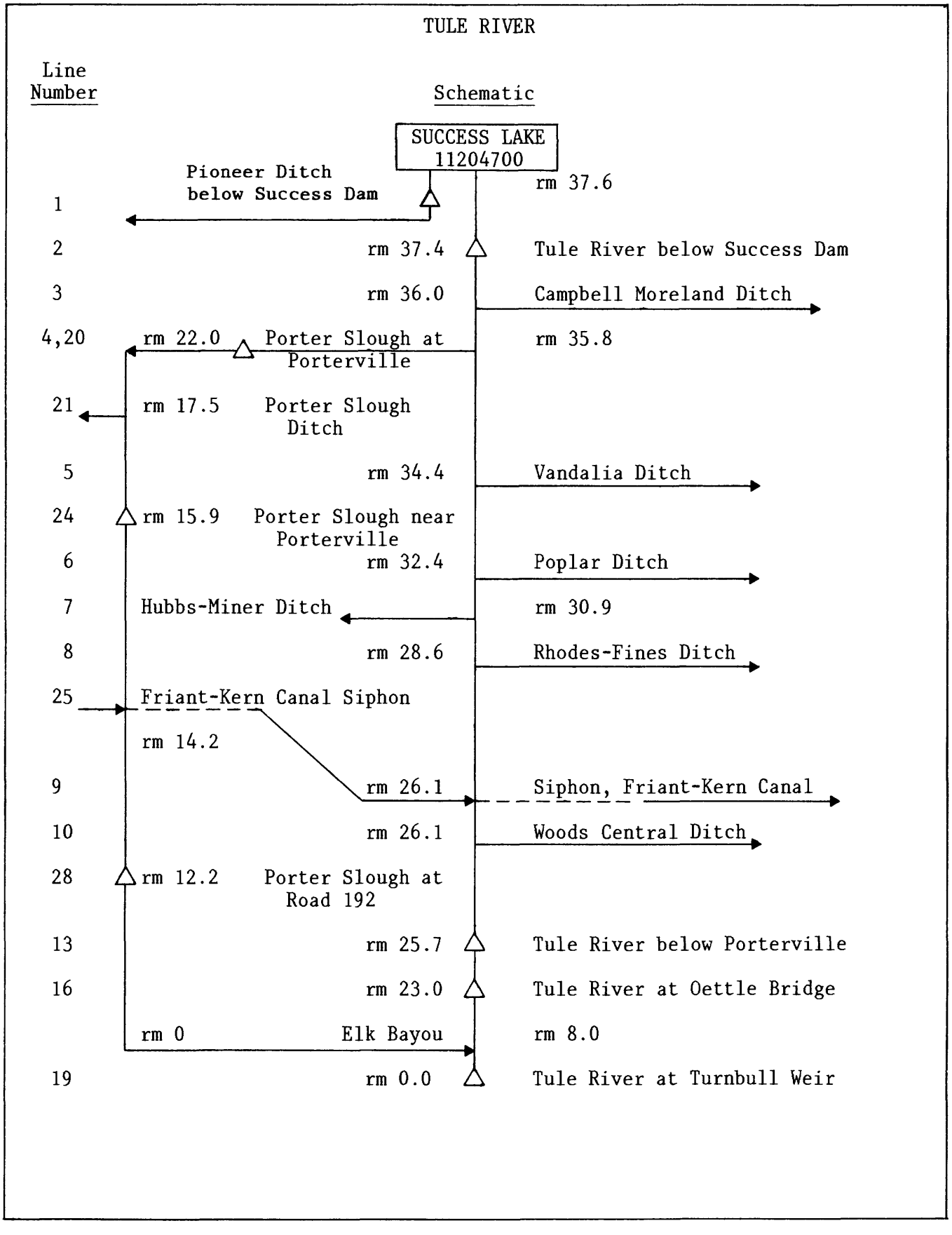
Line Number	Explanation for water-budget table
1	11191000 Gaged flow on Kern River below Isabella Dam.
2	11187500 Gaged inflow from Borel Canal below Isabella Dam.
3	Ungaged inflow from 29 tributaries. Estimated by using regression equations.
4	Theoretical flow to combination of Kern River near Democrat Springs and Conduit No. 1, the sum of lines 1, 2, and 3.
5	Loss between Kern River below Isabella Dam and combination of Kern River near Democrat Springs and Conduit No. 1, line 4 minus line 6.
6	11192500 Gaged flow on Kern River near Democrat Springs combined with Conduit No. 1.
7	Ungaged flow from 10 tributaries. Estimated by using regression equations.
8	Theoretical flow to Kern River near Bakersfield (first point of measurement), the sum of lines 6 and 7.
9	Loss between combination of Kern River near Democrat Springs and Conduit No. 1 and Kern River near Bakersfield, line 8 minus line 10.
10	11194000 Gaged flow on Kern River near Bakersfield (first point of measurement). Water years 1961-76, U.S. Geological Survey (USGS), 1977 by Bakersfield City Water Department (BCWD).
11	Inflow from Friant-Kern Canal (BCWD).
12	Diversion to Beardsley-Lerdo Canals (BCWD).
13	Do------ Eastside-Kern Island Canals (BCWD).
14	Do------ Farmers Canal (BCWD).
15	Do------ Stine Canal (BCWD).
16	Do------ Buena Vista Canal (BCWD).
17	Do------ James Canal (BCWD).
18	Do------ Plunkett Canal (BCWD).
19	Do------ Kern River Conduit (BCWD).
20	Do------ Calloway Canal (BCWD).
21	Do------ Pioneer Canal (BCWD).
22	Do------ Kern County Canal and Water Company-Johnson Canal (BCWD).
23	Do------ Castro Canal (BCWD).
24	Do------ Old South Canal (BCWD).
25	Do------ Wilson Canal (BCWD).
26	Total diversions, the sum of lines 12 through 25.
27	Theoretical flow to Kern River at second point of measurement, the sum of lines 10 and 11 minus line 26.
28	Loss between Kern River near Bakersfield and Kern River at second point of measurement, line 27 minus line 29.
29	Gaged flow on Kern River at second point of measurement (BCWD).

Water budget for Kern River, 1961-77

[Thousands of acre-feet]

LINE	MEAN	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
1	347.6	45.8	284.3	298.8	144.8	221.9	147.8	1023.0	265.3	1636.0	369.2	144.5	101.1	511.9	310.6	257.4	84.0	62.9
2	280.2	130.6	271.2	280.9	268.4	333.0	339.0	325.4	345.0	315.7	378.0	294.2	203.9	188.2	367.5	357.7	227.3	136.7
3	18.2	2.3	7.4	5.2	6.5	21.5	6.0	31.8	7.1	87.8	14.9	11.1	5.5	44.0	30.4	19.5	6.3	2.0
4	646.0	178.7	562.9	584.9	419.7	576.4	492.8	1380.1	617.4	2039.5	762.1	449.8	310.5	744.1	708.5	634.6	317.6	201.6
5	12.7	0.9	2.3	2.6	7.0	15.1	1.1	14.1	4.4	52.5	14.3	9.3	10.4	34.7	27.8	12.6	4.9	1.9
6	633.3	177.8	560.7	582.3	412.7	561.3	491.7	1366.0	613.0	1987.0	747.8	440.5	300.1	709.4	680.7	622.0	312.7	199.7
7	3.0	0.4	1.2	0.9	1.1	3.6	1.0	5.3	1.2	14.6	2.5	1.8	0.9	7.3	5.0	3.2	1.0	0.3
8	636.3	178.2	561.9	583.2	413.8	564.9	492.7	1371.3	614.2	2001.6	750.3	442.3	301.0	716.7	685.7	625.2	313.7	200.0
9	-24.0	-7.2	-27.4	-21.2	-20.9	-5.0	-9.6	-29.7	-15.7	-129.4	-22.7	-13.4	-13.2	-27.8	-25.5	-14.1	-10.8	-13.7
10	660.2	185.4	589.3	604.4	434.7	569.9	502.3	1401.0	629.9	2131.0	773.0	455.8	314.2	744.5	711.2	639.3	324.5	213.7
11	17.9	2.9	31.8	37.8	0.6	36.5	6.0	36.6	0.0	17.3	9.5	18.4	0.0	46.2	59.6	1.1	0.0	0.0
12	153.4	62.2	171.8	180.7	74.8	181.2	124.3	208.6	159.3	217.3	234.9	121.8	97.8	184.3	202.4	211.4	108.0	67.1
13	136.8	106.6	113.1	135.7	145.2	131.5	126.8	119.0	148.4	150.9	172.5	145.4	139.3	143.8	152.0	143.3	142.8	108.7
14	4.1	0.0	0.7	2.3	1.8	2.8	2.0	10.1	2.2	7.7	4.5	3.1	3.4	6.9	10.7	6.7	2.9	1.1
15	6.4	0.0	2.3	7.1	1.0	4.4	2.2	17.3	4.0	18.0	7.1	4.4	3.0	14.4	13.7	7.4	2.8	0.1
16	11.5	0.0	4.6	12.8	1.8	7.8	4.3	26.3	5.6	24.4	15.8	9.5	14.0	21.2	19.8	16.2	9.3	2.6
17	9.4	0.1	0.0	1.2	0.5	1.9	0.2	25.2	5.1	57.6	19.8	10.7	5.5	7.0	7.9	8.6	8.5	0.8
18	1.0	0.0	0.1	0.0	0.2	2.2	0.9	3.4	0.7	1.5	2.4	1.0	1.9	0.8	0.6	0.7	0.7	0.1
19	54.6	0.0	0.0	53.7	74.6	33.4	16.6	2.1	42.2	573.3	67.3	0.0	1.8	20.7	25.6	15.3	0.7	0.4
20	23.8	5.9	11.5	5.9	30.3	2.2	9.3	114.3	19.3	114.4	23.2	0.0	0.0	39.0	17.8	11.3	0.0	0.7
21	8.8	0.7	0.0	1.3	2.0	31.8	0.0	45.8	4.8	25.9	19.6	2.8	0.4	13.5	0.0	0.0	0.0	0.0
22	13.8	0.0	0.0	2.3	1.7	0.0	0.0	0.0	0.0	0.0	18.9	39.3	21.4	70.5	33.3	35.7	5.6	6.5
23	0.3	0.0	2.7	0.7	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.2	0.1	0.0	0.0
24	2.9	0.3	3.1	3.4	0.8	3.3	2.5	4.0	3.4	4.0	4.0	3.7	2.8	3.7	4.6	4.2	0.9	0.1
25	0.4	0.0	0.0	0.6	0.0	0.7	0.2	0.9	0.0	3.2	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	427.2	175.7	309.8	407.8	334.9	403.2	289.3	577.3	395.4	1198.3	591.1	341.8	291.3	526.0	488.6	461.0	282.3	188.3
27	251.0	12.6	311.3	234.4	100.4	203.2	219.1	860.3	234.5	950.0	191.4	132.4	22.9	264.6	282.2	179.4	42.2	25.4
28	67.3	12.6	142.4	94.9	41.3	62.4	101.9	350.3	70.1	-78.9	5.3	31.9	10.6	107.8	97.1	47.1	24.9	22.9
29	183.6	0.0	168.9	139.5	59.1	140.8	117.2	510.1	164.4	1028.9	186.1	100.4	12.3	156.9	185.1	132.3	17.3	2.5

(p. 13 follows)


TULE RIVER
Line Number
Schematic
SUCCESS LAKE 11204700
Pioneer Ditch below Success Dam
rm 37.6
1
2
rm 37.4
Tule River below Success Dam
3
rm 36.0
Campbell Moreland Ditch
4,20
rm 22.0
Porter Slough at Porterville
rm 35.8
21
rm 17.5
Porter Slough Ditch
5
rm 34.4
Vandalia Ditch
24
rm 15.9
Porter Slough near Porterville
6
rm 32.4
Poplar Ditch
7
Hubbs-Miner Ditch
rm 30.9
8
rm 28.6
Rhodes-Fines Ditch
25
Friant-Kern Canal Siphon
rm 14.2
9
rm 26.1
Siphon, Friant-Kern Canal
10
rm 26.1
Woods Central Ditch
28
rm 12.2
Porter Slough at Road 192
13
rm 25.7
Tule River below Porterville
16
rm 23.0
Tule River at Oettle Bridge
rm 0
Elk Bayou
rm 8.0
19
rm 0.0
Tule River at Turnbull Weir

Line Number

Explanation for water-budget table

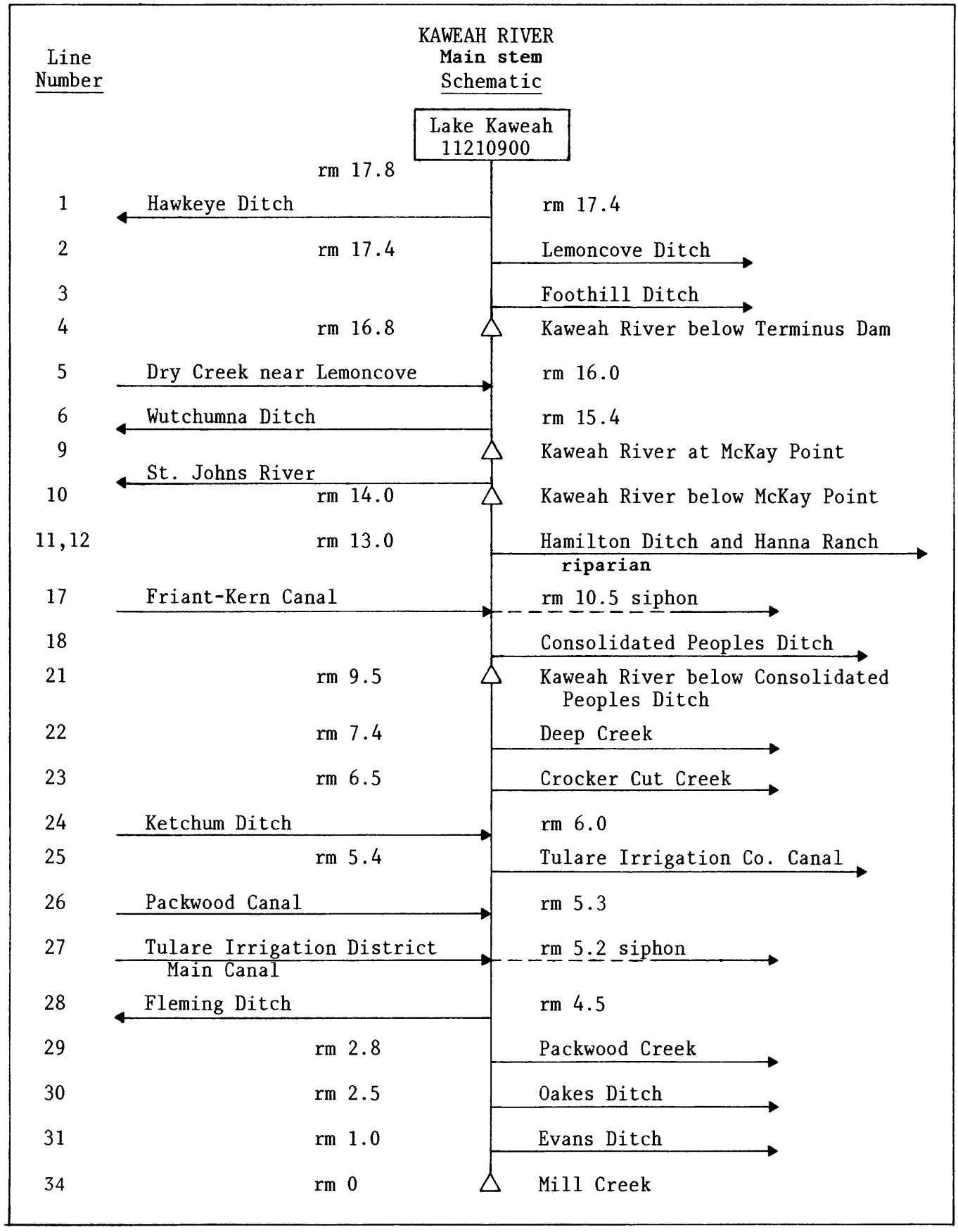
1 11204680 Gaged diversion to Pioneer Ditch below Success Dam. Not used in computations.
2 11204900 Gaged flow on Tule River below Success Dam.
3 Diversion to Campbell Moreland Ditch above Porterville, Tule River Association (TRA).
4 CO-3182 Diversion to Porter Slough at Porterville. Also see line 20.
5 Diversion to Vandalia Ditch near Porterville (TRA).
6 Do------ Poplar Ditch near Porterville (TRA).
7 Do------ Hubbs-Miner Ditch at Porterville (TRA).
8 Do------ Rhodes-Fines Ditch near Porterville (TRA). Discontinued and abandoned in 1969; years 1970-77 assumed to be zero.
9 CO-3923 Inflow from Friant-Kern Canal to Tule River, U.S. Bureau of Reclamation (USBR).
10 Diversion to Woods Central Ditch near Porterville (TRA).
11 Theoretical flow to Tule River below Porterville, the sum of lines 2 and 9 minus lines 3 through 8 and 10.
12 Loss between Tule River below Success Dam and Tule River below Porterville, line 11 minus line 13.
13 CO-3169 Gaged flow on Tule River below Porterville.
14 Theoretical flow to Tule River at Oettle Bridge, use line 13.
15 Loss between Tule River below Porterville and Tule River at Oettle Bridge, line 14 minus line 16.
16 Gaged flow on Tule River at Oettle Bridge (TRA).
17 Theoretical flow to Tule River at Turnbull Weir, use line 16.
18 Loss between Tule River at Oettle Bridge and Tule River at Turnbull Weir, line 17 minus line 19.
19 Gaged flow on Tule River at Turnbull Weir (C. Chastain, California Department of Water Resources, oral commun., 1978, verified by TRA Annual Reports--Section II).
20 CO-3182 Gaged flow on Porter Slough at Porterville. Same as line 4.
21 CO-3984 Diversion of Porter Slough Ditch at Porterville.
22 Theoretical flow to Porter Slough near Porterville, line 20 minus line 21.
23 Loss between Porter Slough at Porterville and Porter Slough near Porterville, line 22 minus line 24.
24 CO-3187 Gaged flow on Porter Slough near Porterville. Flow for years 1967-77 estimated by correlation with Porter Slough at Porterville.
25 CO-3913 Inflow from Friant-Kern Canal to Porter Slough (USBR).
26 Theoretical flow to Porter Slough at Road 192, the sum of lines 24 and 25.
27 Loss between Porter Slough near Porterville and Porter Slough at Road 192, line 26 minus line 28.
28 Porter Slough at Road 192 (Roger Robb, Lower Tule Irrigation District, written commun., 1978). No data available for 1961-66.

Water budget for Tule River, 1961-77

[Thousands of acre-feet]

LINE	MEAN	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
1	5.0	6.0	7.1	5.8	5.1	4.9	4.7	3.9	5.3	4.3	5.7	5.0	5.3	3.4	4.5	3.9	5.4	4.1
2	120.0	13.4	67.1	104.7	54.1	114.1	54.3	344.4	71.2	456.4	141.9	73.8	32.3	205.2	146.4	109.5	39.3	11.0
3	6.0	4.8	7.5	8.8	7.5	7.5	4.6	8.3	5.3	5.3	6.6	6.1	4.7	5.2	4.4	6.1	5.0	4.7
4	13.1	1.8	7.4	13.8	5.7	17.1	7.2	50.1	7.0	48.7	17.1	4.7	1.7	21.5	11.8	6.4	0.0	0.0
5	1.1	0.6	1.4	1.2	0.9	1.9	0.7	1.7	1.6	1.8	1.3	1.1	0.1	2.0	1.3	1.0	0.1	0.0
6	21.4	1.0	14.0	18.1	15.9	17.8	8.4	38.3	19.5	39.6	35.7	8.6	5.7	46.9	39.2	36.4	17.9	1.1
7	2.2	0.2	2.0	3.4	2.6	3.7	3.2	3.5	3.4	1.8	2.2	1.3	1.4	2.6	1.3	2.4	1.8	0.9
8	0.5	0.0	1.5	2.3	1.4	2.7	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	16.9	0.2	78.0	50.2	0.4	38.6	7.1	14.7	12.8	8.5	8.1	5.2	2.6	21.5	24.2	14.6	0.0	0.0
10	19.8	0.0	0.9	15.5	1.2	23.3	5.7	41.0	15.1	30.6	43.4	24.7	2.6	51.3	39.6	36.4	5.1	0.0
11	72.7	5.2	110.4	91.7	19.4	78.6	31.1	216.2	32.1	337.1	43.8	32.4	18.5	97.1	73.0	35.5	9.4	4.3
12	18.2	5.2	26.3	27.8	13.6	26.2	13.9	32.8	16.3	26.0	11.7	13.9	12.8	28.4	23.3	17.4	9.4	4.3
13	54.5	0.0	84.1	64.0	5.8	52.5	17.2	183.4	15.8	311.2	32.1	18.5	5.7	68.7	49.8	18.1	0.0	0.0
14	54.5	0.0	84.1	64.0	5.8	52.5	17.2	183.4	15.8	311.2	32.1	18.5	5.7	68.7	49.8	18.1	0.0	0.0
15	20.1	0.0	77.0	50.8	3.1	39.0	10.4	30.5	12.9	22.1	10.8	7.5	3.0	35.7	25.5	14.3	0.0	0.0
16	34.4	0.0	7.1	13.2	2.7	13.5	6.8	152.9	2.9	289.1	21.3	11.0	2.7	33.0	24.2	3.8	0.0	0.0
17	34.4	0.0	7.1	13.2	2.7	13.5	6.8	152.9	2.9	289.1	21.3	11.0	2.7	33.0	24.2	3.8	0.0	0.0
18	18.4	0.0	7.1	13.2	2.7	13.5	6.8	97.3	2.9	73.5	21.3	11.0	2.7	33.0	24.2	3.8	0.0	0.0
19	16.0	0.0	0.0	0.0	0.0	0.0	0.0	55.6	0.0	215.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	13.1	1.8	7.4	13.8	5.7	17.1	7.2	50.1	7.0	48.7	17.1	4.7	1.7	21.5	11.8	6.4	0.0	0.0
21	2.0	0.3	2.3	3.1	1.6	3.7	1.5	4.4	0.8	1.8	2.2	1.2	0.7	3.7	3.1	2.7	0.0	0.0
22	11.1	1.5	5.2	10.7	4.1	13.4	5.7	45.7	6.3	46.9	14.9	3.5	1.0	17.9	8.7	3.7	0.0	0.0
23	6.4	1.4	3.1	5.5	3.1	6.3	3.9	29.1	3.0	30.7	8.5	1.0	-0.6	10.1	4.0	0.6	0.0	0.0
24	4.7	0.1	2.1	5.2	1.0	7.2	1.8	16.6	3.3	16.2	6.4	2.5	1.6	7.8	4.8	3.1	0.0	0.0
25	2.2	0.9	2.3	3.1	0.7	2.1	1.6	1.9	1.5	0.3	2.3	2.6	2.3	2.1	6.8	4.2	1.8	0.6
26	6.9	1.0	4.4	8.3	1.7	9.3	3.5	18.5	4.8	16.5	8.7	5.1	3.9	9.9	11.6	7.3	1.8	0.6
27	-	-	-	-	-	-	-	-4.3	3.1	-10.0	1.8	5.0	3.7	3.8	9.9	7.3	1.8	0.6
28	6.0	-	-	-	-	-	-	22.7	1.7	26.5	6.8	0.1	0.2	6.1	1.7	0.0	0.0	0.0

(p. 17 follows)


KAWEAH RIVER
Main stem
Schematic
Line Number
Lake Kaweah
11210900
rm 17.8
1
Hawkeye Ditch
rm 17.4
2
rm 17.4
Lemoncove Ditch
3
Foothill Ditch
4
rm 16.8
Kaweah River below Terminus Dam
5
Dry Creek near Lemoncove
rm 16.0
6
Wutchumna Ditch
rm 15.4
9
Kaweah River at McKay Point
St. Johns River
10
rm 14.0
Kaweah River below McKay Point
11,12
rm 13.0
Hamilton Ditch and Hanna Ranch
riparian
17
Friant-Kern Canal
rm 10.5 siphon
18
Consolidated Peoples Ditch
21
rm 9.5
Kaweah River below Consolidated Peoples Ditch
22
rm 7.4
Deep Creek
23
rm 6.5
Crocker Cut Creek
24
Ketchum Ditch
rm 6.0
25
rm 5.4
Tulare Irrigation Co. Canal
26
Packwood Canal
rm 5.3
27
Tulare Irrigation District Main Canal
rm 5.2 siphon
28
Fleming Ditch
rm 4.5
29
rm 2.8
Packwood Creek
30
rm 2.5
Oakes Ditch
31
rm 1.0
Evans Ditch
34
rm 0
Mill Creek

KAWEAH RIVER
(Main stem)

Line Number	Explanation for water-budget table
1	Diversion to Hawkeye Ditch (Doffelmyer Ditch), was not used in computations, Kaweah Delta Water Conservation District (KDWCD).
2	11210850 Gaged diversion to Lemoncove Ditch below Terminus Dam was not used in computations.
3	11210930 Gaged diversion to Foothill Ditch below Terminus Dam was not used in computations.
4	11210950 Gaged flow on Kaweah River below Terminus Dam.
5	11211300 Gaged inflow from Dry Creek near Lemoncove.
6	Diversion to Wutchumna Ditch (KDWCD).
7	Theoretical flow to Kaweah River at McKay Point, the sum of lines 4 and 5 minus line 6.
8	Loss between Kaweah River below Terminus Dam and Kaweah River at McKay Point, line 7 minus line 9.
9	Kaweah River at McKay Point (KDWCD). Here the river divides into two channels, the St. Johns River (refer to St. Johns River water budget) and the Kaweah River.
10	Gaged flow on Kaweah River below McKay Point (KDWCD).
11	Diversion to Hamilton Ditch (KDWCD).
12	Diversion to Hanna Ranch riparian (KDWCD).
13	Inflow from Friant-Kern Canal to Tulare Irrigation District (KDWCD).
14	Inflow from Friant-Kern Canal to Kaweah Delta Water Conservation District (KDWCD).
15	Inflow from Friant-Kern Canal to Lakeside Irrigation District (KDWCD).
16	Inflow from Friant-Kern Canal to Kings County Water District (KDWCD).
17	Total Central Valley Project water to the Kaweah River, the sum of lines 13, 14, 15, and 16.
18	Diversion to Consolidated Peoples Ditch (KDWCD).
19	Theoretical flow to Kaweah River below Consolidated Peoples Ditch, the sum of lines 10 and 17 minus lines 11, 12, and 18.
20	Loss between Kaweah River below McKay Point and Kaweah River below Consolidated Peoples Ditch, line 19 minus line 21.
21	Gaged flow on Kaweah River below Consolidated Peoples Ditch (KDWCD).
22	Diversion to Deep Creek (KDWCD).
23	Diversion to Crocker Cut Creek (KDWCD).
24	Inflow from Ketchum Ditch. Discharge assumed to be the same as that diverted from St. Johns River (KDWCD).
25	Diversion to Tulare Irrigation Company Canal. Years 1961 and 1962 include water from Ketchum Ditch (KDWCD).
26	Inflow from Packwood Canal. Also a diversion from St. Johns River (KDWCD).
27	Inflow from Tulare Irrigation District release at Main Canal siphon (KDWCD).
28	Diversion to Fleming Ditch (KDWCD).
29	Diversion to Packwood Creek. Kaweah River divides into Mill Creek and Packwood Creek (KDWCD).
30	Diversion to Oakes Ditch (KDWCD).
31	Diversion to Evans Ditch (KDWCD).
32	Theoretical flow to Mill Creek, the sum of lines 21, 24, 26, and 27 minus lines 22, 23, 25, and 28 through 31.
33	Loss between Kaweah River below Peoples Ditch and Mill Creek, line 32 minus line 34.
34	Gaged flow on Mill Creek (KDWCD).

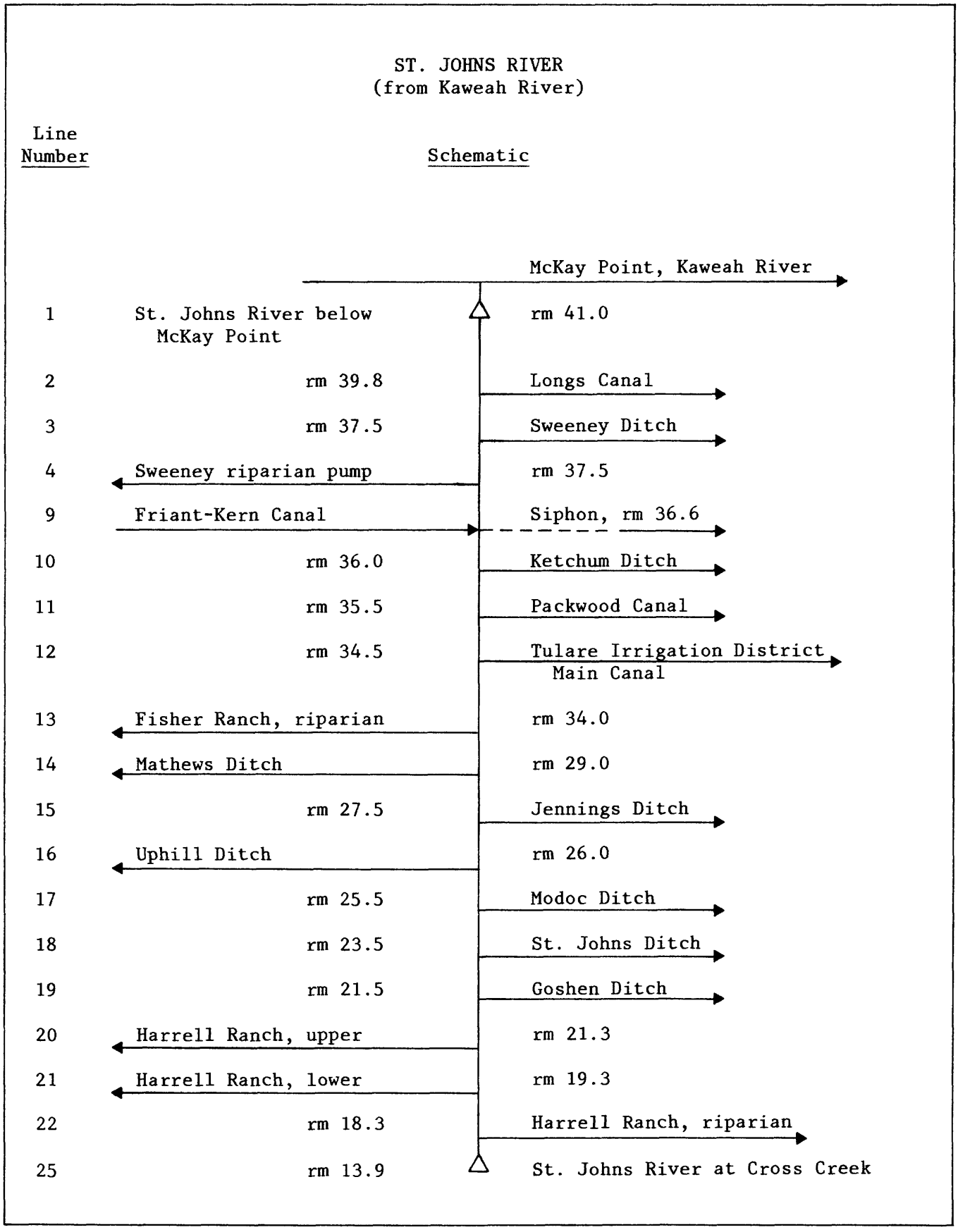
Water budget for Kaweah River (main stem), 1961-77

[Thousands of acre-feet]

LINE	MEAN	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
1	1.2	0.0	0.0	0.6	1.3	1.5	1.6	1.5	1.6	1.4	1.6	1.5	1.6	1.6	1.5	1.5	1.4	0.0
2	3.3	0.0	1.8	3.9	3.5	3.4	4.1	3.2	3.9	2.7	4.0	3.9	4.2	3.3	3.3	3.3	3.8	3.8
3	13.3	0.0	11.6	12.1	12.3	17.4	15.8	10.1	12.2	9.9	13.5	14.7	10.4	18.6	19.4	15.8	16.1	15.8
4	389.7	94.8	380.1	464.5	210.1	459.8	225.1	985.8	213.8	1174.0	410.1	267.5	147.0	586.4	461.3	355.7	114.2	75.2
5	13.8	0.1	11.6	9.1	2.8	13.2	1.6	47.0	2.2	78.9	10.9	5.0	1.6	24.2	16.3	8.9	1.5	0.2
6	53.9	15.0	60.3	67.1	36.7	74.2	42.2	100.8	41.7	82.3	58.1	51.0	28.4	78.1	74.0	55.5	23.6	27.7
7	349.6	80.0	331.3	406.5	176.2	398.8	184.6	931.9	174.2	1170.6	362.9	221.5	120.2	532.4	403.6	309.1	92.2	47.7
8	-11.8	-11.4	-25.9	-22.7	-0.3	-14.3	-11.5	-7.3	-2.8	-9.7	-11.7	-5.8	-11.1	-12.7	-18.2	-9.4	-12.9	-13.1
9	361.4	91.4	357.2	429.2	176.5	413.1	196.1	939.2	177.1	1180.4	374.6	227.3	131.3	545.2	421.8	318.4	105.0	60.8
10	190.6	48.7	181.7	236.4	104.8	221.9	109.6	466.9	106.8	500.1	228.5	136.5	83.4	297.2	215.1	182.3	71.6	49.1
11	3.5	1.6	3.0	3.7	2.4	2.3	3.3	3.2	4.6	3.7	4.4	3.1	4.6	3.6	3.7	4.3	4.7	3.6
12	2.4	0.0	1.1	1.6	1.3	2.2	2.3	1.9	2.8	2.5	3.2	3.4	3.5	3.0	3.2	2.7	3.2	2.9
13	10.1	0.0	0.0	14.5	0.0	8.1	0.0	3.2	11.6	29.2	13.8	8.7	0.0	20.0	34.2	27.0	1.5	0.0
14	13.3	0.0	21.2	18.0	7.8	30.8	8.3	81.7	0.0	23.5	1.1	2.7	0.0	5.3	25.1	0.0	0.0	0.0
15	0.4	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	5.9	0.0	0.0	0.1	0.0	0.0	0.0
16	0.8	0.0	0.0	0.0	0.0	4.7	0.0	0.0	0.0	0.0	0.0	2.5	0.0	0.0	5.5	0.3	0.0	0.0
17	24.5	0.0	21.2	32.5	7.8	44.1	8.3	84.9	11.6	52.7	14.9	19.6	0.0	25.3	64.9	27.3	1.5	0.0
18	76.6	24.8	75.7	92.2	53.1	91.9	53.6	161.2	46.1	184.3	76.7	61.3	41.3	102.9	106.8	80.5	31.9	17.9
19	132.9	22.4	123.1	171.4	55.8	169.6	58.6	385.4	64.8	362.2	159.1	88.3	33.9	213.0	171.6	122.2	33.3	24.7
20	-2.0	3.6	9.7	3.7	-8.0	-3.1	-5.1	3.9	-9.2	-6.4	-3.4	1.4	3.3	-2.3	-10.6	-4.1	-5.1	-2.8
21	134.9	18.7	113.4	167.7	63.8	172.7	63.8	381.6	73.9	368.6	162.5	86.9	30.7	215.3	182.2	126.3	38.4	27.4
22	38.7	1.3	41.3	47.7	12.1	47.6	17.9	135.4	14.3	110.6	36.6	23.0	0.5	74.5	59.6	34.5	0.0	0.6
23	31.8	0.0	17.5	52.2	9.5	45.7	5.7	86.2	12.0	109.5	43.9	18.4	1.8	54.0	45.1	38.6	0.9	0.0
24	16.2	15.5	20.5	18.6	16.4	20.4	20.1	25.3	9.5	35.1	15.1	9.0	10.3	22.2	19.2	11.8	5.8	0.0
25	16.3	0.6	19.9	22.0	6.7	26.3	8.8	51.3	9.1	49.5	17.4	10.4	2.6	21.0	18.3	9.9	2.0	0.6
26	6.4	0.0	13.7	24.1	0.2	3.1	0.5	19.1	0.0	39.6	3.1	0.0	0.0	4.6	0.0	0.7	0.0	0.0
27	0.6	0.0	0.0	0.0	0.0	0.0	0.0	3.7	4.1	0.0	1.2	0.0	0.0	0.0	0.0	1.0	0.0	0.0
28	3.3	2.1	3.6	3.5	2.2	4.1	2.6	5.5	2.4	5.7	3.2	3.3	2.9	3.2	3.7	3.5	2.2	2.4
29	14.4	0.0	12.0	20.7	0.6	4.6	3.6	53.9	6.7	65.2	24.1	0.7	0.0	26.5	10.7	8.9	5.8	0.0
30	2.4	1.1	2.7	3.4	1.9	3.3	1.7	4.1	1.8	4.4	2.7	1.8	1.5	3.1	3.3	2.4	1.2	0.7
31	10.4	3.5	8.8	11.1	6.8	11.9	8.9	19.3	8.6	25.8	9.8	8.2	6.4	12.9	13.9	12.2	6.0	2.2
32	40.9	25.5	41.9	50.0	40.7	52.6	35.2	73.8	32.6	72.5	44.2	30.0	25.3	47.0	46.8	29.7	26.1	21.0
33	20.2	19.7	25.7	25.4	27.7	29.1	21.5	22.4	17.2	16.1	23.9	18.2	14.0	17.1	19.7	11.9	17.5	15.5
34	20.7	5.8	16.2	24.6	12.9	23.5	13.8	51.4	15.4	56.5	20.3	11.8	11.4	29.8	27.2	17.8	8.6	5.4

(p. 21 follows)

ST. JOHNS RIVER
(from Kaweah River)



ST. JOHNS RIVER
(from Kaweah River)

Line Number

Explanation for water-budget table

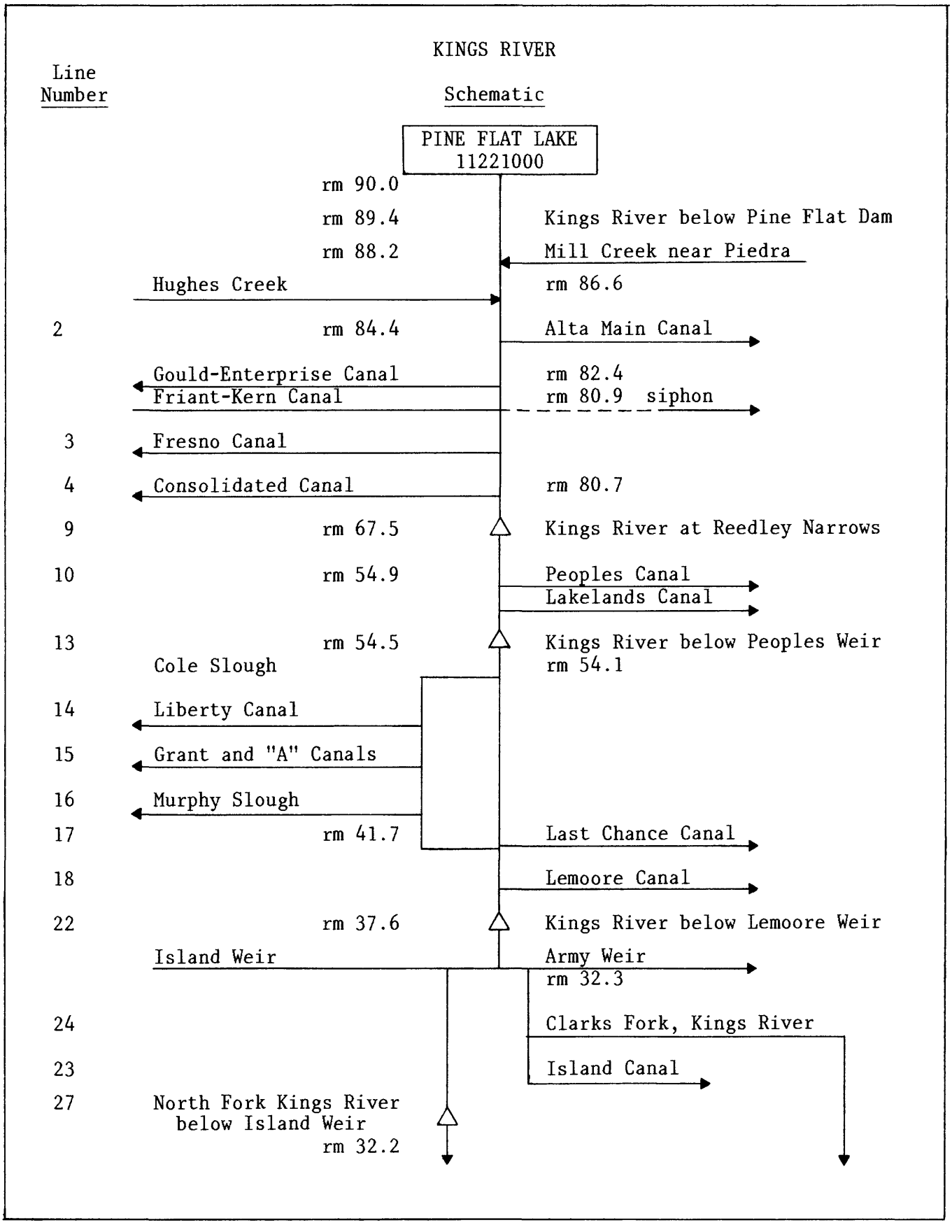
Line Number	
1	Gaged flow on St. Johns River below McKay Point, Kaweah Delta Water Conservation District (KDWCD).
2	Diversion to Longs Canal (KDWCD).
3	Diversion to Sweeney Ditch, south side (KDWCD).
4	Diversion to Sweeney riparian pump, north side (KDWCD).
5	Inflow from Friant-Kern Canal to Tulare Irrigation District (KDWCD).
6	Inflow from Friant-Kern Canal to Kaweah Delta Water Conservation District (KDWCD).
7	Inflow from Friant-Kern Canal to Lakeside Irrigation District (KDWCD).
8	Inflow from Friant-Kern Canal to Kings County Water District (KDWCD).
9	Total Central Valley Project water to St. Johns River, the sum of lines 5, 6, 7, and 8.
10	Diversion to Ketchum Ditch at Head (KDWCD).
11	Do------ Packwood Canal from St. Johns River (KDWCD).
12	Do------ Tulare Irrigation District Main Canal (KDWCD).
13	Do------ Fisher Ranch, riparian (KDWCD).
14	Do------ Mathews Ditch (KDWCD).
15	Do------ Jennings Ditch (KDWCD).
16	Do------ Uphill Ditch (KDWCD).
17	Do------ Modoc Ditch (KDWCD).
18	Do------ St. Johns Ditch (KDWCD).
19	Do------ Goshen Ditch (KDWCD).
20	Do------ Harrell Ranch, upper (KDWCD).
21	Do------ Harrell Ranch, lower (KDWCD).
22	Do------ Harrell Ranch, riparian (KDWCD).
23	Theoretical flow to St. Johns River where it enters Hydrologic Unit V, the sum of lines 1 and 9 minus lines 2, 3, 4, and 10 through 22.
24	Loss between St. Johns River below McKay Point and St. Johns River where it enters Hydrologic Unit V, line 23 minus line 25. Years 1961 and 1967-77 estimated by correlation with the theoretical flow on line 23.
25	Flow on St. Johns River where it enters Hydrologic Unit V (at Cross Creek) (KDWCD). Data available only for 1962-66.

Water budget for St. Johns River (from Kaweah River), 1961-77

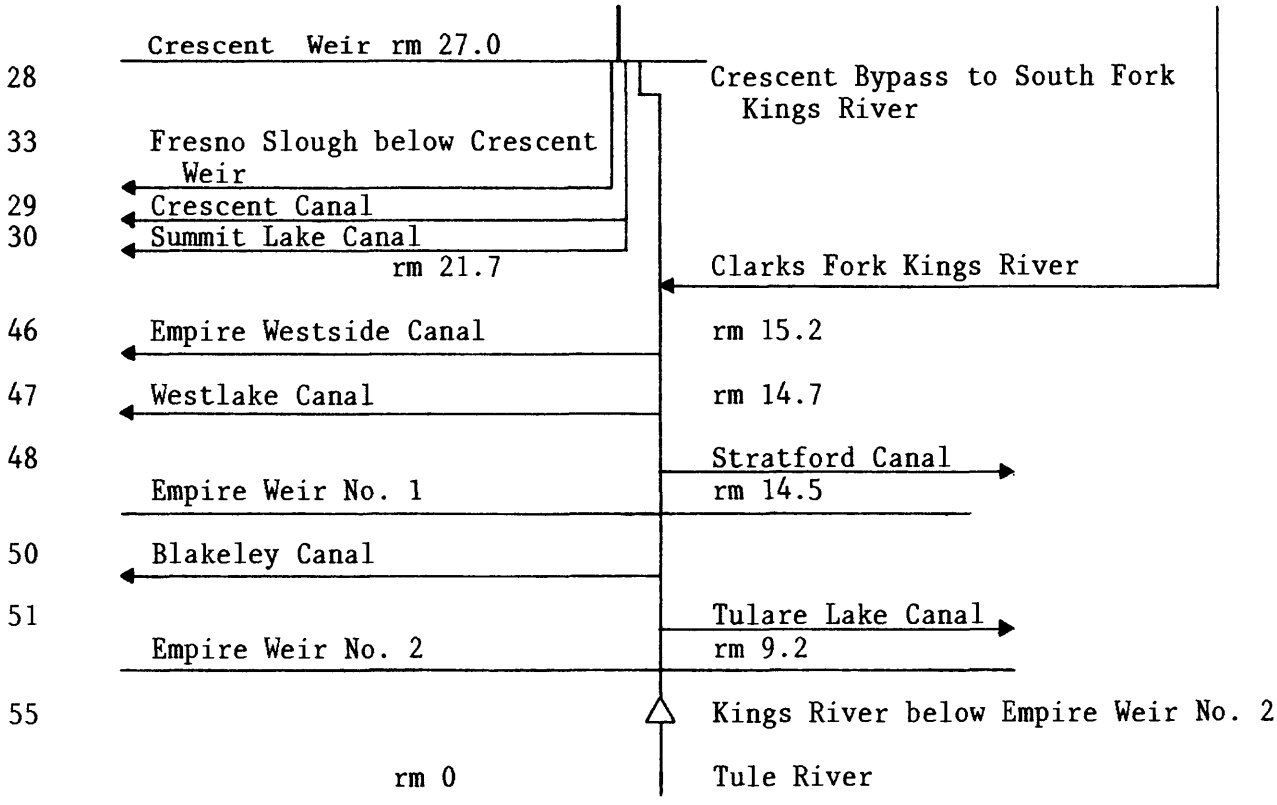
[Thousands of acre-feet]

LINE	MEAN	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
1	170.8	42.7	175.6	192.8	71.7	191.2	86.5	472.3	70.3	680.3	146.1	90.8	48.0	248.0	206.6	136.2	33.4	11.7
2	4.3	2.4	4.8	3.6	3.1	4.7	3.7	5.0	5.2	4.4	3.5	4.8	4.2	4.8	5.1	5.0	3.9	4.6
3	0.7	0.6	0.7	0.9	0.9	1.9	1.4	0.3	0.6	0.8	0.5	0.3	0.2	0.6	0.8	0.5	0.8	0.1
4	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.3	0.1	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0
5	8.4	0.0	0.0	21.9	0.0	4.7	0.0	8.5	8.4	34.6	8.0	3.6	0.0	13.0	15.9	24.5	0.0	0.0
6	13.4	0.0	28.8	31.9	2.4	25.2	9.6	64.6	0.0	29.5	0.0	5.7	0.0	4.5	25.1	0.5	0.0	0.1
7	5.9	0.0	0.0	20.2	0.0	14.8	11.3	7.3	25.3	0.0	5.9	6.7	0.0	2.9	5.1	0.0	0.0	0.0
8	3.8	0.0	0.0	17.6	0.0	6.8	6.3	9.7	7.4	0.0	0.0	3.3	0.0	7.5	4.2	1.8	0.0	0.0
9	31.5	0.0	28.8	91.6	2.4	51.5	27.2	90.2	41.2	64.1	13.9	19.3	0.0	28.0	50.2	26.7	0.0	0.1
10	16.3	15.5	20.5	18.6	16.4	20.4	20.1	25.3	9.5	35.1	15.1	9.0	10.3	22.2	19.2	11.8	5.8	1.7
11	6.4	0.0	13.7	24.1	0.2	3.1	0.5	19.1	0.0	39.6	3.1	0.0	0.0	4.6	0.0	0.7	0.0	0.0
12	14.2	0.0	6.7	5.0	0.0	0.6	4.7	45.1	4.3	57.8	14.6	13.0	0.0	24.5	33.4	31.7	0.0	0.0
13	1.7	1.6	1.6	2.0	1.1	2.9	2.3	2.8	0.8	1.3	1.7	1.9	1.5	2.7	2.0	1.6	0.4	0.0
14	3.8	2.1	2.6	6.1	3.0	6.1	3.4	8.0	4.0	5.8	3.9	3.1	1.4	3.6	4.2	4.9	2.2	0.0
15	5.4	1.8	10.5	10.6	5.6	13.8	5.5	14.2	5.2	9.3	4.2	4.0	2.1	5.2	0.0	0.0	0.0	0.0
16	7.7	0.3	9.5	9.9	3.2	9.9	5.8	20.5	4.5	18.0	6.7	5.0	1.9	13.5	11.7	8.4	1.3	0.0
17	13.8	1.0	15.5	19.2	7.0	21.0	10.2	36.5	7.5	24.8	12.7	13.0	4.9	20.7	21.1	15.2	4.6	0.0
18	1.4	0.0	2.2	1.6	0.3	2.0	0.5	4.6	0.8	4.6	1.5	0.4	0.0	2.9	0.7	1.9	0.2	0.0
19	2.8	0.0	1.1	1.2	0.0	0.2	0.0	8.7	0.9	14.5	3.5	0.8	0.0	6.0	6.2	4.8	0.0	0.0
20	7.0	1.1	2.8	14.1	4.0	14.3	4.2	21.9	3.5	14.1	7.5	4.1	0.3	11.2	8.0	6.9	0.4	0.0
21	3.7	0.0	0.4	8.7	1.3	8.8	2.4	16.8	1.9	5.0	3.0	0.0	0.0	6.6	3.9	3.6	0.0	0.0
22	0.9	0.0	0.0	0.2	0.2	2.3	0.5	4.2	0.0	3.6	0.0	0.3	0.0	0.0	2.2	1.4	0.0	0.0
23	112.3	16.2	111.4	158.5	27.5	130.6	48.2	329.3	62.7	505.7	78.2	50.0	20.9	146.9	138.5	64.6	13.8	5.4
24	46.7	16.2	55.5	52.4	27.5	57.1	37.1	96.0	41.5	118.0	47.5	37.0	20.9	64.0	62.0	42.0	13.8	5.4
25	-	-	55.9	106.1	0.0	73.5	11.1	-	-	-	-	-	-	-	-	-	-	-

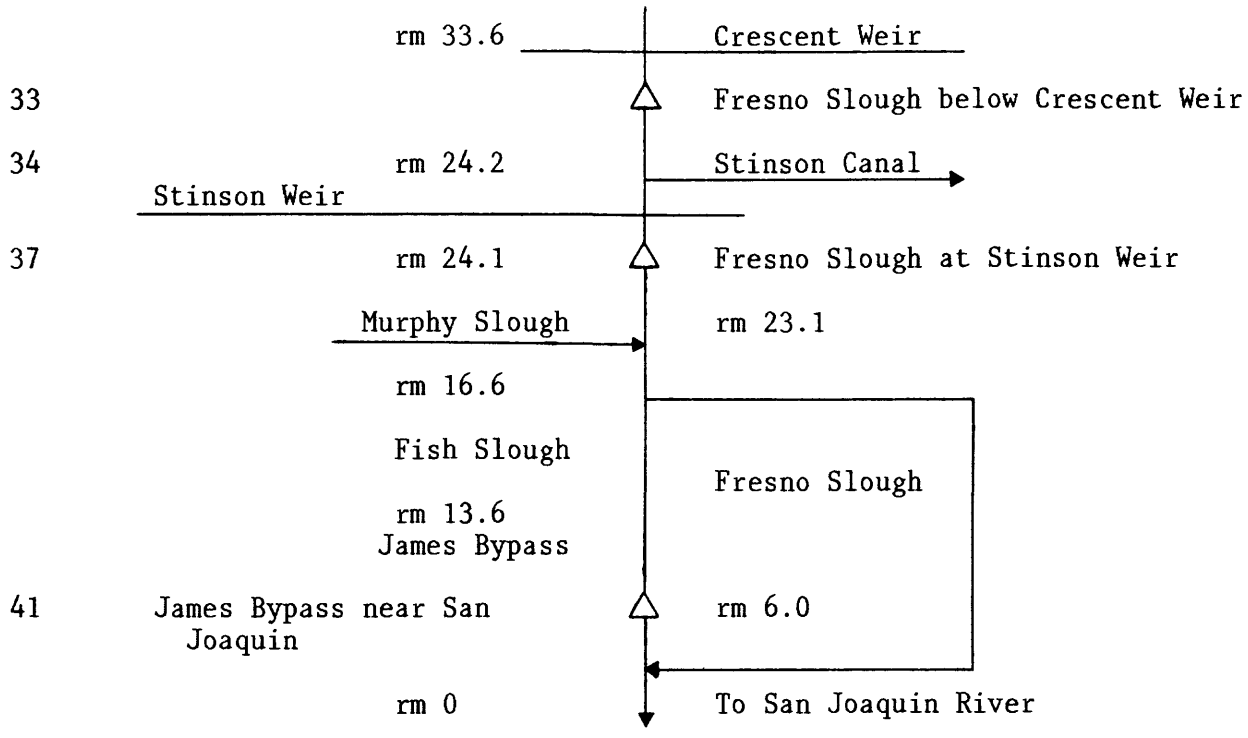
(p. 25 follows)


KINGS RIVER
Line Number
Schematic
PINE FLAT LAKE
11221000
rm 90.0
rm 89.4
Kings River below Pine Flat Dam
rm 88.2
Mill Creek near Piedra
Hughes Creek
rm 86.6
2
rm 84.4
Alta Main Canal
Gould-Enterprise Canal
rm 82.4
Friant-Kern Canal
rm 80.9 siphon
3
Fresno Canal
4
Consolidated Canal
rm 80.7
9
rm 67.5
Kings River at Reedley Narrows
10
rm 54.9
Peoples Canal
Lakelands Canal
13
rm 54.5
Kings River below Peoples Weir
Cole Slough
rm 54.1
14
Liberty Canal
15
Grant and "A" Canals
16
Murphy Slough
17
rm 41.7
Last Chance Canal
18
Lemoore Canal
22
rm 37.6
Kings River below Lemoore Weir
Island Weir
Army Weir
rm 32.3
24
Clarks Fork, Kings River
23
Island Canal
27
North Fork Kings River
below Island Weir
rm 32.2

Schematic
(Kings River--Continued)



Schematic
(Kings River--Continued)



Line Number	Explanation for water-budget table
1	Calculated flow on Kings River. The discharge was computed by the Kings River Water Association (KRWA). It is the sum of 11221500 Kings River below Pine Flat Dam; 11221700 Mill Creek near Piedra; Hughes Creek and other tributaries between Pine Flat Dam and Piedra (estimated as 12.2 percent of Mill Creek), and water released into the Kings River (releases are made through the Kings River wasteway near the siphon and or the "76" Channel and Alta Main Canal seepage).
2	Diversion to Alta Main Canal (KRWA).
3	Do------ Fresno Canal (KRWA).
4	Do------ Consolidated Canal (KRWA).
5	Total diversions, the sum of lines 2, 3, and 4.
6	Diversion of the Centerville Bottoms Ditches. Computed as 75 percent of diversion, assuming the remainder is returned to the Kings River (Hubbert, 1968).
7	Theoretical flow to Kings River at Reedley Narrows, line 1 minus lines 5 and 6.
8	Loss between calculated Kings River and Kings River at Reedley Narrows, line 7 minus line 9.
9	Gaged flow on Kings River at Reedley Narrows (KRWA).
10	Diversion to Lakelands Canal and Peoples Canal (KRWA).
11	Theoretical flow to Kings River below Peoples Weir, line 9 minus line 10.
12	Loss between Kings River at Reedley Narrows and Kings River below Peoples Weir, line 11 minus line 13.
13	Gaged flow on Kings River below Peoples Weir (KRWA).
14	Diversion to Liberty Canal (KRWA).
15	Do------ Grant Canal and "A" Canal (KRWA).
16	Do------ Murphy Slough (KRWA).
17	Do------ Last Chance Canal (KRWA).
18	Do------ Lemoore Canal (KRWA).
19	Total diversions, the sum of lines 14 through 18.
20	Theoretical flow to Kings River below Lemoore Weir, line 13 minus line 19.
21	Loss between Kings River below Peoples Weir and Kings River below Lemoore Weir, line 20 minus line 22.
22	Gaged flow on Kings River below Lemoore Weir (KRWA).
23	Diversion to Island Canal (KRWA).
24	Gaged flow of Clarks Fork Kings River below Army Weir (KRWA). This line is treated as a diversion in this part of the summary.
25	Theoretical flow to North Fork Kings River below Island Weir, line 22 minus lines 23 and 24.
26	Loss between Kings River below Lemoore Weir and North Fork Kings River below Island Weir, line 25 minus line 27.

Water budget for Kings River, 1961-77

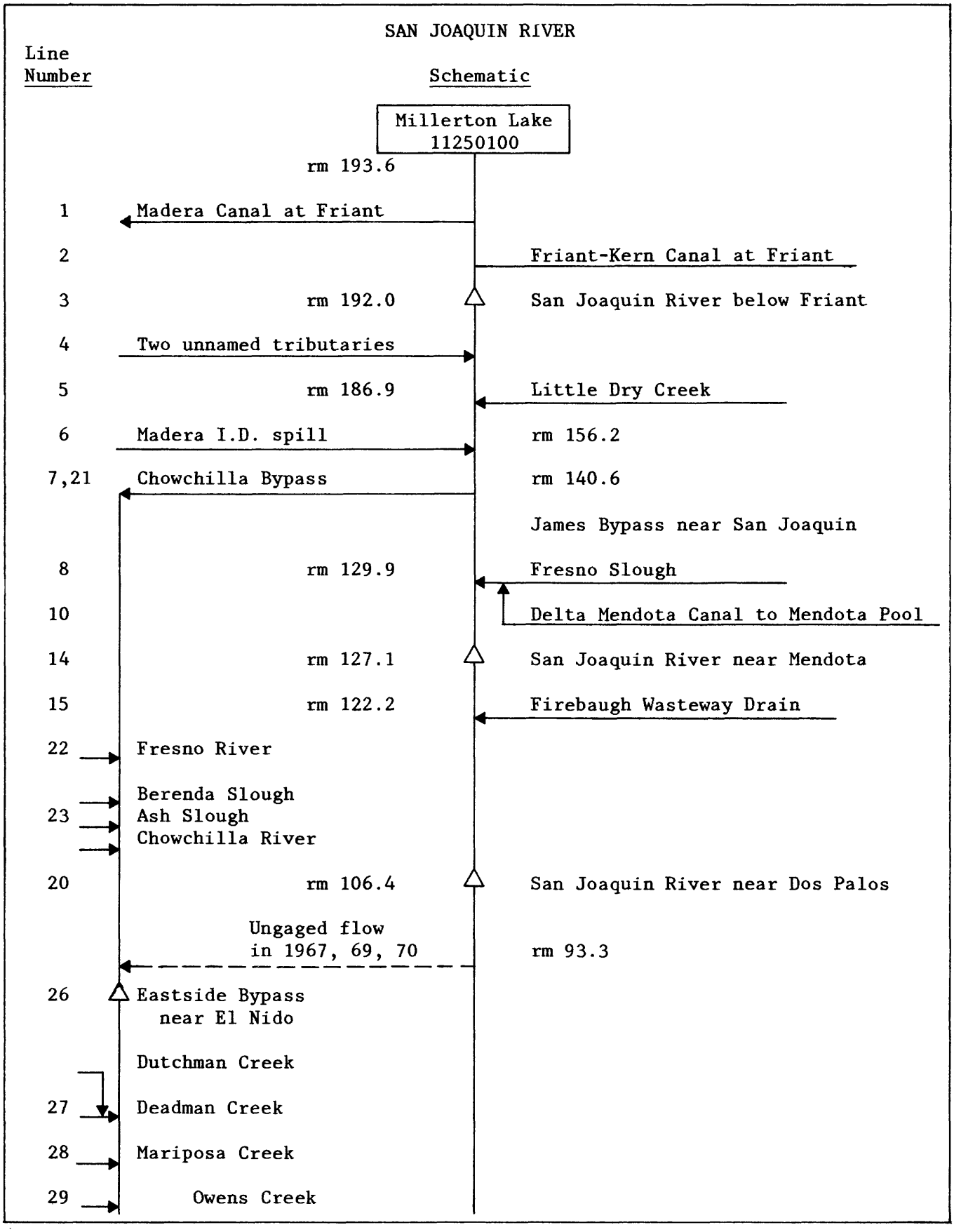
[Thousands of acre-feet]

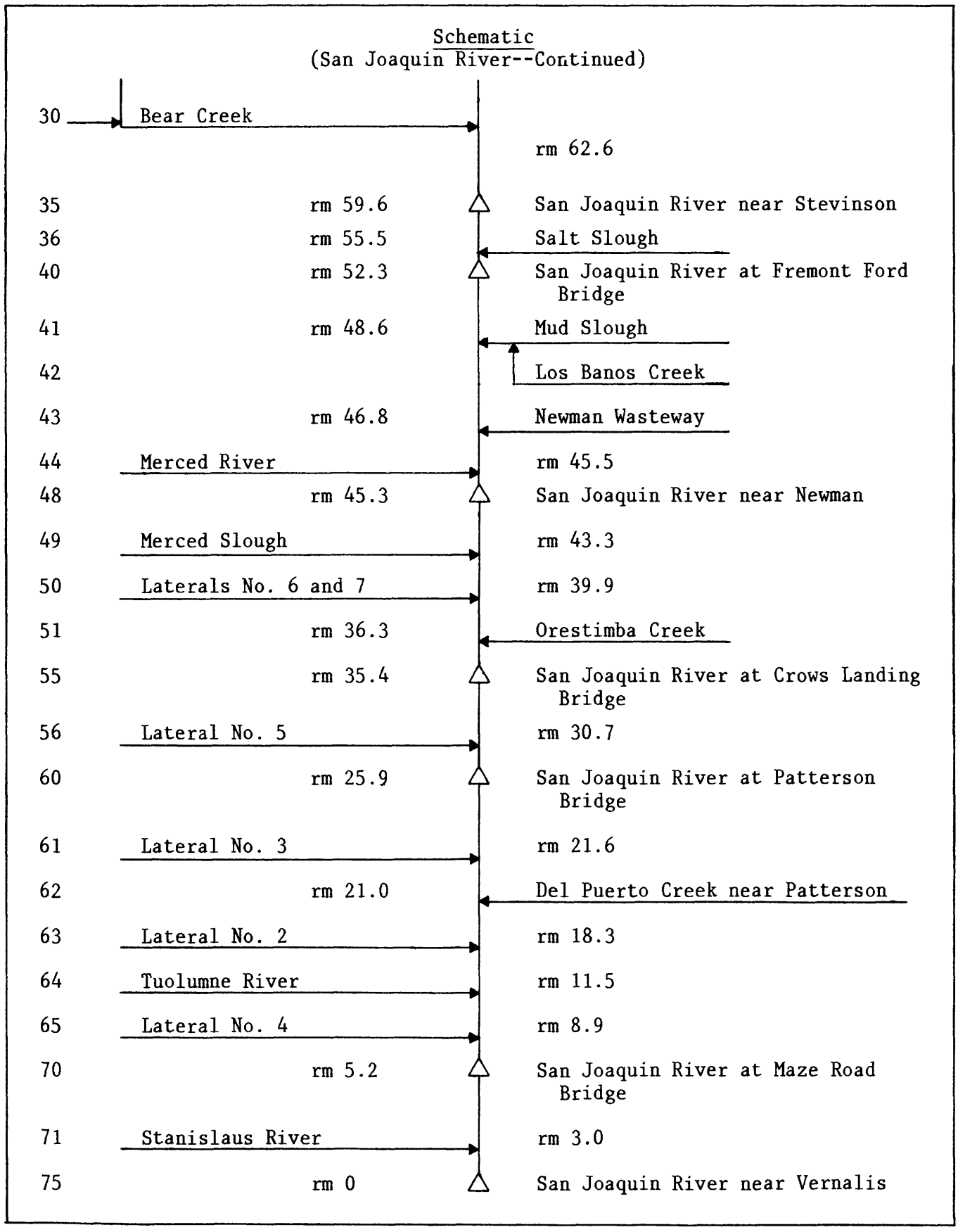
LINE	MEAN	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
1	1707.2	672.4	1849.7	1919.4	1209.1	2019.2	1522.2	3059.6	1363.5	3900.8	1734.3	1353.1	1024.9	2094.9	2254.4	1748.0	751.7	544.9
2	161.9	46.2	234.9	214.0	125.5	239.5	153.9	281.6	94.6	258.0	169.4	138.1	86.8	224.3	220.0	184.0	43.4	38.7
3	486.1	281.1	521.8	521.9	393.9	590.3	475.8	628.8	492.5	558.3	603.9	548.1	401.0	588.7	568.2	587.8	267.4	234.2
4	265.4	59.1	305.6	357.1	136.2	347.1	243.2	525.1	203.2	536.3	348.9	164.2	117.5	497.3	450.3	216.8	1.6	2.5
5	913.5	386.5	1062.3	1093.1	655.5	1176.9	872.8	1435.6	790.3	1352.6	1122.3	850.4	605.2	1310.3	1238.5	988.7	312.4	275.4
6	42.2	47.1	50.6	44.7	44.5	44.1	46.5	40.4	44.8	34.6	40.7	41.3	45.5	38.2	38.6	41.6	37.9	35.8
7	751.6	238.9	736.8	781.6	509.1	798.3	602.9	1583.7	528.4	2513.7	571.3	461.4	374.3	746.4	977.3	717.8	401.5	233.7
8	-53.8	-25.1	-68.8	-80.8	-73.4	-71.6	-44.2	7.2	-61.7	-100.6	-97.5	-71.2	-51.1	-79.7	-75.7	-21.2	-1.3	2.2
9	805.4	264.0	805.7	862.4	582.5	869.9	647.1	1576.5	590.0	2614.3	668.8	532.6	425.3	826.1	1053.0	738.9	402.8	231.4
10	183.5	104.0	182.8	232.8	187.7	216.8	194.0	287.6	136.8	207.0	198.8	161.2	106.6	232.1	293.8	221.5	82.6	73.3
11	621.9	160.0	622.9	629.7	394.8	653.1	453.1	1288.9	453.2	2407.3	470.1	371.4	318.8	594.0	759.1	517.4	320.2	158.1
12	16.5	26.8	43.1	21.3	35.5	46.4	30.0	-26.1	-5.1	22.1	-2.1	20.6	15.4	62.8	30.8	-42.8	-11.9	14.0
13	605.4	133.2	579.8	608.4	359.3	606.6	423.1	1315.0	458.3	2385.2	472.2	350.8	303.3	531.2	728.3	560.3	332.1	144.1
14	6.7	0.0	13.3	11.4	0.0	10.3	3.8	18.4	0.0	21.1	4.2	0.0	0.0	14.8	12.3	3.9	0.0	0.0
15	49.7	11.3	67.3	75.3	38.5	81.0	45.9	109.6	35.4	83.5	46.1	30.7	15.2	69.6	71.1	49.8	14.5	0.0
16	55.9	11.0	75.2	66.7	34.4	73.1	49.7	98.8	41.4	102.9	62.9	44.1	20.1	83.1	92.8	62.3	25.3	6.8
17	64.6	22.6	87.2	76.0	43.0	95.8	69.2	114.1	44.7	85.8	58.7	49.6	55.8	89.8	97.7	62.9	32.2	13.6
18	86.1	38.0	96.5	82.8	89.7	95.8	96.2	108.7	92.5	83.6	97.3	95.9	81.2	85.9	102.2	104.2	71.5	42.1
19	263.0	82.9	339.4	312.2	205.5	356.0	264.9	449.5	213.9	376.9	269.2	220.3	172.3	343.3	376.1	283.0	143.6	62.5
20	342.3	50.3	240.3	296.2	153.8	250.6	158.2	865.5	244.4	2008.3	203.0	130.5	131.0	188.0	352.2	277.3	188.5	81.6
21	65.9	50.2	79.7	76.0	62.0	78.9	69.0	46.8	76.9	83.0	43.9	59.1	69.8	50.7	62.0	100.4	62.5	49.3
22	276.5	0.1	160.6	220.3	91.8	171.7	89.3	818.7	167.5	1925.3	159.1	71.4	61.2	137.3	290.3	176.9	126.0	32.3
23	5.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.7	10.1	6.7	3.9	17.7	20.0	14.2	3.8	0.0
24	84.7	0.0	104.9	166.2	67.5	106.2	54.6	174.1	137.8	147.6	28.5	26.3	40.4	63.2	97.4	105.1	95.8	24.3
25	186.2	0.1	55.7	54.0	24.3	65.5	34.7	644.6	29.8	1759.9	120.5	38.4	16.9	56.3	172.9	57.7	26.4	7.9
26	10.1	0.1	10.9	7.8	9.6	14.1	11.1	18.9	1.6	13.4	7.5	10.9	12.5	11.8	8.4	13.8	10.6	7.9

27 Gaged flow on North Fork Kings River below Island Weir (KRWA).
28 Gaged flow on Crescent Bypass to South Fork Kings River. Determined from headgate rating curves (KRWA). This line is treated as a diversion in this part of the summary.
29 Diversion to Crescent Canal (KRWA).
30 Diversion to Summit Lake Canal (KRWA).
31 Theoretical flow to Fresno Slough below Crescent Weir, line 27 minus lines 28, 29, 30.
32 Loss between North Fork Kings River below Island Weir and Fresno Slough below Crescent Weir, line 31 minus line 33.
33 Gaged flow on Fresno Slough below Crescent Weir (KRWA).
34 Diversion to Stinson Canal (KRWA).
35 Theoretical flow to Fresno Slough at Stinson Weir, line 33 minus line 34.
36 Loss between Fresno Slough below Crescent Weir and Fresno Slough at Stinson Weir, line 35 minus line 37.
37 Gaged flow on Fresno Slough at Stinson Weir (KRWA).
38 Diversions between Stinson Weir and downstream confluence with Fresno Slough (KRWA).
39 Theoretical flow to James Bypass near San Joaquin, line 37 minus line 38.
40 Loss between Fresno Slough at Stinson Weir and James Bypass near San Joaquin, line 39 minus line 41.
41 11253500 Gaged flow on James Bypass near San Joaquin (USBR).
42 Total flow of South Fork Kings River channels, the sum of lines 24 and 28.
43 Diversion to Clarks Fork Reclamation District No. 2069 (KRWA).
44 Do------ Upper San Jose Water Company (KRWA).
45 Do------ John Heinlen Mutual Water Company (KRWA).
46 Do------ Empire Westside Canal (KRWA).
47 Do------ Westlake Canal (KRWA).
48 Do------ Stratford Canal (KRWA).
49 Miscellaneous diversions from Empire Pool No. 1 (KRWA).
50 Diversion to Blakeley Canal, including Empire West Canal (KRWA).
51 Diversion to Tulare Lake Canal (KRWA).
52 Total diversions, the sum of lines 43 through 51.
53 Theoretical flow to Kings River below Empire Weir No. 2, line 42 minus line 52.
54 Loss between South Fork Kings River channels and Kings River below Empire Weir No. 2, line 53 minus line 55.
55 Gaged flow on Kings River below Empire Weir No. 2 (KRWA).

Water budget for Kings River, 1961-77--Continued

27	176.2	0.0	44.8	46.2	14.7	51.4	23.6	625.6	28.2	1746.5	113.0	27.5	4.4	44.6	164.5	43.9	15.8	0.0
28	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	33.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29	13.5	0.0	18.8	16.3	7.7	21.7	9.6	24.5	10.9	24.2	17.4	8.2	1.1	17.0	26.1	16.4	9.5	0.0
30	1.6	0.0	1.9	1.5	0.4	1.2	0.8	2.0	1.1	3.0	3.4	2.3	0.9	2.6	2.0	2.8	0.8	0.0
31	159.1	0.0	24.0	28.4	6.6	28.4	13.2	599.0	16.2	1686.1	92.1	17.0	2.5	24.9	136.4	24.7	5.5	0.0
32	4.9	0.0	6.1	1.6	2.8	4.5	2.7	13.9	3.5	29.2	4.2	4.4	1.8	4.2	-2.4	2.8	3.8	0.0
33	154.2	0.0	18.0	26.8	3.8	23.9	10.5	585.1	12.7	1656.9	88.0	12.6	0.7	20.7	138.8	21.8	1.7	0.0
34	6.7	0.0	7.2	12.0	1.5	12.4	4.7	19.0	6.8	17.9	7.3	3.4	0.0	5.0	8.3	8.4	0.0	0.0
35	147.5	0.0	10.7	14.8	2.3	11.4	5.8	566.1	5.8	1639.0	80.6	9.2	0.7	15.7	130.5	13.4	1.7	0.0
36	11.2	0.0	10.7	11.3	2.2	10.3	5.6	23.3	5.0	59.1	11.0	7.1	0.7	13.6	16.9	12.0	1.7	0.0
37	136.3	0.0	0.0	3.5	0.1	1.1	0.2	542.8	0.8	1579.9	69.6	2.1	0.0	2.1	113.6	1.4	0.0	0.0
38	3.2	0.0	0.0	0.0	0.0	0.0	0.0	6.8	0.0	28.4	1.8	0.0	0.0	0.1	17.0	0.0	0.0	0.0
39	133.1	0.0	0.0	3.5	0.1	1.1	0.2	536.0	0.8	1551.5	67.8	2.1	0.0	2.0	96.6	1.4	0.0	0.0
40	4.6	0.0	0.0	3.5	0.1	1.1	0.2	51.2	0.8	0.5	5.6	2.1	0.0	2.0	10.3	1.4	0.0	0.0
41	128.5	0.0	0.0	0.0	0.0	0.0	0.0	484.8	0.0	1551.0	62.2	0.0	0.0	0.0	86.3	0.0	0.0	0.0
42	86.7	0.0	104.9	166.2	67.5	106.2	54.6	174.2	137.8	180.8	28.5	26.3	40.4	63.2	97.4	105.1	95.8	24.3
43	1.0	0.0	1.5	1.2	0.7	0.9	0.6	1.7	0.8	1.1	1.1	1.0	0.9	1.2	1.6	1.9	0.9	0.5
44	1.1	0.0	2.1	2.2	0.7	1.4	0.3	1.0	0.9	0.8	3.0	1.6	0.4	0.3	1.0	1.6	0.2	0.7
45	0.4	0.0	0.5	1.0	0.3	0.5	0.2	0.8	0.4	0.0	0.4	0.4	0.2	0.1	0.4	0.7	0.2	0.1
46	7.8	0.0	13.4	12.6	7.9	17.3	8.1	9.5	13.6	1.5	6.7	4.2	7.3	5.7	8.6	9.4	6.0	1.6
47	5.4	0.0	0.0	0.7	0.6	5.9	2.9	5.4	14.2	2.6	10.4	9.5	7.0	4.1	10.1	12.4	6.3	0.6
48	2.2	0.0	0.0	0.0	0.0	0.0	0.0	4.0	3.5	0.2	2.0	3.9	4.6	4.3	4.0	4.6	4.4	2.2
49	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	-0.2	0.0	0.0	0.2	1.6	0.1	-0.2	-0.2	-0.2	0.3
50	14.5	0.0	13.3	32.6	15.8	26.0	20.1	28.5	21.6	2.9	0.8	1.3	1.9	11.4	27.5	22.4	14.8	5.3
51	26.5	0.0	41.6	70.5	29.5	26.6	15.7	34.4	59.8	1.6	0.0	0.2	7.3	27.6	32.8	50.2	48.0	4.2
52	59.0	0.0	72.4	120.8	55.6	78.6	48.0	85.4	114.8	10.7	24.4	22.2	31.1	54.8	85.9	102.9	80.7	15.4
53	27.6	0.0	32.5	45.5	11.9	27.6	6.6	88.8	23.0	170.2	4.1	4.1	9.3	8.4	11.5	2.2	15.0	8.9
54	4.5	0.0	20.0	15.6	6.9	10.3	4.5	9.5	14.4	-26.0	4.1	4.1	8.2	7.9	-3.3	-12.4	7.2	6.1
55	23.1	0.0	12.5	29.9	5.0	17.3	2.1	79.3	8.6	196.2	0.0	0.0	1.1	0.5	14.8	14.6	7.8	2.8


SAN JOAQUIN RIVER
Line Number
Schematic
Millerton Lake
11250100
rm 193.6
1
Madera Canal at Friant
2
Friant-Kern Canal at Friant
3
rm 192.0
San Joaquin River below Friant
4
Two unnamed tributaries
5
rm 186.9
Little Dry Creek
6
Madera I.D. spill
rm 156.2
7,21
Chowchilla Bypass
rm 140.6
James Bypass near San Joaquin
8
rm 129.9
Fresno Slough
10
Delta Mendota Canal to Mendota Pool
14
rm 127.1
San Joaquin River near Mendota
15
rm 122.2
Firebaugh Wasteway Drain
22
Fresno River
Berenda Slough
23
Ash Slough
Chowchilla River
20
rm 106.4
San Joaquin River near Dos Palos
Ungaged flow
in 1967, 69, 70
rm 93.3
26
Eastside Bypass
near El Nido
Dutchman Creek
27
Deadman Creek
28
Mariposa Creek
29
Owens Creek


Schematic
(San Joaquin River--Continued)
30
Bear Creek
rm 62.6
35
rm 59.6
San Joaquin River near Stevinson
36
rm 55.5
Salt Slough
40
rm 52.3
San Joaquin River at Fremont Ford Bridge
41
rm 48.6
Mud Slough
42
Los Banos Creek
43
rm 46.8
Newman Wasteway
44
Merced River
rm 45.5
48
rm 45.3
San Joaquin River near Newman
49
Merced Slough
rm 43.3
50
Laterals No. 6 and 7
rm 39.9
51
rm 36.3
Orestimba Creek
55
rm 35.4
San Joaquin River at Crows Landing Bridge
56
Lateral No. 5
rm 30.7
60
rm 25.9
San Joaquin River at Patterson Bridge
61
Lateral No. 3
rm 21.6
62
rm 21.0
Del Puerto Creek near Patterson
63
Lateral No. 2
rm 18.3
64
Tuolumne River
rm 11.5
65
Lateral No. 4
rm 8.9
70
rm 5.2
San Joaquin River at Maze Road Bridge
71
Stanislaus River
rm 3.0
75
rm 0
San Joaquin River near Vernalis

Line Number	Explanation for water-budget table
1	11249500 Diversion to Madera Canal at Friant (USBR). Not used in computations.
2	11250000 Diversion to Friant-Kern Canal at Friant (USBR). Not used in computations.
3	11251000 Gaged flow on San Joaquin River below Friant.
4	Ungaged inflow from two tributaries. Estimated by using regression equations.
5	Inflow from Little Dry Creek. Estimated by correlation to 11258900 West Fork Chowchilla River near Mariposa.
6	Ungaged inflow from Madera Irrigation District Spill into the San Joaquin River (Terry Erlewine, California Department of Water Resources, written commun., 1979).
7	BO-7802 Gaged diversion to Chowchilla Bypass at head (DWR, San Joaquin District).
8	11253500 Gaged inflow from James Bypass near San Joaquin (USBR).
9	Diversions from Fresno Slough (DWR).
10	BO-0770 Gaged inflow from Delta Mendota Canal to Mendota Pool.
11	Total diversions (DWR).
12	Theoretical flow to San Joaquin River near Mendota, the sum of lines 3, 4, 5, 6, 8, and 10 minus lines 7, 9, and 11.
13	Loss between San Joaquin River below Friant and San Joaquin River near Mendota, line 12 minus line 14.
14	BO-7710 Gaged flow on San Joaquin River near Mendota.
15	BO-0985 Inflow from Firebaugh Wasteway Drain at head. All years estimated by using a factor of 0.0024, based on 1959 water year, multiplied by flow from Delta Mendota Canal to Mendota Pool (line 10).
16	No ungaged drainage.
17	Diversions (DWR).
18	Theoretical flow to San Joaquin River near Dos Palos, the sum of lines 14, 15, and 16 minus line 17.
19	Loss between San Joaquin River near Mendota and San Joaquin River near Dos Palos, line 18 minus line 20.
20	BO-7610 Gaged flow on San Joaquin River near Dos Palos.
21	BO-7802 Gaged flow on Chowchilla Bypass at head (DWR, San Joaquin District).
22	Theoretical inflow from Fresno River (refer to Fresno River water budget).
23	Gaged inflow from Chowchilla River and Ash and Berenda Sloughs (refer to Chowchilla River water budget).
24	Theoretical flow to Eastside Bypass near El Nido, the sum of lines 21, 22, and 23. Years 1967, 1969, and 1970 were not available[1].
25	Loss between Chowchilla Bypass at head and Eastside Bypass near El Nido, line 24 minus line 26. Years 1967, 1969, and 1970 were estimated[1].
26	BO-0435 Gaged flow on the Eastside Bypass near El Nido. Years 1961-64 estimated by correlation with theoretical flow of Fresno River (line 22).
27	Gaged inflow from Deadman Creek near Merced and Dutchman Creek near Marguerite (U.S. Army Corps of Engineers, 1975, sheet 6, table 5). Years 1973-77 furnished by U.S. Army Corps of Engineers. Five days inflow was estimated in 1975.

See footnote at end of table, page 38.

Water budget for San Joaquin River, 1961-77

[Thousands of acre-feet]

LINE	MEAN	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
1	253.5	102.6	276.8	270.6	227.7	324.4	224.2	389.2	169.6	404.1	298.4	280.7	152.9	347.3	395.3	319.8	94.4	31.7
2	1100.3	441.6	1370.0	1513.0	837.9	1631.0	1066.0	1413.0	967.2	1082.0	1214.0	1092.0	811.8	1371.0	1668.0	1392.0	570.9	264.0
3	284.6	99.8	75.1	82.8	70.4	63.3	62.4	1269.0	57.7	2208.0	86.8	47.8	68.1	285.1	136.2	53.8	80.8	90.9
4	0.3	0.0	0.4	0.5	0.1	0.7	0.2	0.9	0.1	1.3	0.3	0.1	0.1	0.5	0.3	0.5	0.0	0.0
5	5.7	0.3	6.1	7.7	1.6	10.8	3.7	13.9	0.9	20.7	5.1	2.2	0.9	8.5	5.6	8.6	0.5	0.1
6	1.7	1.1	1.7	1.9	1.2	1.9	1.7	2.6	0.9	2.6	3.2	2.4	0.5	2.7	2.3	1.9	0.2	0.1
7	144.0	0.0	0.0	0.0	0.0	0.0	0.0	720.1	0.0	1665.2	0.0	0.0	0.0	58.2	4.3	0.0	0.0	0.0
8	128.5	0.0	0.0	0.0	0.0	0.0	0.0	484.8	0.0	1551.0	62.2	0.0	0.0	0.0	86.3	0.0	0.0	0.0
9	153.9	166.5	161.6	141.4	185.4	176.9	182.0	138.9	164.1	125.9	160.3	156.2	161.3	139.7	147.4	164.6	157.8	86.6
10	922.1	1020.5	991.1	966.4	1065.7	994.7	1059.9	572.1	1031.8	377.9	961.5	1031.8	1070.0	788.1	903.4	1060.1	1021.1	760.0
11	599.2	614.8	567.2	570.4	621.1	573.4	627.6	643.6	608.8	606.4	578.4	623.6	647.7	557.0	632.4	630.1	618.1	466.1
12	445.9	340.4	345.6	347.5	332.6	321.0	318.6	840.6	318.5	1763.9	380.4	304.5	330.5	330.0	350.0	330.2	326.9	298.4
13	164.7	179.5	182.9	192.9	167.1	162.5	150.1	246.9	154.7	203.1	134.9	115.1	141.0	163.0	149.4	151.8	151.1	154.5
14	281.1	160.9	162.7	154.6	165.5	158.4	168.4	593.8	163.8	1560.8	245.5	189.4	189.5	167.0	200.6	178.4	175.7	144.0
15	2.2	2.4	2.4	2.3	2.6	2.4	2.5	1.4	2.5	0.9	2.3	2.5	2.6	1.9	2.2	2.5	2.5	1.8
17	163.7	165.1	163.4	163.5	169.3	160.4	165.7	165.6	164.1	168.2	171.2	168.0	169.1	146.6	170.7	167.7	171.6	132.6
18	119.5	-1.8	1.7	-6.6	-1.2	0.4	5.2	429.6	2.2	1393.6	76.6	23.9	23.1	22.3	32.1	13.2	4.4	13.2
19	6.9	-8.7	-2.5	-10.6	-2.6	-1.1	1.2	52.6	-3.2	28.0	1.5	20.6	21.5	1.6	16.3	-2.0	-5.1	10.0
20	112.6	6.9	4.2	4.0	1.4	1.4	4.0	377.0	5.4	1365.5	75.1	3.3	1.6	20.7	15.7	15.2	9.5	3.2
21	144.0	0.0	0.0	0.0	0.0	0.0	0.0	720.1	0.0	1665.2	0.0	0.0	0.0	58.2	4.3	0.0	0.0	0.0
22	47.0	1.5	51.8	33.3	4.5	56.3	2.9	148.9	3.8	265.3	40.5	11.6	5.1	87.8	55.5	28.9	0.7	0.2
23	159.1	19.6	200.1	178.9	91.4	255.5	123.1	310.7	79.5	430.0	190.2	117.6	70.0	241.2	196.4	200.2	0.0	0.0
24	-	21.1	251.9	212.2	95.9	311.8	126.0	-	83.2	-	-	129.2	75.1	387.1	256.2	229.2	0.7	0.2
25	147.1	21.0	194.9	181.2	91.7	262.5	112.2	271.8	78.6	253.5	164.5	124.1	75.0	219.5	249.0	200.2	0.7	0.2
26	311.0	0.1	57.0	31.0	4.2	49.3	13.8	1295.0	4.6	3485.0	138.6	5.1	0.1	167.6	7.2	28.9	0.0	0.0
27	7.3	0.7	9.0	9.4	2.3	13.2	4.7	20.0	1.8	31.8	7.3	3.2	1.3	9.5	3.9	5.2	0.0	0.0

28 BO-6210 Gaged inflow from Mariposa Creek below Mariposa Dam (U.S. Army Corps of Engineers, 1975, sheet 5, table 5).
29 BO-6170 Gaged inflow from Owens Creek below Owens Reservoir near Planada, Merced Irrigation District (MeID). Years 1975-77 partially estimated.
30 BO-5570 Gaged inflow from Bear Creek below Bear Reservoir near Planada (MeID), 1974 partially estimated.
31 Ungaged inflow between Mariposa Creek below Mariposa Dam and Duck Slough near Merced. Estimated by correlation with 11274500, Orestimba Creek near Newman.
32 No diversions (DWR).
33 Theoretical flow to San Joaquin River near Stevinson, the sum of lines 20 and 26 through 31 minus line 32. Years 1967, 1969, and 1970 were not available[1].
34 Loss between the sum of Eastside Bypass near El Nido and San Joaquin River near Dos Palos, and San Joaquin River near Stevinson, line 33 minus line 35. Years 1967 and 1969-70 were estimated.[1]
35 BO-7400 Gaged flow on San Joaquin River near Stevinson. Water year 1961 estimated by correlation with San Joaquin River at Fremont Ford Bridge.
36 11261000 Gaged inflow from Salt Slough near Los Banos, 1961-68. BO-0470 Gaged inflow from Salt Slough near Stevinson, 1969-77.
37 No diversions (DWR).
38 Theoretical flow to San Joaquin River at Fremont Ford Bridge, the sum of lines 35 and 36 minus line 37.
39 Loss between San Joaquin River near Stevinson and San Joaquin River at Fremont Ford Bridge, line 38 minus line 40.
40 11261500 BO-7375 Gaged flow on San Joaquin River at Fremont Ford Bridge. Water year 1971 estimated 75 days more than 300 ft^3/s, 1972-77 (DWR).
41 BO-0400 Gaged inflow from Mud Slough near Stevinson. Estimated by correlation with Orestimba Creek near Newman.
42 11262800 Gaged inflow from Los Banos Creek near Los Banos. Years 1967-77 estimated by correlation with 11274590 Orestimba Creek near Crows Landing.
43 BO-0350 Inflow from Newman Wasteway near Newman. All years estimated by using the average of the 1959 and 1960 water-year records.
44 Theoretical inflow from Merced River (refer to Merced River water budget).
45 Diversions (DWR). Years 1971-77 estimated the same as the 1961-70 average.
46 Theoretical flow to San Joaquin River near Newman, the sum of lines 40 through 44 minus line 45.
47 Loss between San Joaquin River at Fremont Ford Bridge and San Joaquin River near Newman, line 46 minus line 48.
48 11274000 Gaged flow on San Joaquin River near Newman.
49 11273000 Gaged inflow from Merced River Slough near Newman (refer to Merced River water budget).
50 Inflow from Lateral Nos. 6 and 7, and Miscellaneous 6 and 7, Turlock Irrigation District (TID).
51 BO-8720 Gaged inflow from Orestimba Creek near Crows Landing. Water year 1967 estimated for 2½ months. Years 1973-77 gaged inflow from Orestimba Creek below Highway 33.
52 Diversions (DWR). Years 1971-77 estimated the same as the 1961-70 average.

See footnote at end of table, page 38.

Water budget for San Joaquin River, 1961-77--Continued

28	24.2	1.2	28.4	27.5	4.4	40.5	12.7	49.5	4.9	100.0	25.2	7.1	3.8	45.5	27.8	32.5	0.7	0.1
29	3.7	0.2	4.5	2.6	0.3	5.7	1.8	6.5	0.6	19.9	4.5	0.9	0.3	6.6	2.9	5.1	0.7	0.0
30	16.6	1.6	18.6	19.7	2.3	27.7	9.6	29.6	3.4	62.8	17.7	5.1	2.7	34.0	18.9	27.1	1.7	0.2
31	12.2	0.9	16.5	21.0	1.8	12.0	4.6	30.5	0.9	38.0	15.4	8.4	0.9	26.0	16.2	13.1	0.9	0.9
32	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33	-	11.6	138.1	115.3	16.7	149.7	51.3	-	21.6	-	-	33.1	10.7	309.9	92.7	127.2	13.7	4.5
34	-42.2	-1.2	-29.3	-19.5	-13.8	-63.5	-38.1	-71.0	-30.7	-137.0	-42.5	-15.5	-12.8	-63.2	-91.4	-57.7	-24.9	-5.4
35	421.8	12.8	167.4	134.8	30.5	213.2	89.4	1492.0	52.4	3862.0	253.9	48.6	23.5	373.1	184.1	184.9	38.6	9.9
36	88.3	44.4	58.0	77.0	62.7	72.1	68.5	128.6	83.8	153.0	103.8	111.4	53.9	127.0	110.5	114.2	80.1	51.5
37	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
38	510.1	57.2	225.4	211.8	93.2	285.3	157.9	1620.6	136.2	4015.0	357.7	160.0	77.3	500.1	294.6	299.1	118.7	61.4
39	156.9	-7.2	20.3	-30.0	-11.4	-16.5	-16.6	659.5	-10.6	2096.0	11.5	0.0	-13.0	29.7	-19.1	-5.6	-13.0	-6.6
40	353.2	64.4	205.1	241.9	104.6	301.8	174.5	961.1	146.8	1919.0	346.2	160.0	90.4	470.4	313.7	304.7	131.7	68.0
41	395.0	0.4	350.0	620.0	1.6	160.0	16.4	940.0	0.4	2700.0	290.0	66.0	0.4	1020.0	350.0	200.0	0.4	0.4
42	5.9	0.0	9.5	5.0	0.0	7.7	0.0	10.3	2.3	23.8	5.6	5.0	2.1	9.0	6.6	7.1	4.4	2.8
43	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
44	364.3	51.5	373.2	499.9	84.8	680.2	202.0	689.5	197.0	980.0	486.1	194.9	246.7	233.6	468.7	526.7	219.0	58.7
45	1.6	0.7	0.9	0.6	2.2	1.7	3.1	2.0	3.6	0.2	0.8	1.6	1.6	1.6	1.6	1.6	1.6	1.6
46	1121.9	120.6	941.9	1371.2	193.8	1153.0	394.8	2603.8	347.9	5627.7	1132.2	429.3	342.9	1736.4	1142.4	1041.9	358.9	133.2
47	157.0	-24.0	294.3	549.9	-62.3	66.0	-63.1	308.8	-66.6	442.7	176.3	-15.7	-40.6	817.2	291.0	116.3	-72.5	-49.0
48	964.9	144.6	647.6	821.3	256.1	1087.0	457.9	2295.0	414.5	5185.0	955.9	445.0	383.5	919.2	851.4	925.6	431.4	182.2
49	18.0	0.0	0.0	0.2	0.0	3.1	0.3	24.1	0.0	277.3	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.0
50	8.6	1.6	7.3	8.8	5.1	8.8	4.9	8.9	5.5	9.8	9.9	11.2	5.6	9.6	13.0	16.7	15.2	4.8
51	14.7	2.8	10.7	19.1	6.3	10.5	8.2	25.0	6.4	56.4	14.2	12.6	5.8	21.9	16.3	14.5	11.2	7.5
52	7.1	7.2	5.2	5.4	7.4	6.5	7.6	6.0	10.9	4.1	11.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1

53 Theoretical flow to San Joaquin River at Crows Landing Bridge, the sum of lines 48 through 51 minus line 52.
54 Loss between San Joaquin River near Newman and San Joaquin River at Crows Landing Bridge, line 53 minus line 55.
55 BO-7250 Gaged flow on San Joaquin River at Crows Landing Bridge (DWR). No data available for 1961-65 and 1973-77.
56 Inflow from Lateral No. 5. Lateral No. 5 is a composite of Lateral Nos. 4, 4½, 5, 5½, and Miscellaneous 5 (TID).
57 Diversions (DWR). Years 1971-77 partially estimated the same as the 1961-70 average. The major diversion for this period was furnished by the Patterson Water District.
58 Theoretical flow to San Joaquin River at Patterson Bridge, the sum of lines 55 and 56 minus line 57.
59 Loss between San Joaquin River at Crows Landing Bridge and San Joaquin River at Patterson Bridge, line 58 minus line 60.
60 BO-7200 Gaged flow on San Joaquin River at Patterson Bridge. No available data for 1961-69.
61 Inflow from Lateral No. 3. Lateral No. 3 is a composite of Lateral Nos. 2½, 3, and Miscellaneous 3 (TID).
62 11274630 Gaged inflow from Del Puerto Creek near Patterson. Years 1961-65 estimated by correlation to Orestimba Creek near Crows Landing.
63 Inflow from Lateral No. 2 (TID).
64 Theoretical inflow from Tuolumne River (refer to Tuolumne River water budget).
65 Inflow from Lateral No. 4 (Modesto Irrigation District).
66 Ungaged inflow. Estimated by regression equations.
67 Diversions (DWR). Years 1971-77 partially estimated the same as the 1961-70 average. The major diversions for this period were furnished by the West Stanislaus Irrigation District and the El Solyo Water District.
68 Theoretical flow to San Joaquin River at Maze Road Bridge, the sum of lines 60 through 66 minus line 67.
69 Loss between San Joaquin River at Patterson Bridge and San Joaquin River at Maze Road Bridge, line 68 minus line 70.
70 BO-7040 Gaged flow on San Joaquin River at Maze Road Bridge. No data available for 1961-65.
71 Theoretical inflow from Stanislaus River (refer to Stanislaus River water budget).
72 Diversions (DWR). Years 1971-77 estimated the same as the 1961-70 average.
73 Theoretical flow to San Joaquin River near Vernalis, the sum of lines 70 and 71 minus line 72.
74 Loss between San Joaquin River at Maze Road Bridge and San Joaquin River near Vernalis, line 73 minus line 75.
75 11303500 Gaged flow on San Joaquin River near Vernalis.

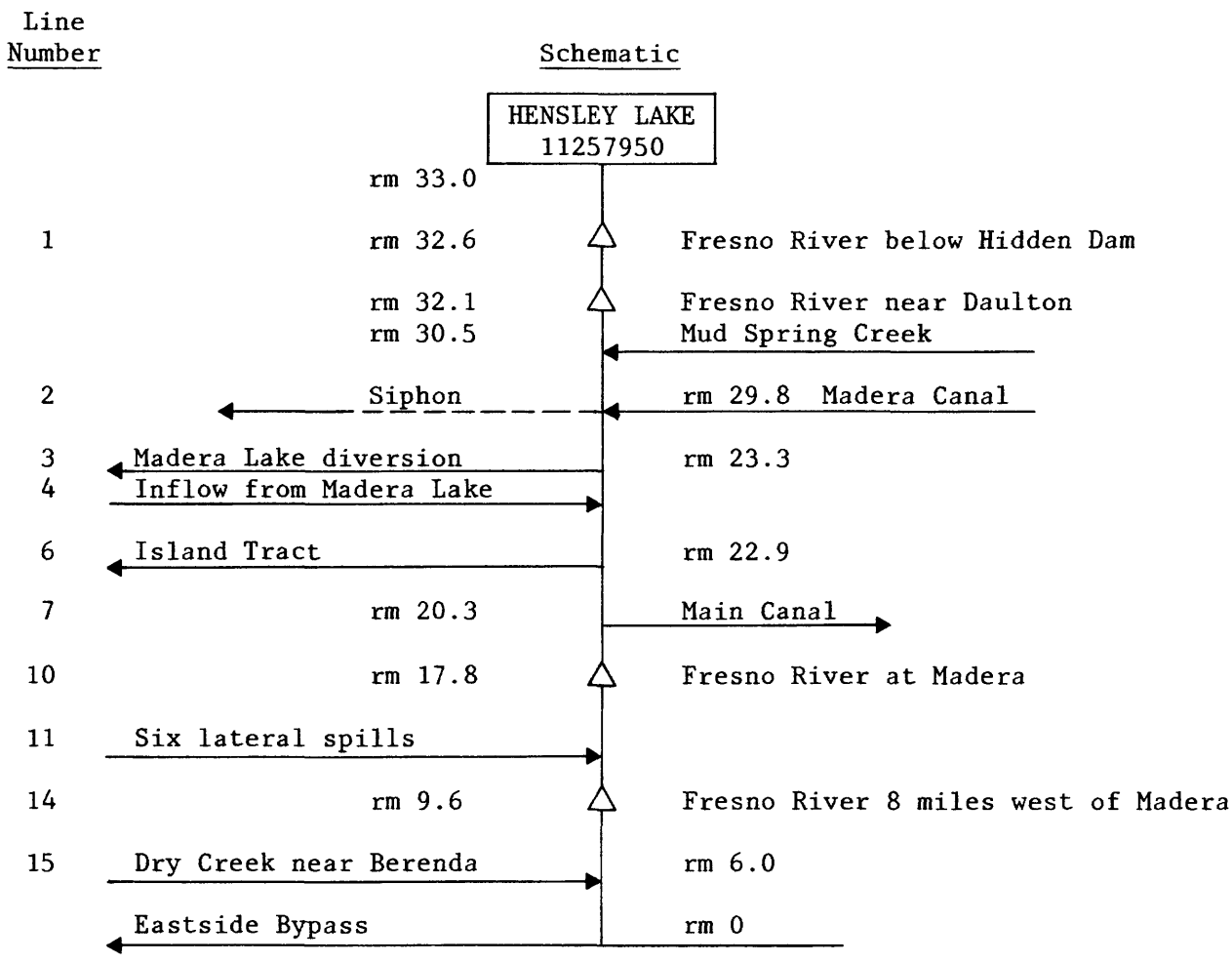
[1]Values for lines 24, 25, 33, and 34 could not be computed for years 1967, 1969, and 1970 by the standard method because an unmeasured part of the floodflows measured at the San Joaquin River near Dos Palos (line 20) was diverted into the Eastside Bypass above the gage at El Nido (line 26) and therefore measured again. Instead, combined losses for the two reaches could be computed (sum of lines 20 through 23 and 27 through 31, minus line 35). This amount was reapportioned to the two reaches by correlating the remaining years of line 34 with the sum of lines 28 and 30.

Water budget for San Joaquin River, 1961-77--Continued

53	-	-	-	-	-	-	463.6	2347.0	415.4	5524.4	968.9	461.6	387.8	-	-	-	-	-
54	-	-	-	-	-	-	-4.5	-123.0	-40.8	-28.6	-24.4	-48.8	-43.6	-	-	-	-	-
55	-	-	-	-	-	-	468.1	2470.0	456.2	5553.0	993.3	510.4	431.4	-	-	-	-	-
56	30.6	11.1	22.2	19.9	24.5	40.1	29.1	40.5	29.3	22.2	47.5	38.0	24.3	29.5	39.3	49.9	44.2	8.8
57	63.1	73.7	61.6	53.6	72.4	63.2	64.1	45.2	59.8	44.4	64.1	60.4	71.8	61.1	67.1	65.5	77.5	67.7
58	-	-	-	-	-	-	433.1	2465.3	425.7	5530.8	976.7	488.0	383.9	-	-	-	-	-
59	-	-	-	-	-	-	-	-	-	-	-74.3	-58.2	-53.8	-	-	-	-	-
60	-	-	-	-	-	-	-	-	-	-	1051.0	546.2	437.7	1079.0	1016.0	1083.0	577.0	248.8
61	6.5	0.5	3.1	4.0	4.4	12.3	5.0	8.8	6.2	7.3	11.1	9.0	5.0	7.2	6.1	7.9	9.9	2.3
62	2.7	0.0	1.3	5.6	0.2	1.3	0.7	5.8	0.4	10.8	2.9	1.8	0.2	8.7	2.9	3.1	0.1	0.0
63	4.9	0.3	2.9	2.6	1.8	4.9	4.0	6.2	4.9	6.5	5.4	5.6	6.4	5.1	6.5	9.5	9.3	0.6
64	832.8	251.0	425.0	972.7	564.3	1538.0	754.4	1847.5	569.6	2512.6	1026.6	548.5	312.7	436.6	632.1	937.4	676.3	152.5
65	5.9	0.5	6.2	6.3	4.6	13.1	6.1	8.3	5.8	6.8	5.4	5.8	3.3	5.6	7.8	6.8	6.1	1.5
66	2.9	0.0	3.5	5.1	0.1	2.0	0.4	6.8	0.0	13.8	3.0	1.1	0.0	7.1	3.3	2.4	0.0	0.0
67	106.9	138.4	112.2	100.8	111.1	124.2	124.5	91.5	99.1	95.8	115.3	111.6	110.9	95.7	107.0	89.5	87.5	101.5
68	-	-	-	-	-	-	-	-	-	-	1990.1	1006.5	654.4	1453.7	1567.6	1960.5	1191.1	304.3
69	-	-	-	-	-	-	-	-	-	-	-136.9	-146.5	107.7	-113.3	-130.4	120.5	-158.9	104.5
70	-	-	-	-	-	-	1339.0	4275.0	1084.0	8197.0	2127.0	1153.0	762.1	1567.0	1698.0	2081.0	1350.0	408.8
71	629.9	53.0	393.5	832.7	174.7	1120.8	361.8	1373.8	276.5	1599.2	826.7	556.4	273.5	828.9	1065.3	770.3	194.3	7.6
72	10.7	10.5	8.3	8.4	15.6	13.9	16.6	7.4	9.6	5.1	11.6	10.7	10.7	10.7	10.7	10.7	10.7	10.7
73	-	-	-	-	-	-	1684.2	5641.4	1350.9	9791.2	2942.1	1698.7	1024.9	2385.2	2752.6	2840.6	1533.6	405.7
74	-	-	-	-	-	-	-11.8	80.4	-78.5	-278.8	-121.9	-76.3	-89.1	12.2	-17.4	25.6	1.6	-10.8
75	2604.2	437.2	1487.0	2813.0	1124.0	3795.0	1696.0	5561.0	1429.0	10070.0	3064.0	1775.0	1114.0	2373.0	2770.0	2815.0	1532.0	416.5

(p. 41 follows)

FRESNO RIVER



FRESNO RIVER

Line Number	Explanation for water-budget table
1	11258000 Gaged flow on Fresno River below Hidden Dam. Gage relocated to present site in 1975, formerly published as Fresno River near Daulton. Records are considered equivalent.
2	Inflow from Madera Canal, Madera Irrigation District (MaID).
3	Diversion to Madera Lake (MaID). Years 1961-66 estimated by correlation with Fresno River near Daulton.
4	Inflow from Madera Lake (MaID). Years 1961-67 estimated as zero.
5	Diversion of Fresno River pumps (MaID). Years 1961-67 estimated the same as the 1968-75 average.
6	Diversion to Island Tract (MaID). Years 1961-66 estimated by correlation with Fresno River near Daulton.
7	Diversion to Main Canal (MaID).
8	Theoretical flow to Fresno River at Madera, the sum of lines 1, 2, and 4 minus lines 3, 5, 6, and 7.
9	Loss between Fresno River below Hidden Dam and Fresno River at Madera, line 8 minus line 10.
10	Gaged flow on Fresno River at Madera (MaID).
11	Inflow from six lateral spills (MaID). Years 1961-67 estimated by correlation with Fresno River at Madera.
12	Theoretical flow to Fresno River 8 miles west of Madera, the sum of lines 10 and 11.
13	Loss between Fresno River at Madera and Fresno River 8 miles west of Madera, line 12 minus line 14.
14	Gaged flow on Fresno River 8 miles west of Madera (MaID). Years 1961 and 1962 are estimated.
15	Gaged inflow from Dry Creek near Berenda. Outflow of Madera Irrigation District to river (MaID). Years 1961-66 estimated by correlation with Fresno River near Daulton.
16	Theoretical flow to mouth at Eastside Bypass, the sum of lines 14 and 15.

Water budget for Fresno River, 1961-77

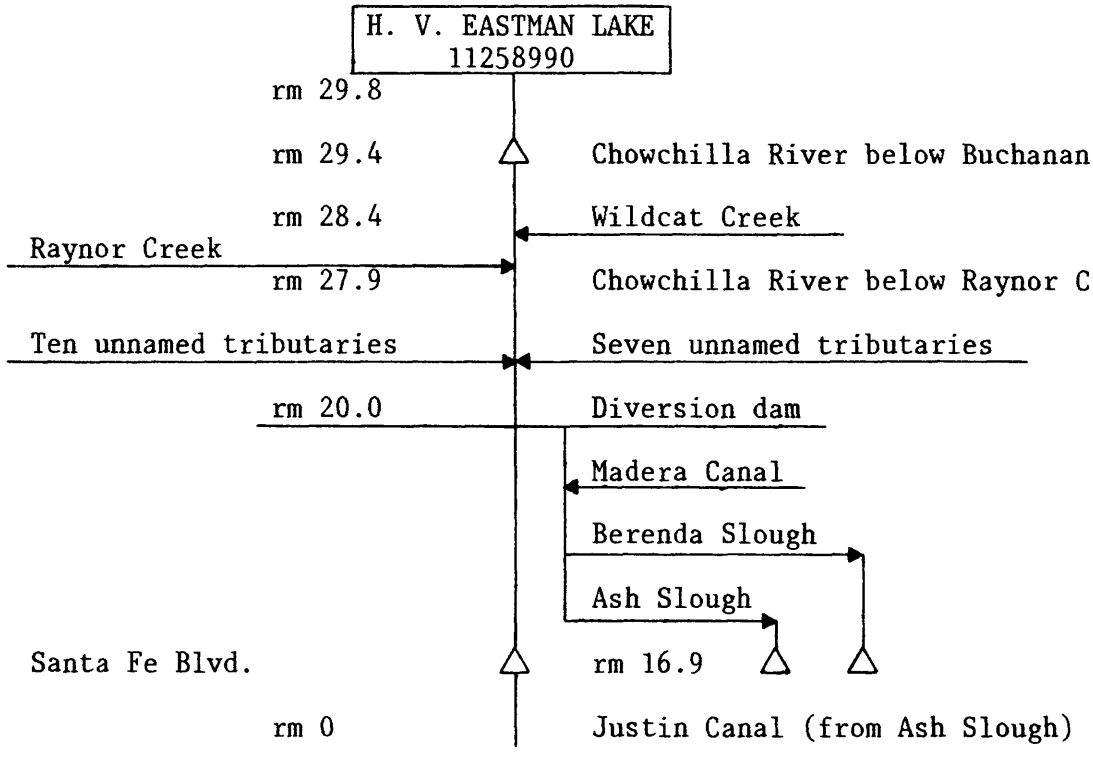
[Thousands of acre-feet]

LINE	MEAN	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
1	75.5	14.6	91.9	76.9	31.8	110.2	44.8	186.4	26.3	268.4	69.2	46.0	26.8	113.7	78.8	80.1	15.0	2.9
2	32.3	28.1	34.8	41.7	33.4	27.1	34.4	56.4	28.1	39.2	27.1	36.3	24.5	38.3	48.2	30.1	11.2	11.0
3	3.6	2.9	4.4	4.1	3.3	4.7	3.5	4.7	4.0	8.9	3.1	4.2	0.3	4.9	4.7	3.1	0.2	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0
5	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	1.0	0.3	0.5	1.2	0.6	0.7	1.1	0.7	0.5	0.2
6	1.0	0.3	1.2	1.0	0.6	1.3	0.7	1.3	0.4	1.1	0.7	0.7	0.3	2.2	2.3	1.8	0.3	0.3
7	49.2	30.7	50.4	54.1	46.7	74.8	47.4	58.0	33.1	77.2	66.0	61.6	34.0	57.7	66.6	57.7	13.1	7.5
8	53.5	8.1	70.0	58.7	14.0	55.8	26.9	178.2	15.9	220.0	26.1	14.5	16.2	86.4	52.3	47.8	12.1	6.0
9	3.4	7.5	17.6	13.1	-1.3	-8.9	15.2	2.2	11.1	-40.1	-10.4	-2.5	8.8	7.6	-1.3	21.3	12.1	6.0
10	50.1	0.6	52.4	45.6	15.3	64.8	11.7	176.0	4.7	260.1	36.5	17.0	7.4	78.8	53.5	26.5	0.0	0.0
11	1.7	0.5	0.6	0.6	0.5	0.7	0.5	3.3	0.6	1.1	0.7	0.4	1.9	9.9	4.7	2.8	0.2	0.0
12	51.8	1.1	53.1	46.3	15.8	65.4	12.2	179.3	5.3	261.2	37.2	17.4	9.3	88.7	58.2	29.3	0.2	0.0
13	9.7	1.1	7.1	17.9	13.8	15.9	12.2	37.1	3.5	12.4	4.3	8.7	4.8	10.6	9.4	5.5	0.2	0.0
14	42.1	0.0	46.0	28.3	2.0	49.5	0.0	142.2	1.8	248.7	32.9	8.7	4.5	78.1	48.8	23.8	0.0	0.0
15	4.9	1.5	5.8	5.0	2.5	6.8	2.9	6.7	2.0	16.6	7.6	2.9	0.6	9.7	6.7	5.1	0.7	0.2
16	47.0	1.5	51.8	33.3	4.5	56.3	2.9	148.9	3.8	265.3	40.5	11.6	5.1	87.8	55.5	28.9	0.7	0.2

CHOWCHILLA RIVER

Line Number

Schematic



River ends about 2 rm from the San Joaquin River

Line Number

Explanation for water-budget table

1 11259000 Gaged flow on Chowchilla River below Buchanan Dam. Years 1973-75 computed using 11259300, Chowchilla River below Raynor Creek and subtracting the inflow from five ungaged tributaries estimated by using regression equations.

2 Ungaged inflow from Wildcat Creek, Raynor Creek, and 17 unnamed tributaries. Estimated by using regression equations.

3 Gaged inflow from Madera Canal. Years 1961-62 (DWR, 1963, 1965), 1963-77 (DWR).

4 Theoretical flow to the Chowchilla Water District gages on the Chowchilla River and Ash and Berenda Sloughs at Santa Fe Blvd., the sum of lines 1, 2, and 3.

5 Loss between Chowchilla River below Buchanan Dam and the Chowchilla Water District gages on the Chowchilla River and Ash and Berenda Sloughs at Santa Fe Blvd., line 4 minus line 6.

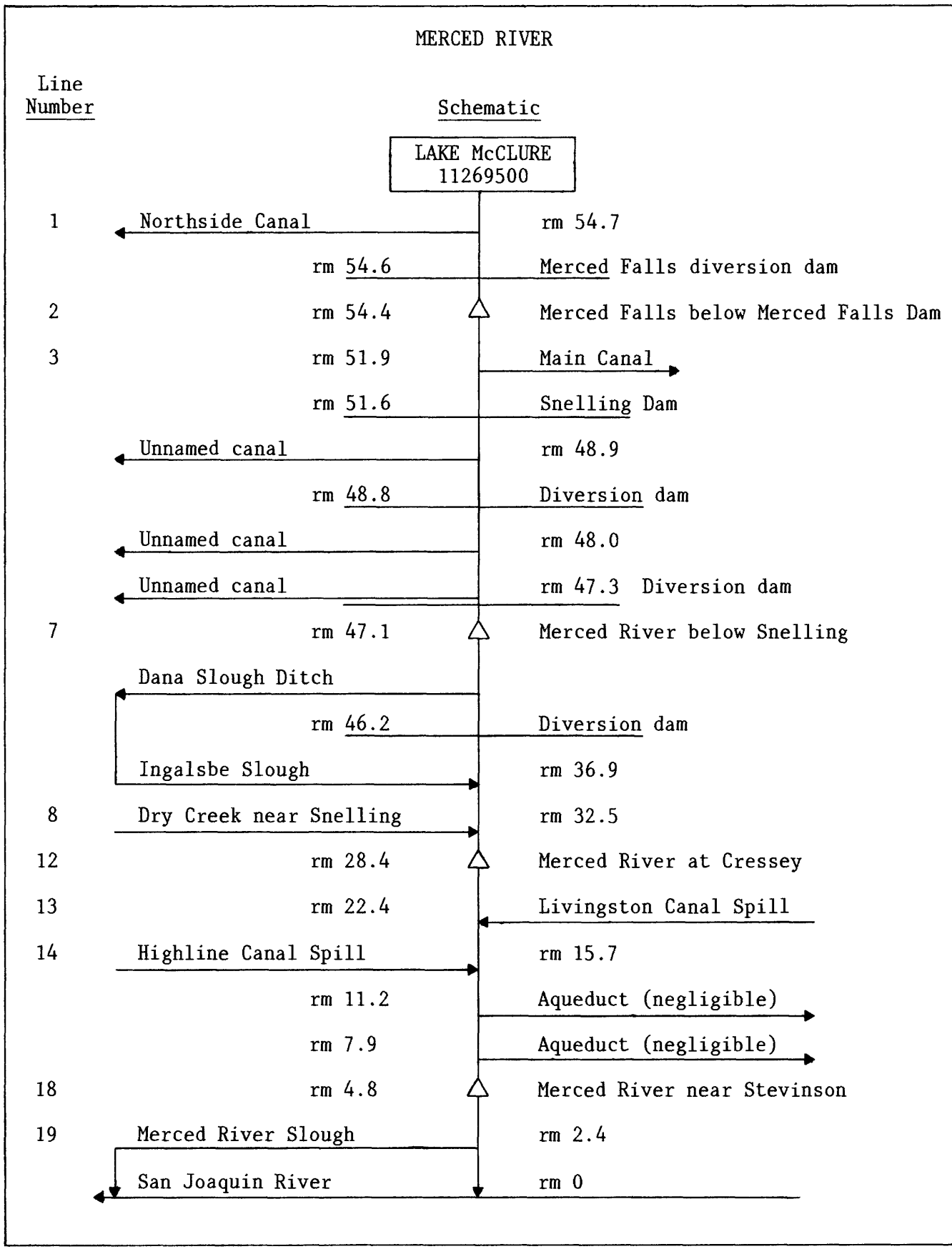
6 Gaged flow on the Chowchilla River and Ash and Berenda Sloughs at Santa Fe Blvd. Years 1961-66 computed by estimating the loss based on a correlation with Chowchilla River below Buchanan Dam and then combining this loss with the theoretical flow. Years 1967-77 from the Chowchilla Water District.

(t. 47 follows)

Water budget for Chowchilla River, 1961-77

[Thousands of acre-feet]

LINE	MEAN	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
1	61.2	5.6	68.7	71.1	17.6	100.0	35.3	151.2	13.5	240.8	55.3	24.7	9.5	93.4	74.1	73.6	4.5	0.8
2	2.8	0.2	3.4	3.9	0.6	4.7	1.6	5.3	0.6	10.2	3.0	1.0	0.4	4.8	3.2	4.5	0.3	0.1
3	100.1	39.8	130.0	105.9	95.2	140.8	97.2	143.8	66.0	144.9	132.3	105.5	59.7	134.4	138.4	129.9	37.1	0.0
4	164.0	45.6	202.1	180.9	113.4	245.5	134.1	300.3	80.1	395.9	190.6	131.3	69.7	232.6	215.7	208.0	42.0	0.9
5	4.9	26.0	2.0	2.0	22.0	-10.0	11.0	-10.5	0.6	-34.1	0.4	13.6	-0.3	-8.6	19.3	7.7	42.0	0.9
6	159.1	19.6	200.1	178.9	91.4	255.5	123.1	310.7	79.5	430.0	190.2	117.6	70.0	241.2	196.4	200.2	0.0	0.0


MERCED RIVER
Line Number
Schematic
LAKE McCLURE 11269500
1
Northside Canal
rm 54.7
rm 54.6
Merced Falls diversion dam
2
rm 54.4
Merced Falls below Merced Falls Dam
3
rm 51.9
Main Canal
rm 51.6
Snelling Dam
Unnamed canal
rm 48.9
rm 48.8
Diversion dam
Unnamed canal
rm 48.0
Unnamed canal
rm 47.3 Diversion dam
7
rm 47.1
Merced River below Snelling
Dana Slough Ditch
rm 46.2
Diversion dam
Ingalsbe Slough
rm 36.9
8
Dry Creek near Snelling
rm 32.5
12
rm 28.4
Merced River at Cressey
13
rm 22.4
Livingston Canal Spill
14
Highline Canal Spill
rm 15.7
rm 11.2
Aqueduct (negligible)
rm 7.9
Aqueduct (negligible)
18
rm 4.8
Merced River near Stevinson
19
Merced River Slough
rm 2.4
San Joaquin River
rm 0

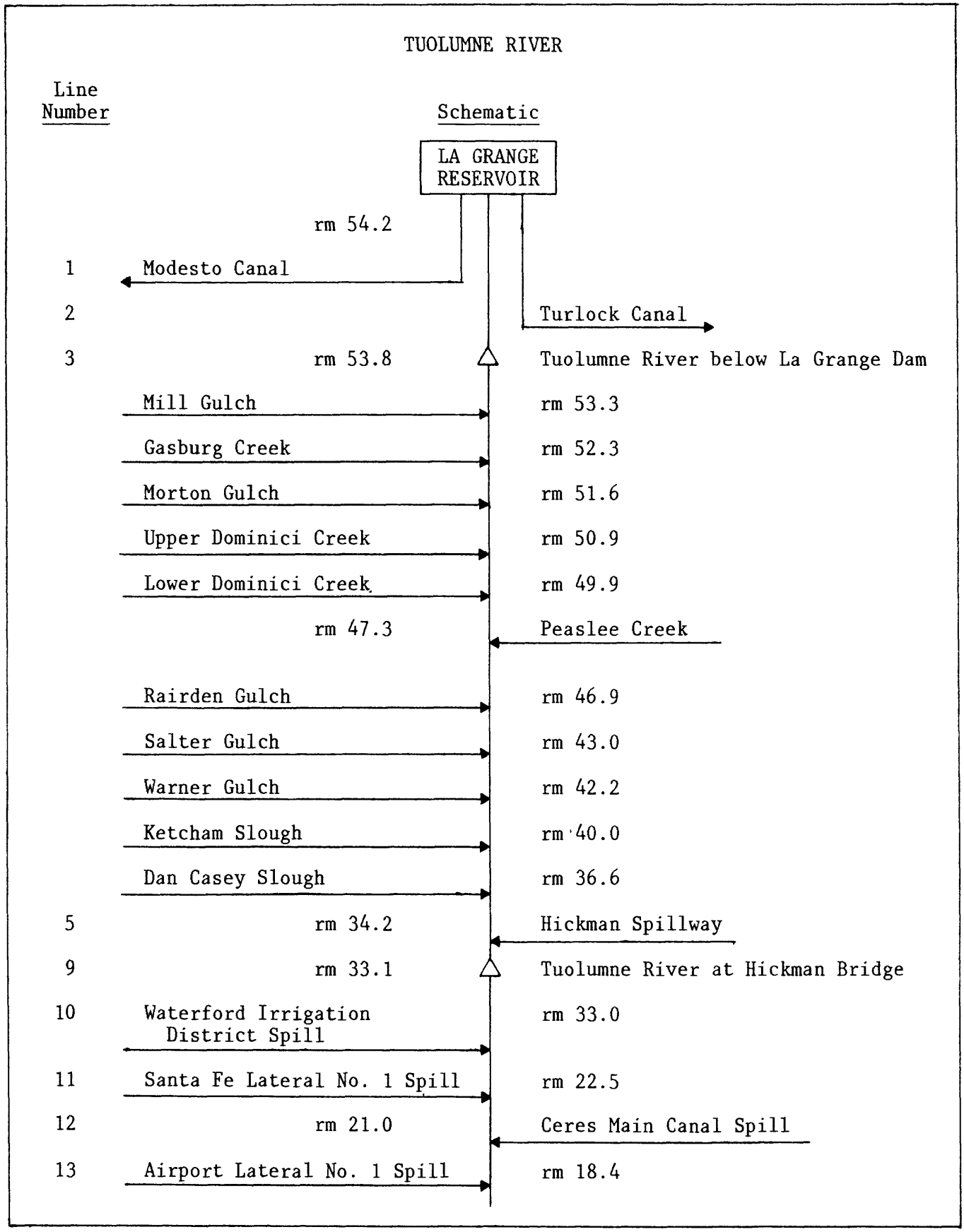
MERCED RIVER

Line Number	Explanation for water-budget table
1	BO-5940 Gaged diversion to Northside Canal, Merced Irrigation District (MeID). Not used in computations.
2	11270900 Gaged flow on Merced River below Merced Falls Dam. Years 1961-64 estimated by subtracting Northside Canal from 11270000, Merced River at Exchequer.
3	BO-5930 Gaged diversion to Main Canal near Merced Falls (MeID).
4	Diversions (DWR). Years 1961-65 and 1971-77 estimated by correlation with Merced River below Merced Falls Dam.
5	Theoretical flow to Merced River below Snelling, line 2 minus lines 3 and 4.
6	Loss between Merced River below Merced Falls Dam and Merced River below Snelling, line 5 minus line 7. Negative values, especially 1961-64, were caused by ungaged inflow.
7	BO-5170 Gaged flow on Merced River below Snelling.
8	11271320, BO-5165 Gaged inflow from Dry Creek near Snelling. Years 1961-66 estimated by correlation with 11281000, South Fork Tuolumne River near Oakland Recreation Camp.
9	Diversions (DWR). Years 1971-77 estimated the same as the 1961-70 average.
10	Theoretical flow to Merced River at Cressey, the sum of lines 7 and 8 minus line 9.
11	Loss between Merced River below Snelling and Merced River at Cressey, line 10 minus line 12.
12	BO-5155 Gaged flow on Merced River at Cressey. Years 1961-62, and 1972 partially estimated by correlation with Merced River near Stevinson.
13	Gaged inflow from Livingston Canal Spill (MeID).
14	Gaged inflow from Highline Canal Spill, Turlock Irrigation District.
15	Diversions (DWR). Years 1971-77 estimated the same as the 1961-70 average.
16	Theoretical flow to Merced River near Stevinson, the sum of lines 12, 13, and 14 minus line 15.
17	Loss between Merced River at Cressey and Merced River near Stevinson, line 16 minus line 18.
18	11272500 Gaged flow on Merced River near Stevinson.
19	11273000 Gaged diversion to Merced River Slough near Newman. Years 1973-77 estimated by correlation with Merced River near Stevinson.
20	Diversions (DWR). Years 1971-77 estimated the same as the 1961-70 average.
21	Theoretical flow to mouth at the San Joaquin River, line 18 minus lines 19 and 20.

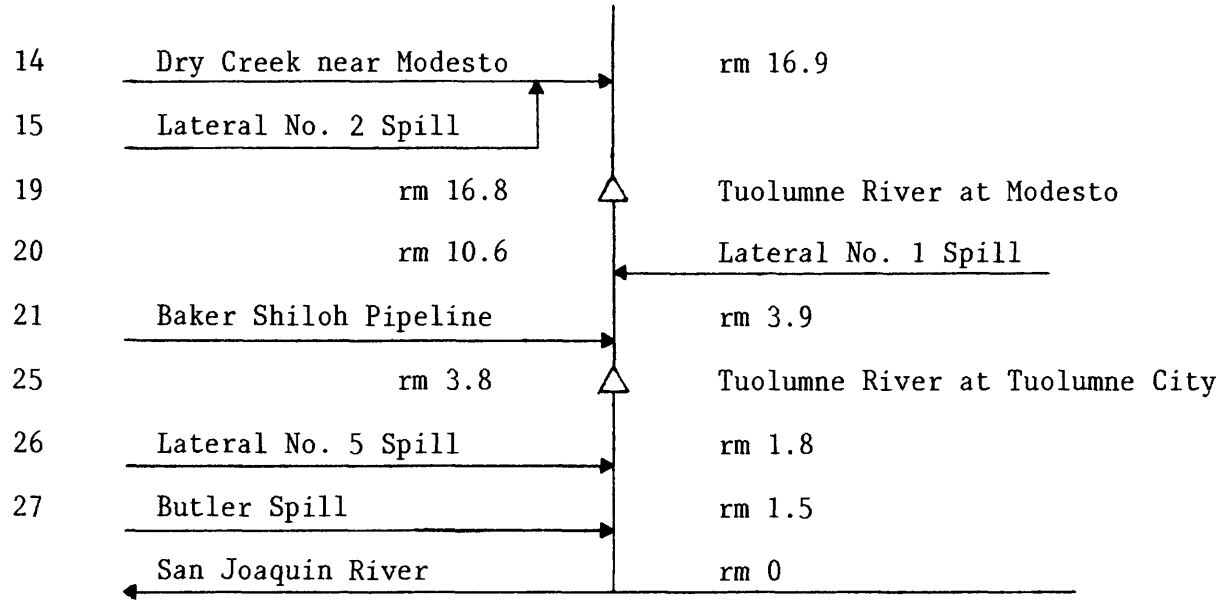
Water budget for Merced River, 1961-77

[Thousands of acre-feet]

LINE	MEAN	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
1	22.1	14.9	25.3	21.7	20.5	22.8	16.1	20.3	24.9	21.0	24.6	23.4	26.2	24.7	24.8	22.7	27.1	14.9
2	844.9	293.6	861.2	929.0	479.9	1228.0	477.2	1217.0	749.8	1770.0	1028.0	662.9	824.0	703.4	1057.0	1103.0	716.0	262.8
3	494.7	249.7	576.5	512.2	424.6	551.1	288.9	527.8	554.3	570.2	591.3	502.4	581.6	570.3	621.8	599.2	510.3	178.0
4	39.6	32.2	40.0	40.1	39.5	40.6	30.5	37.7	51.5	39.6	42.0	39.7	39.9	39.8	40.3	40.3	39.8	39.9
5	310.5	11.7	244.8	376.7	15.8	636.3	157.8	651.6	144.1	1160.1	394.7	120.7	202.4	93.4	394.9	463.5	165.9	44.9
6	-0.5	-11.9	-31.1	-18.1	-12.5	40.1	19.2	19.1	5.0	-22.7	5.3	-7.0	3.4	-18.6	12.9	10.1	8.5	-9.4
7	311.0	23.6	275.9	394.8	28.2	596.2	138.6	632.5	139.1	1182.9	389.4	127.7	199.0	112.0	382.0	453.4	157.4	54.4
8	9.4	0.3	4.5	8.3	1.1	12.8	3.0	23.7	1.7	39.9	10.6	3.6	1.2	25.9	8.4	15.2	0.2	0.0
9	31.7	30.5	36.9	35.3	33.9	30.8	26.6	32.9	34.3	26.2	30.0	31.7	31.7	31.7	31.7	31.7	31.7	31.7
10	288.7	-6.7	243.6	367.7	-4.6	578.2	115.1	623.3	106.4	1196.6	370.1	99.6	168.4	106.2	358.6	436.9	125.8	22.7
11	-60.2	-49.0	-97.8	-87.9	-68.5	-85.3	-55.9	-51.0	-59.4	-11.4	-56.8	-63.0	-54.1	-76.2	-64.4	-56.1	-54.7	-31.7
12	348.9	42.3	341.4	455.6	63.9	663.5	171.0	674.3	165.8	1208.0	426.9	162.6	222.5	182.4	423.0	493.0	180.5	54.4
13	8.4	1.4	8.6	10.8	4.0	10.8	2.6	14.3	10.2	15.0	10.7	5.4	7.5	9.7	12.1	11.8	5.6	1.5
14	4.8	0.7	3.8	5.2	4.7	7.0	4.5	6.0	4.0	6.3	6.6	6.3	3.4	5.8	6.1	5.6	5.4	0.5
15	17.6	23.2	17.2	16.3	21.3	18.2	18.8	15.4	17.9	11.8	16.1	17.6	17.6	17.6	17.6	17.6	17.6	17.6
16	344.4	21.2	336.6	455.3	51.3	663.1	159.2	679.2	162.0	1217.5	428.0	156.6	215.7	180.3	423.6	492.8	173.9	38.8
17	-43.9	-35.8	-43.9	-49.9	-40.6	-26.6	-51.4	-38.9	-42.8	-42.5	-64.3	-44.4	-37.1	-59.4	-51.3	-40.3	-51.2	-26.0
18	388.3	57.0	380.5	505.2	91.9	689.7	210.6	718.1	204.8	1260.0	492.3	201.0	252.8	239.7	474.9	533.1	225.1	64.8
19	18.0	0.0	0.0	0.2	0.0	3.1	0.3	24.1	0.0	277.3	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.0
20	6.1	5.5	7.2	5.1	7.0	6.4	8.3	4.5	7.8	2.7	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
21	364.3	51.5	373.2	499.9	84.8	680.2	202.0	689.5	197.0	980.0	486.1	194.9	246.7	233.6	468.7	526.7	219.0	58.7


TUOLUMNE RIVER
Line Number
Schematic
LA GRANGE RESERVOIR
rm 54.2
1
Modesto Canal
2
Turlock Canal
3
rm 53.8
Tuolumne River below La Grange Dam
Mill Gulch
rm 53.3
Gasburg Creek
rm 52.3
Morton Gulch
rm 51.6
Upper Dominici Creek
rm 50.9
Lower Dominici Creek
rm 49.9
rm 47.3
Peaslee Creek
Rairden Gulch
rm 46.9
Salter Gulch
rm 43.0
Warner Gulch
rm 42.2
Ketcham Slough
rm 40.0
Dan Casey Slough
rm 36.6
5
rm 34.2
Hickman Spillway
9
rm 33.1
Tuolumne River at Hickman Bridge
10
Waterford Irrigation District Spill
rm 33.0
11
Santa Fe Lateral No. 1 Spill
rm 22.5
12
rm 21.0
Ceres Main Canal Spill
13
Airport Lateral No. 1 Spill
rm 18.4

TUOLUMNE RIVER
(Schematic--Continued)



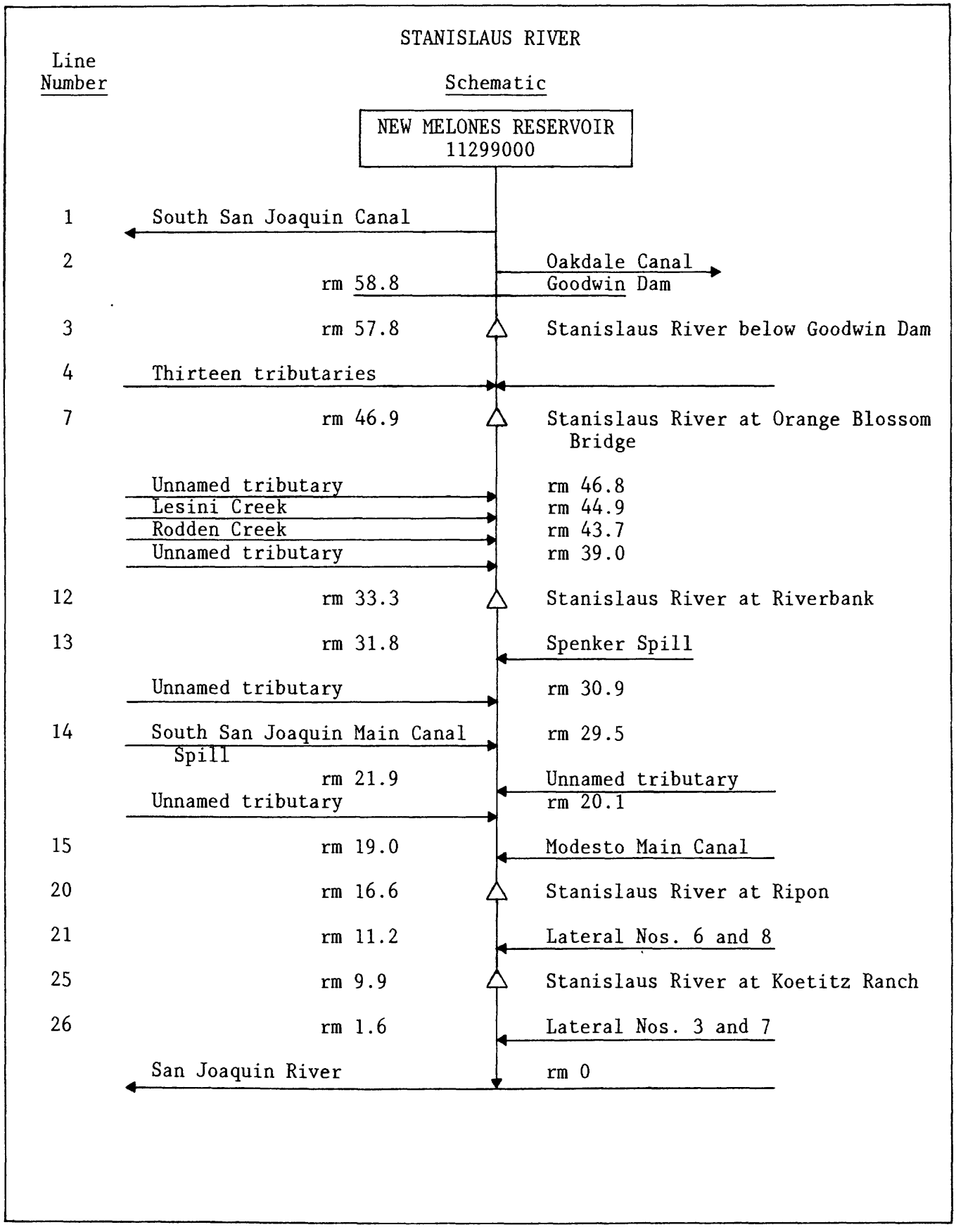
Line Number	Explanation for water-budget table
1	11289000 Gaged diversion to Modesto Canal. Not used in computations.
2	11289500 Gaged diversion to Turlock Canal. Not used in computations.
3	11289650 Gaged flow on Tuolumne River below La Grange Dam. Years 1961-70 estimated by assuming discharge is equal to BO-4175 Tuolumne River at La Grange.
4	Ungaged inflow from 11 tributaries. These include: Mill Gulch, Gasburg Creek, Morton Gulch, Upper Dominici Creek, Lower Dominici Creek, Peaslee Creek, Rairden Gulch, Salter Gulch, Warner Gulch, Ketcham Slough, and Dan Casey Slough. Estimated by using regression equations.
5	Gaged inflow from Hickman Spillway, Turlock Irrigation District (TID).
6	Diversions (DWR). Years 1971-77 estimated the same as the 1961-70 average.
7	Theoretical flow to Tuolumne River at Hickman Bridge, the sum of lines 3, 4, and 5, minus line 6.
8	Loss between Tuolumne River below La Grange Dam and Tuolumne River at Hickman Bridge, line 7 minus line 9.
9	BO-4150 Gaged flow on Tuolumne River at Hickman Bridge.
10	Gaged inflow from Waterford Irrigation District Spill to Tuolumne River, Waterford Irrigation District. Water year 1961 estimated by using the 1962-75 average.
11	Gaged inflow from Santa Fe Lateral No. 1 Spill, Modesto Irrigation District (MoID).
12	Gaged inflow from Ceres Main Canal Spill (TID).
13	Gaged inflow from Airport Lateral No. 1 Spill (MoID).
14	BO-4130 Gaged inflow from Dry Creek near Modesto. Water year 1961 estimated by correlation with Tuolumne River at Tuolumne City.
15	Gaged inflow from Lateral No. 2 Spill (MoID).
16	Diversions (DWR). Years 1971-77 estimated the same as the 1961-70 average.
17	Theoretical flow to Tuolumne River at Modesto, the sum of lines 9 through 15 minus line 16.
18	Loss between Tuolumne River at Hickman Bridge and Tuolumne River at Modesto, line 17 minus line 19.
19	11290000 Gaged flow on Tuolumne River at Modesto.
20	Gaged inflow from Lateral No. 1 Spill (TID).
21	Gaged inflow from Baker Shiloh Pipeline (MoID).
22	Diversions (DWR). Years 1971-77 estimated the same as the 1961-70 average.
23	Theoretical flow to Tuolumne River at Tuolumne City, the sum of lines 19, 20, and 21 minus line 22.
24	Loss between Tuolumne River at Modesto and Tuolumne River at Tuolumne City, line 23 minus line 25.
25	BO-4105 Gaged flow on Tuolumne River at Tuolumne City. Years 1963 and 1965 were partially estimated by correlation with Tuolumne River at Modesto.
26	Gaged inflow from Lateral No. 5 Spill (MoID).
27	Gaged inflow from Butler Spill (MoID).
28	Diversions (DWR). Years 1971-77 estimated the same as the 1961-70 average.
29	Theoretical flow to mouth at the San Joaquin River, the sum of lines 25, 26, and 27 minus line 28.

Water budget for Tuolumne River, 1961-77

[Thousands of acre-feet]

LINE	MEAN	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
1	331.0	224.8	364.6	359.5	286.5	405.8	282.7	345.5	291.4	383.5	372.3	315.1	274.6	340.6	357.7	392.5	392.1	237.0
2	565.1	372.0	634.4	574.7	522.4	653.0	500.9	609.9	482.3	595.2	618.5	588.9	576.9	587.1	621.3	688.4	780.3	200.0
3	583.4	114.4	155.6	811.7	372.1	1091.0	562.8	1510.0	398.2	2131.0	730.1	345.9	165.3	165.0	375.7	561.5	361.0	67.1
4	0.2	0.2	0.1	0.3	0.1	0.4	0.2	0.5	0.2	0.8	0.3	0.1	0.1	0.1	0.2	0.3	0.2	0.0
5	8.3	0.0	9.2	0.1	0.0	0.5	0.1	27.1	0.0	0.1	0.1	0.1	0.0	0.0	13.8	30.1	60.5	0.0
6	2.5	2.3	2.1	1.8	2.6	2.2	2.6	2.1	2.7	3.2	2.8	2.5	2.5	2.5	2.5	2.5	2.5	2.5
7	589.5	112.3	162.7	810.3	369.6	1089.7	560.4	1535.5	395.6	2128.7	727.7	343.6	162.9	162.6	387.3	589.4	419.2	64.7
8	-90.7	-54.5	-75.2	-67.3	-80.8	-101.3	-62.2	-83.5	-94.8	-196.3	-89.2	-49.1	-52.5	-78.2	-117.3	-176.6	-111.6	-50.9
9	680.2	166.8	237.9	877.6	450.4	1191.0	622.6	1619.0	490.4	2325.0	816.9	392.7	215.4	240.8	504.6	766.0	530.8	115.6
10	1.8	2.0	0.5	1.5	0.8	3.1	0.7	2.7	1.4	1.6	1.9	2.6	2.0	1.6	4.5	2.5	1.0	0.2
11	0.7	0.0	0.2	0.1	0.1	3.5	0.2	1.3	2.0	1.0	0.4	0.2	0.1	0.2	0.5	1.0	0.9	0.1
12	8.6	0.0	7.6	2.1	0.2	1.1	0.9	13.3	1.0	4.2	3.0	7.1	0.8	4.0	8.6	30.6	60.9	0.0
13	2.6	0.1	1.6	4.5	1.2	6.6	1.5	4.6	1.5	4.1	2.3	2.5	1.6	2.1	4.2	2.6	2.6	0.7
14	62.0	15.5	60.3	53.6	29.9	89.6	51.2	81.7	35.6	148.8	70.9	53.6	44.1	105.4	74.5	82.3	50.4	6.6
15	0.8	0.2	1.1	1.4	0.3	2.7	0.7	1.8	0.9	0.9	0.7	0.5	0.1	0.4	0.7	0.8	1.1	0.1
16	1.3	1.8	1.6	1.3	1.5	1.0	1.1	0.9	1.2	1.1	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
17	755.4	182.7	307.7	939.5	481.4	1296.6	676.7	1723.4	531.5	2484.6	894.7	457.8	262.9	353.2	596.3	884.6	646.5	122.1
18	-33.9	-40.3	-57.6	-51.0	-58.3	-36.4	-57.8	-27.6	-21.7	62.6	-78.5	-61.6	-47.8	-29.7	-4.5	-24.6	-10.3	-31.2
19	789.3	223.0	365.3	990.5	539.7	1333.0	734.5	1751.0	553.2	2422.0	973.2	519.4	310.7	382.9	600.8	909.2	656.8	153.3
20	0.6	0.1	1.0	1.8	0.5	1.8	0.5	0.8	0.7	0.9	0.2	0.3	0.2	0.4	0.1	0.2	0.1	0.0
21	0.8	0.2	0.7	1.0	0.6	1.2	0.8	0.9	1.1	0.5	1.6	0.8	0.7	0.8	1.1	1.3	0.6	0.2
22	6.5	10.0	5.3	3.0	9.8	3.2	9.1	4.1	10.4	4.1	6.1	6.5	6.5	6.5	6.5	6.5	6.5	6.5
23	784.2	213.3	361.8	990.4	531.0	1332.8	726.7	1748.6	544.6	2419.4	968.8	514.0	305.1	377.6	595.6	904.2	651.0	147.0
24	-44.1	-48.7	-63.7	17.9	-32.8	-194.2	-28.0	-90.4	-22.7	-79.6	-49.2	-26.3	-6.7	-53.8	-26.8	-22.3	-15.0	-7.8
25	828.4	262.0	425.5	972.5	563.8	1527.0	754.7	1839.0	567.3	2499.0	1018.0	540.3	311.8	431.4	622.4	926.5	666.0	154.8
26	7.4	0.2	3.7	5.1	5.5	11.2	5.3	8.7	7.8	9.6	11.1	10.3	4.8	7.2	9.9	11.1	11.4	3.2
27	5.1	1.0	3.7	3.6	3.7	6.8	3.3	4.5	4.3	8.3	5.7	5.9	4.2	6.0	7.8	7.8	7.0	2.5
28	8.0	12.1	7.9	8.5	8.8	7.0	8.9	4.7	9.7	4.3	8.2	8.0	8.0	8.0	8.0	8.0	8.0	8.0
29	832.8	251.0	425.0	972.7	564.3	1538.0	754.4	1847.5	569.6	2512.6	1026.6	548.5	312.7	436.6	632.1	937.4	676.3	152.5

(p. 55 + follows)


STANISLAUS RIVER
Line Number
Schematic
NEW MELONES RESERVOIR
11299000
1
South San Joaquin Canal
2
Oakdale Canal
rm 58.8
Goodwin Dam
3
rm 57.8
Stanislaus River below Goodwin Dam
4
Thirteen tributaries
7
rm 46.9
Stanislaus River at Orange Blossom Bridge
Unnamed tributary
rm 46.8
Lesini Creek
rm 44.9
Rodden Creek
rm 43.7
Unnamed tributary
rm 39.0
12
rm 33.3
Stanislaus River at Riverbank
13
rm 31.8
Spenker Spill
Unnamed tributary
rm 30.9
14
South San Joaquin Main Canal Spill
rm 29.5
rm 21.9
Unnamed tributary
Unnamed tributary
rm 20.1
15
rm 19.0
Modesto Main Canal
20
rm 16.6
Stanislaus River at Ripon
21
rm 11.2
Lateral Nos. 6 and 8
25
rm 9.9
Stanislaus River at Koetitz Ranch
26
rm 1.6
Lateral Nos. 3 and 7
San Joaquin River
rm 0

STANISLAUS RIVER

Line Number	Explanation for water-budget table
1	11300500 Gaged diversion to South San Joaquin Canal. Not used in computations.
2	11301000 Gaged diversion to Oakdale Canal. Not used in computations.
3	11302000 Gaged flow on Stanislaus River below Goodwin Dam.
4	Ungaged inflow from 13 tributaries. Estimated by using regression equations.
5	Theoretical flow to Stanislaus River at Orange Blossom Bridge, the sum of lines 3 and 4.
6	Loss between Stanislaus River below Goodwin Dam and Stanislaus River at Orange Blossom Bridge, line 5 minus line 7.
7	BO-3175 Gaged flow on Stanislaus River at Orange Blossom Bridge.
8	Ungaged inflow from six tributaries. Estimated by using regression equations.
9	Diversions (DWR). Years 1971-77 estimated the same as the 1961-70 average.
10	Theoretical flow to Stanislaus River at Riverbank, the sum of lines 7 and 8 minus line 9.
11	Loss between Stanislaus River at Orange Blossom Bridge and Stanislaus River at Riverbank, line 10 minus line 12.
12	BO-3145 Gaged flow on Stanislaus River at Riverbank. Years 1967-77 estimated by correlation with Stanislaus River at Ripon.
13	Gaged inflow from Modesto Main Canal at Spenker Spill, Modesto Irrigation District (MoID).
14	Ungaged inflow from South San Joaquin Main Canal. Five hundred acre-ft estimated based on correspondence with South San Joaquin Irrigation District.
15	Gaged inflow from Modesto Main Canal (MoID).
16	Ungaged inflow from four tributaries. Estimated by using regression equations.
17	Diversions (DWR). Years 1971-77 estimated the same as the 1961-70 average.
18	Theoretical flow to Stanislaus River at Ripon, the sum of lines 12 through 16 minus line 17.
19	Loss between Stanislaus River at Riverbank and Stanislaus River at Ripon, line 18 minus line 20.
20	11303000 Gaged flow on Stanislaus River at Ripon.
21	Gaged inflow from Lateral Nos. 6 and 8 (MoID).
22	Diversions (DWR). Years 1971-77 estimated the same as the 1961-70 average.
23	Theoretical flow to Stanislaus River at Koetitz Ranch, the sum of lines 20 and 21 minus line 22.
24	Loss between Stanislaus River at Ripon and Stanislaus River at Koetitz Ranch, line 23 minus line 25.
25	BO-3115 Gaged flow on Stanislaus River at Koetitz Ranch. Years 1961-62 and 1969-70 estimated by correlation with Stanislaus River at Ripon.
26	Gaged inflow from Lateral Nos. 3 and 7 (MoID).
27	Diversions (DWR). Years 1971-77 estimated the same as the 1961-70 average.
28	Theoretical flow to mouth at the San Joaquin River, the sum of lines 25 and 26 minus line 27.

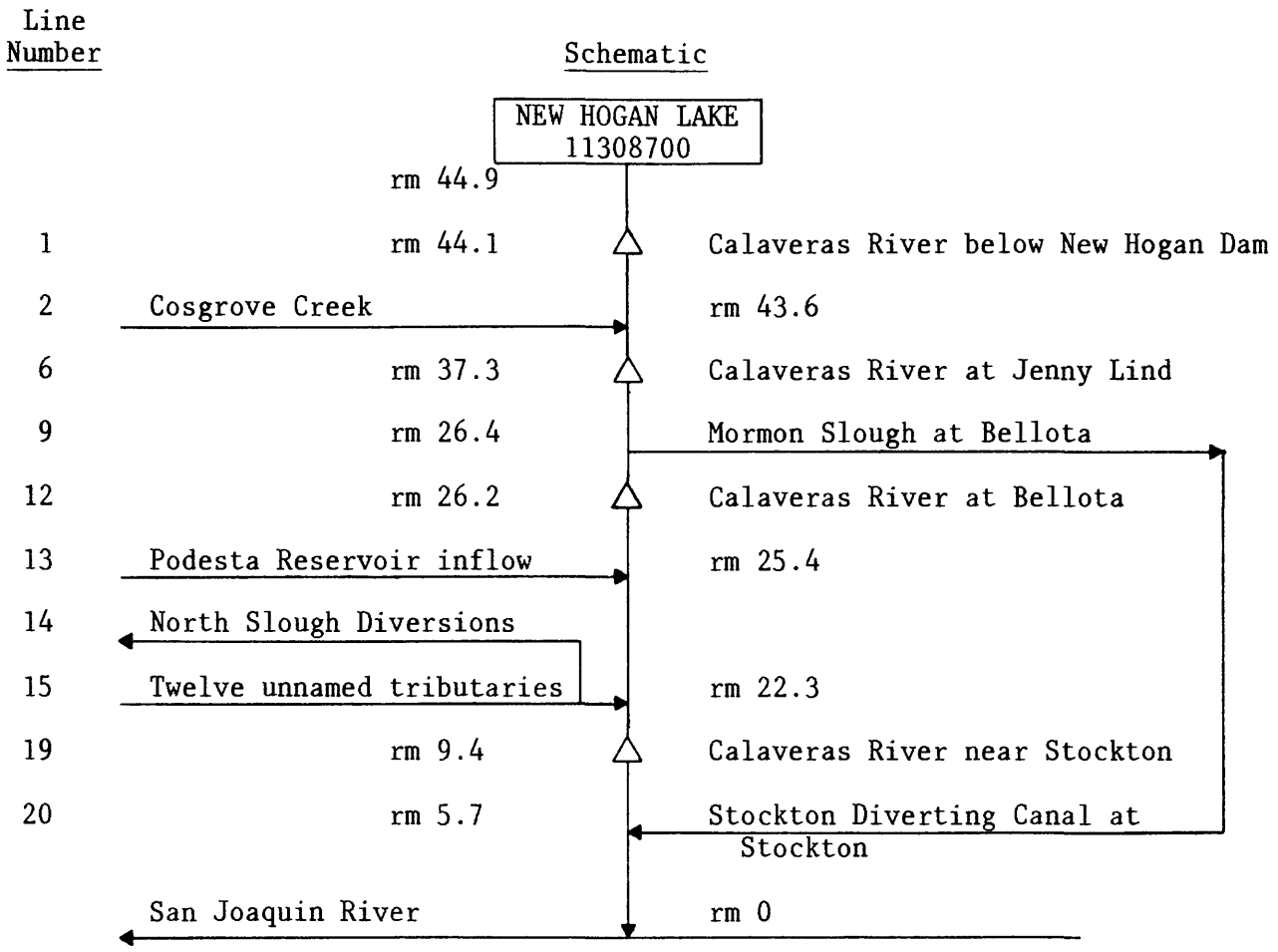
Water budget for Stanislaus River, 1961-77

[Thousands of acre-feet]

LINE	MEAN	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
1	360.8	286.8	420.0	359.8	384.5	386.6	352.2	367.9	355.7	392.3	405.9	432.6	409.5	383.1	384.0	449.9	279.5	82.9
2	158.9	112.9	177.0	153.5	167.6	181.8	164.3	154.0	161.1	182.1	189.8	190.9	179.3	166.1	167.9	186.1	127.3	39.7
3	532.8	17.3	318.5	731.5	115.5	1101.0	272.4	1212.0	158.3	1543.0	722.4	405.2	188.3	675.6	903.1	585.1	103.3	4.7
4	1.8	0.3	1.3	2.3	0.9	3.7	0.9	3.7	0.8	4.4	2.5	1.6	0.9	2.8	2.5	1.8	0.2	0.1
5	534.6	17.6	319.8	733.8	116.4	1104.7	273.3	1215.7	159.1	1547.4	724.9	406.8	189.2	678.4	905.6	586.9	103.5	4.8
6	-40.7	-12.4	-42.8	4.4	-13.9	-13.3	-22.7	-100.3	-26.7	-100.6	-77.4	-56.5	-18.1	-64.3	-76.2	-43.2	-19.1	-8.8
7	575.3	30.0	362.6	729.4	130.3	1118.0	296.0	1316.0	185.8	1648.0	802.3	463.3	207.3	742.7	981.8	630.1	122.6	13.5
8	0.4	0.1	0.3	0.5	0.2	0.8	0.2	0.8	0.2	1.0	0.5	0.3	0.2	0.6	0.5	0.4	0.1	0.0
9	1.5	1.7	1.6	1.1	1.8	1.1	2.0	0.9	1.5	1.6	1.6	1.5	1.5	1.5	1.5	1.5	1.5	1.5
10	574.2	28.4	361.3	728.8	128.7	1117.8	294.2	1315.9	184.5	1647.3	801.3	462.2	206.0	741.8	980.9	629.0	121.2	12.1
11	-3.2	-23.8	-6.8	-30.4	-35.6	-23.2	-48.1	75.9	-35.5	47.3	1.3	-7.8	-29.0	21.8	70.9	9.0	-27.8	-11.9
12	577.4	52.2	368.1	759.2	164.3	1141.0	342.3	1240.0	220.0	1600.0	800.0	470.0	235.0	720.0	910.0	620.0	149.0	24.0
13	0.5	0.0	0.0	0.3	0.0	2.1	0.0	0.6	0.5	3.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
15	7.5	1.5	7.9	10.9	3.0	9.8	4.4	12.8	10.2	12.4	12.5	11.3	3.4	4.2	7.9	10.1	4.2	0.3
16	0.1	0.0	0.1	0.2	0.1	0.3	0.1	0.3	0.1	0.3	0.2	0.1	0.1	0.2	0.2	0.1	0.0	0.0
17	3.6	4.9	4.1	3.3	3.8	2.9	3.5	2.3	3.9	3.0	4.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
18	582.3	49.3	372.5	767.7	164.1	1150.8	343.8	1251.9	227.4	1613.8	809.2	478.3	235.4	721.2	915.0	627.1	150.1	21.2
19	-67.2	-31.7	-34.6	-93.3	-47.8	-41.2	-33.9	-103.1	-40.2	-93.2	-85.0	-72.3	-47.8	-92.6	-135.0	-142.5	-36.2	-11.4
20	649.4	81.0	407.1	861.0	211.9	1192.0	377.7	1355.0	267.6	1707.0	894.2	550.6	283.2	813.8	1050.0	769.6	186.3	32.5
21	8.8	0.6	3.7	6.0	5.4	8.7	6.3	8.6	8.0	15.0	13.6	15.0	6.3	8.5	11.6	13.2	13.7	5.0
22	3.6	5.1	5.3	2.9	4.1	2.6	4.5	2.3	3.6	2.1	3.4	3.6	3.6	3.6	3.6	3.6	3.6	3.6
23	654.6	76.5	405.5	864.1	213.2	1198.2	379.5	1361.3	272.0	1720.0	904.3	562.0	285.9	818.8	1058.0	779.3	196.4	33.9
24	-2.6	-12.6	-19.0	8.9	-0.6	58.2	-16.9	-32.7	-33.3	99.3	50.7	-19.1	-17.4	-37.3	-31.0	-11.3	-22.4	-8.0
25	657.3	89.1	424.5	855.2	213.8	1140.0	396.4	1394.0	305.3	1620.7	853.6	581.1	303.3	856.1	1089.0	790.6	218.8	41.9
26	12.3	2.1	9.7	13.3	9.4	16.3	10.3	14.1	10.9	15.1	15.1	14.9	9.8	12.4	15.9	19.3	15.1	5.3
27	39.6	38.2	40.6	35.8	48.5	35.5	45.0	34.3	39.7	36.6	42.0	39.6	39.6	39.6	39.6	39.6	39.6	39.6
28	629.9	53.0	393.5	832.7	174.7	1120.8	361.8	1373.8	276.5	1599.2	826.7	556.4	273.5	828.9	1065.3	770.3	194.3	7.6

(p. 59 follows)

CALAVERAS RIVER



CALAVERAS RIVER

Explanation for water-budget table

Line Number	
1	11308900 Gaged flow on Calaveras River below New Hogan Dam. Water year 1961 estimated by correlation with the sum of Calaveras River below New Hogan Dam and Cosgrove Creek near Valley Springs versus Calaveras River at Jenny Lind.
2	Inflow from Cosgrove Creek. Computed as the sum of 11309000 Cosgrove Creek near Valley Springs and one ungaged tributary that flows into Cosgrove Creek. Years 1970-77 estimated by correlation with 11308000 North Fork Calaveras River near San Andreas.
3	Ungaged inflow from 26 tributaries. Estimated by using regression equations.
4	Theoretical flow to Calaveras River at Jenny Lind, the sum of lines 1, 2, and 3.
5	Loss between Calaveras River below New Hogan Dam and Calaveras River at Jenny Lind, line 4 minus line 6.
6	11309500 Gaged flow on Calaveras River at Jenny Lind. Years 1967-77 estimated by correlation with the sum of Cosgrove Creek and Calaveras River below New Hogan Dam.
7	Ungaged inflow from nine tributaries. Estimated by using regression equations.
8	Diversions between Calaveras River at Jenny Lind and Calaveras River at Bellota (DWR). Years 1963-77 estimated using the 1962 value.
9	BO-2560 Gaged diversion to Mormon Slough at Bellota. Years 1967-77 estimated by correlation with Stockton Diverting Canal at Stockton.
10	Theoretical flow to Calaveras River at Bellota, the sum of lines 6 and 7 minus lines 8 and 9.
11	Loss between Calaveras River at Jenny Lind and Calaveras River at Bellota, line 10 minus line 12.
12	BO-2555 Gaged flow on Calaveras River at Bellota. Years 1966-77 estimated by correlation with Calaveras River near Stockton.
13	Ungaged inflow from Podesta Reservoir drainage. Estimated by using regression equations.
14	Ungaged diversion to North Slough. Estimated by using regression equations.
15	Ungaged inflow from 12 tributaries. Estimated by using regression equations.
16	Diversions between Calaveras River at Bellota and Calaveras River near Stockton (DWR). Years 1963-77 estimated using the 1962 value.
17	Theoretical flow to Calaveras River near Stockton, the sum of lines 12, 13, and 15 minus lines 14 and 16.
18	Loss between Calaveras River at Bellota and Calaveras River near Stockton, line 17 minus line 19.
19	BO-2520 Gaged flow on Calaveras River near Stockton. Years 1968-69 and 1975 partially estimated.
20	BO-2580 Gaged inflow from Stockton Diverting Canal at Stockton.
21	Diversions between Calaveras River near Stockton and mouth at San Joaquin River (DWR). Years 1971-77 estimated the same as the 1961-70 average.
22	Theoretical flow to mouth at the San Joaquin River, the sum of lines 19 and 20 minus line 21.

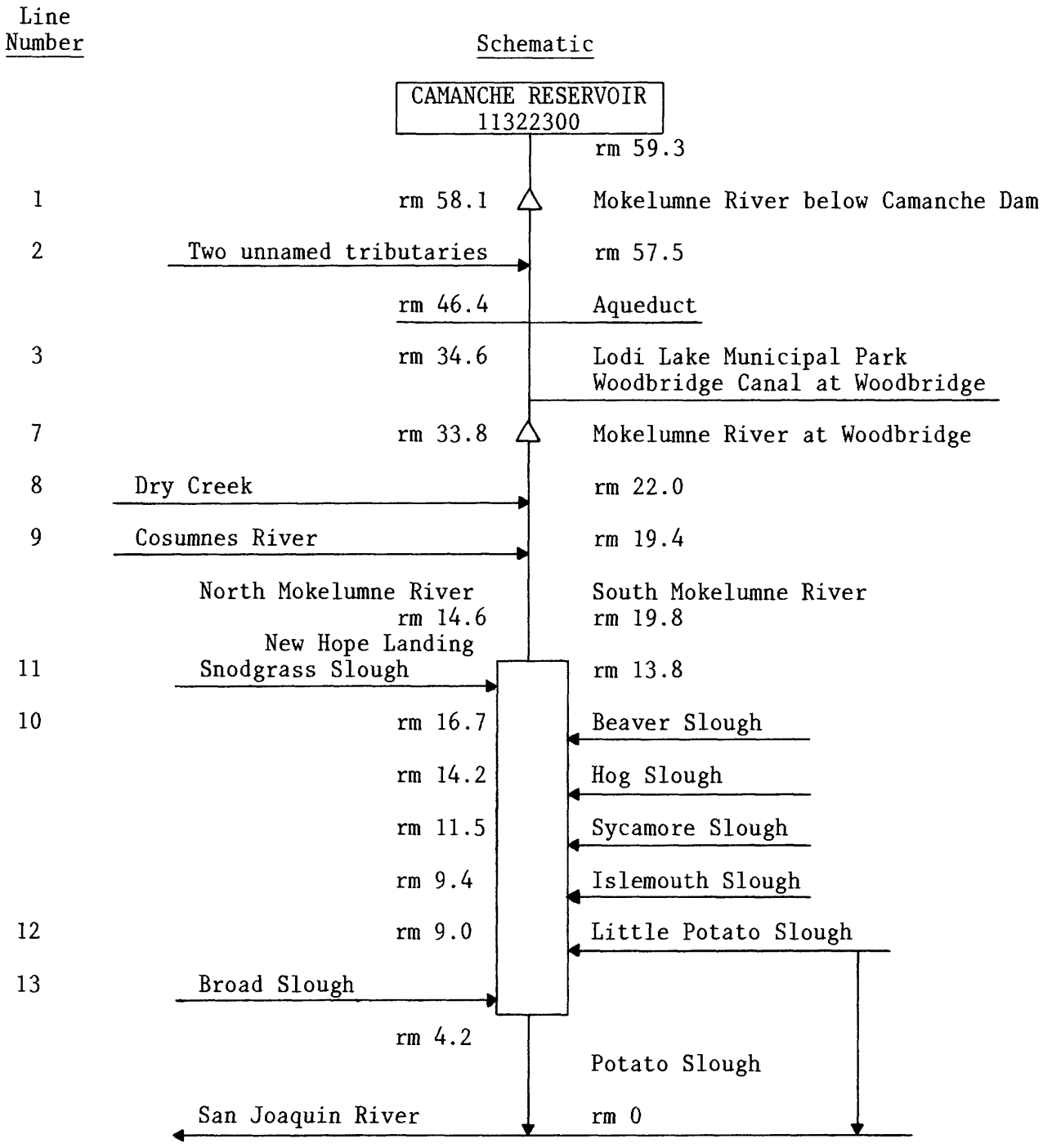
Water budget for Calaveras River, 1961-77

[Thousands of acre-feet]

LINE	MEAN	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
1	134.1	11.3	114.0	151.3	43.9	104.3	80.7	226.9	99.6	350.7	219.8	108.0	75.5	209.1	127.4	214.7	80.5	61.1
2	4.6	0.1	3.6	5.0	1.4	6.9	2.1	11.9	2.1	14.0	6.8	3.3	1.3	8.2	6.6	4.8	0.2	0.0
3	0.6	0.1	0.4	0.7	0.3	1.2	0.3	1.1	0.3	1.4	0.8	0.5	0.3	0.9	0.8	0.6	0.1	0.0
4	139.2	11.5	118.0	157.0	45.6	112.4	83.0	239.9	102.0	366.1	227.4	111.8	77.1	218.2	134.8	220.1	80.8	61.2
5	-1.5	-0.8	-0.5	-2.4	-2.5	0.2	1.5	-3.1	-1.0	-4.9	-0.6	-2.2	-0.9	-0.8	-1.2	-0.9	-2.7	-1.8
6	140.7	12.3	118.5	159.4	48.1	112.2	81.5	243.0	103.0	371.0	228.0	114.0	78.0	219.0	136.0	221.0	83.5	63.0
7	6.7	1.1	4.8	8.5	3.4	13.9	3.3	13.8	3.1	16.3	9.3	5.9	3.2	10.3	9.2	6.7	0.9	0.3
8	2.7	1.4	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
9	101.6	3.5	83.0	105.8	19.9	79.7	31.3	230.0	58.0	359.8	192.2	67.9	12.9	195.0	89.8	187.0	10.0	1.9
10	43.0	8.5	37.6	59.3	28.8	43.6	50.7	24.0	45.3	24.7	42.3	49.2	65.5	31.5	52.6	37.9	71.6	58.6
11	13.7	4.7	16.2	16.4	8.9	-0.4	6.3	-14.0	13.3	-12.3	11.3	24.0	43.2	-0.7	21.4	5.9	46.6	41.8
12	29.4	3.8	21.4	42.8	19.9	44.0	44.4	38.0	32.0	37.0	31.0	25.2	22.3	32.2	31.2	32.0	25.0	16.8
13	0.5	0.1	0.4	0.6	0.3	1.1	0.3	1.1	0.2	1.3	0.7	0.4	0.2	0.8	0.7	0.5	0.1	0.0
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	0.3	0.0	0.2	0.3	0.1	0.5	0.1	0.5	0.1	0.6	0.3	0.2	0.1	0.4	0.3	0.2	0.2	0.1
16	2.8	1.0	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9
17	27.3	2.9	19.0	40.8	17.4	42.6	41.9	36.6	29.4	35.9	29.1	22.9	19.7	30.4	29.3	29.8	22.4	14.0
18	17.7	2.7	7.1	24.1	12.8	28.3	31.9	20.8	18.5	21.9	18.6	16.1	14.4	18.8	18.8	18.8	16.3	11.1
19	9.6	0.1	11.9	16.8	4.6	14.3	10.0	15.8	11.0	14.0	10.5	6.9	5.4	11.6	10.5	11.0	6.1	2.9
20	92.8	1.2	86.7	93.7	10.5	71.9	17.4	217.6	70.3	303.1	169.8	69.9	10.5	181.9	85.3	183.2	4.4	0.5
21	0.6	0.1	0.4	0.1	0.1	0.2	1.2	0.6	1.1	1.1	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
22	101.9	1.3	98.2	110.4	15.0	86.1	26.1	232.8	80.1	316.0	179.8	76.2	15.3	192.9	95.3	193.7	10.0	2.9

(p. 63 follows)

MOKELUMNE RIVER



MOKELUMNE RIVER

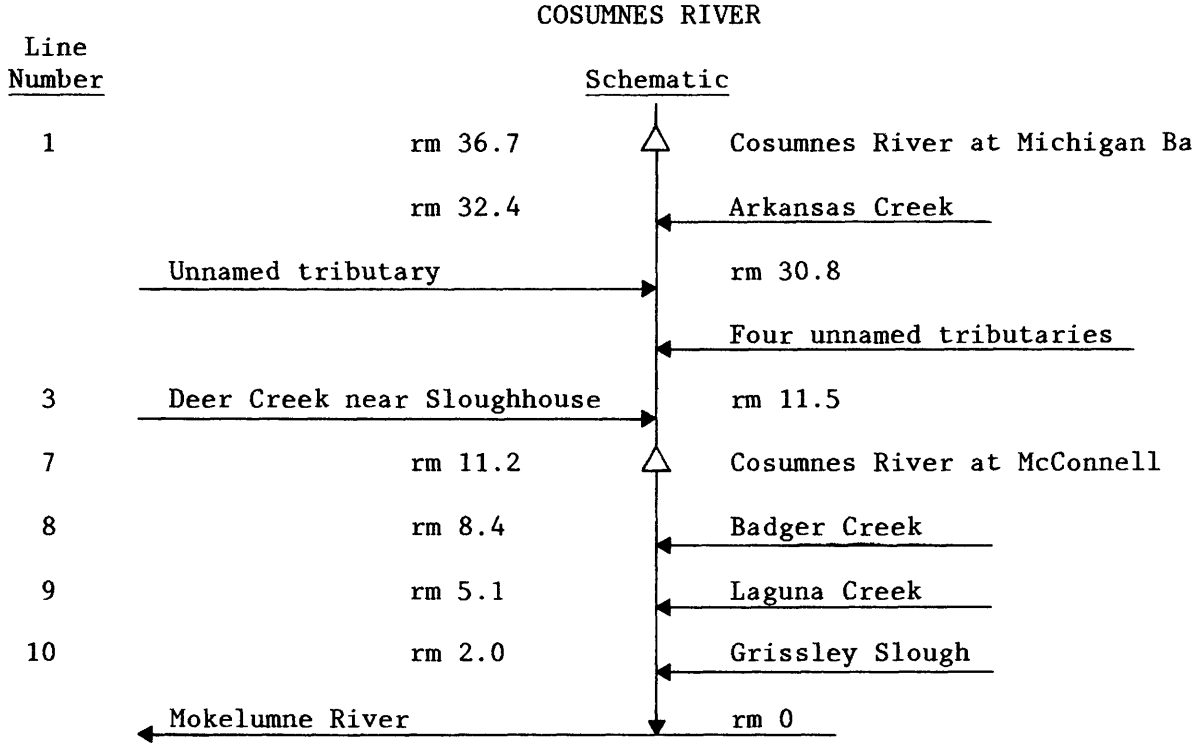
Line Number	Explanation for water-budget table
1	11323500 Gaged flow on Mokelumne River below Camanche Dam.
2	Ungaged inflow from two unnamed tributaries. Estimated by using regression equations.
3	11325000 Gaged diversion to Woodbridge Canal at Woodbridge.
4	Diversions between Mokelumne River below Camanche Dam and Mokelumne River at Woodbridge. Years 1961-75 (DWR). Years 1976-77, East Bay Municipal Utility District (EBMUD). There were negligible diversions to Lodi Lake Municipal Park (rm 34.6) and an aqueduct (rm 46.4).
5	Theoretical flow to Mokelumne River at Woodbridge, the sum of lines 1 and 2 minus lines 3 and 4.
6	Loss between Mokelumne River below Camanche Dam and Mokelumne River at Woodbridge, line 5 minus 7.
7	11325500 Gaged flow on Mokelumne River at Woodbridge.
8	Inflow from Dry Creek. Computed from 11329500 Dry Creek near Galt minus Grissley Slough (refer to Cosumnes River water budget).
9	Cosumnes River inflow (refer to Cosumnes River water budget).
10	Ungaged inflow from four sloughs: Beaver, Hog, Sycamore, and Islemouth. Estimated by using regression equations.
11	Ungaged inflow from Snodgrass Slough. Estimated by using regression equations.
12	Ungaged inflow from Little Potato Slough. Estimated by using regression equations for Potato Slough drainage and assuming half the discharge entered the Mokelumne River.
13	Ungaged inflow from Broad Slough. Estimated by using regression equations.
14	Diversions between Mokelumne River at Woodbridge and at New Hope Landing. Years 1961-75 (DWR). Years 1976-77 (EBMUD). No data available below this point.
15	Theoretical flow to mouth at the San Joaquin River, the sum of lines 7 through 13 minus line 14.

Water budget for Mokelumne River, 1961-77

[Thousands of acre-feet]

LINE	MEAN	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
1	499.7	159.7	388.1	708.8	214.3	724.7	538.8	645.0	347.8	1024.0	680.8	534.9	303.4	517.1	792.3	528.7	252.7	133.3
2	0.2	0.0	0.1	0.2	0.1	0.3	0.1	0.3	0.1	0.4	0.2	0.2	0.1	0.3	0.3	0.1	0.0	0.0
3	97.5	63.0	115.1	103.1	74.3	88.0	108.8	100.3	110.6	108.6	119.7	121.7	109.3	108.7	103.8	99.5	72.3	51.4
4	20.6	15.0	16.2	21.0	21.0	15.9	22.7	19.1	24.6	20.4	24.2	23.2	25.4	21.9	21.9	22.3	18.2	16.7
5	381.7	81.7	256.9	585.0	119.1	621.0	407.4	525.9	212.7	895.3	537.1	390.2	168.8	386.9	666.9	407.1	162.2	65.2
6	48.0	27.3	38.0	22.4	29.3	45.3	55.8	71.5	43.1	97.5	49.5	54.7	50.3	49.9	50.8	44.1	36.6	49.4
7	333.8	54.5	218.9	562.6	89.8	575.7	351.6	454.4	169.6	797.8	487.6	335.5	118.5	337.0	616.1	363.0	125.6	15.8
8	11.9	1.3	5.9	13.8	10.3	15.6	9.2	24.6	13.7	17.2	15.5	15.8	8.7	15.2	20.7	13.8	0.8	0.0
9	418.0	42.1	275.2	568.7	154.8	851.5	185.3	815.2	182.1	980.8	558.6	407.8	176.7	690.7	734.8	456.2	29.3	-4.4
10	2.2	0.4	1.6	3.0	1.0	4.0	1.2	4.2	0.9	5.0	2.8	2.4	0.7	4.3	4.2	1.8	0.2	0.0
11	1.9	0.3	1.4	2.7	0.9	3.5	1.1	3.6	0.8	4.3	2.4	2.1	0.6	3.7	3.7	1.6	0.2	0.0
12	2.4	0.4	1.7	3.3	1.1	4.3	1.3	4.5	1.0	5.4	3.0	2.7	0.8	4.6	4.6	2.0	0.2	0.0
13	0.2	0.0	0.2	0.3	0.1	0.4	0.1	0.4	0.1	0.5	0.3	0.3	0.1	0.4	0.4	0.2	0.0	0.0
14	11.6	10.1	9.8	8.8	12.0	10.0	13.8	11.3	15.8	13.7	14.0	13.2	15.1	12.5	12.7	12.9	6.4	4.7
15	758.9	89.0	495.1	1145.6	245.8	1444.9	536.1	1295.8	352.5	1797.3	1056.2	753.5	291.1	1043.4	1371.8	825.8	150.0	6.9

COSUMNES RIVER



Line Number

Explanation for water-budget table

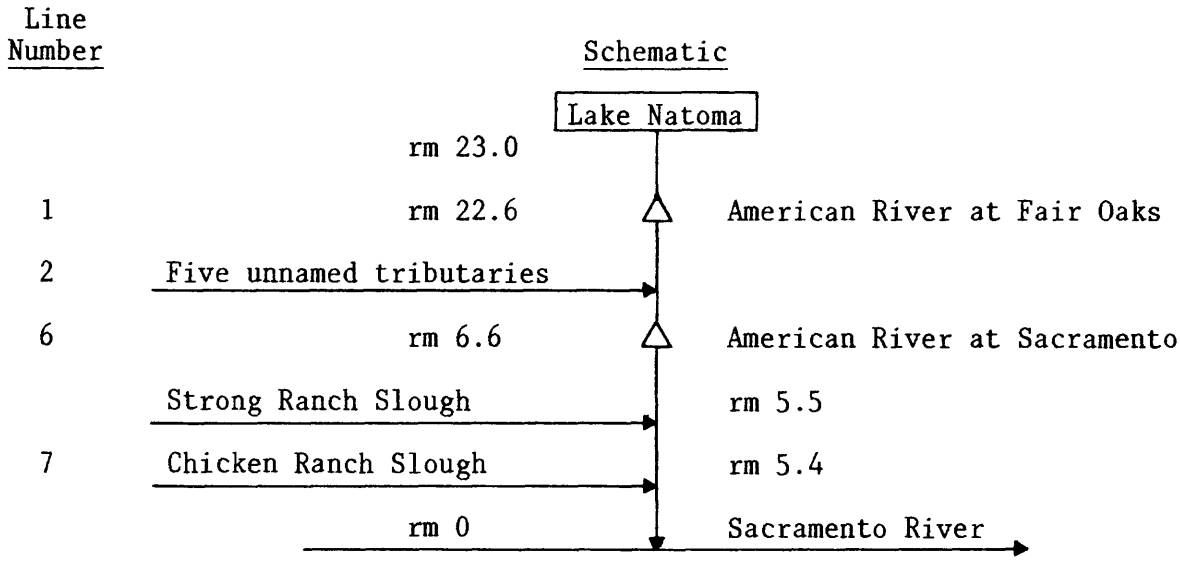
1 11335000 Gaged flow on Cosumnes River at Michigan Bar.
2 Ungaged inflow from seven tributaries. Estimated by using regression equations.
3 11335700, BO-1580 Gaged inflow from Deer Creek near Sloughhouse. Water year 1967 estimated by correlation with 11312000 Bear Creek near Lockeford.
4 Diversions between Cosumnes River at Michigan Bar and Cosumnes River at McConnell. Years 1961-62 (DWR), 1963-77 estimated the same as 1962.
5 Theoretical flow to line 7, the sum of lines 1, 2, and 3 minus line 4.
6 Loss between Cosumnes River at Michigan Bar and Cosumnes River at McConnell. There are about 123 mi^2 of drainage of which no estimate was made. This drainage area contributes to the negative loss (gain) in flow, especially in wet years.
7 11336000 Gaged flow on Cosumnes River at McConnell.
8 Ungaged inflow from Badger Creek, estimated by using regression equations.
9 Ungaged inflow from Laguna Creek, estimated by using regression equations.
10 Ungaged inflow from Grissley Slough, estimated assuming daily discharge equal to that for 11329500 Dry Creek near Galt minus 50 ft^3/s. Assumed zero when Dry Creek less than 50 ft^3/s.
11 Diversions between Cosumnes River at McConnell and mouth at Mokelumne River. Years 1961-62 (DWR), 1963-77 estimated the same as 1962.
12 Theoretical flow to mouth at the Mokelumne River, the sum of lines 7, 8, 9, and 10 minus line 11.

Water budget for Consumnes River, 1961-77

[Thousands of acre-feet]

LINE	MEAN	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
1	324.9	54.9	210.9	453.9	143.2	655.9	167.9	601.2	169.7	679.9	448.6	332.0	182.6	441.9	544.9	364.5	54.9	15.8
2	2.2	0.4	1.6	3.0	0.9	3.9	1.2	4.2	0.9	4.8	2.7	2.4	0.7	4.1	4.1	1.8	0.2	0.0
3	19.4	3.4	13.9	26.4	8.5	34.5	10.4	37.9	8.0	43.1	24.3	21.2	6.4	36.9	36.5	16.0	1.9	0.3
4	9.8	9.3	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8
5	336.7	49.5	216.6	473.4	142.9	684.4	169.7	633.6	168.8	718.0	465.8	345.8	179.9	473.2	575.7	372.5	47.2	6.3
6	2.5	6.0	-7.7	14.9	7.7	20.4	8.8	-10.7	15.6	-33.3	20.6	-1.0	17.8	-37.0	-10.9	12.0	14.3	5.5
7	334.1	43.5	224.3	458.5	135.2	664.0	160.9	644.3	153.2	751.3	445.2	346.8	162.1	510.2	586.6	360.5	32.9	0.8
8	2.8	0.5	2.0	3.8	1.2	5.0	1.5	5.5	1.2	6.2	3.5	3.0	0.9	5.3	5.2	2.3	0.3	0.0
9	16.8	3.0	12.1	23.0	7.4	29.9	9.1	33.0	7.0	37.4	21.1	18.4	5.6	32.1	31.7	13.9	1.7	0.3
10	69.7	0.3	42.3	88.9	16.6	158.1	19.4	138.1	26.3	191.4	94.3	45.1	13.7	148.6	116.8	85.1	0.0	0.0
11	5.5	5.2	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
12	418.0	42.1	275.2	568.7	154.8	851.5	185.3	815.2	182.1	980.8	558.6	407.8	176.7	690.7	734.8	456.2	29.3	-4.4

AMERICAN RIVER



Line Number

Explanation for water-budget table

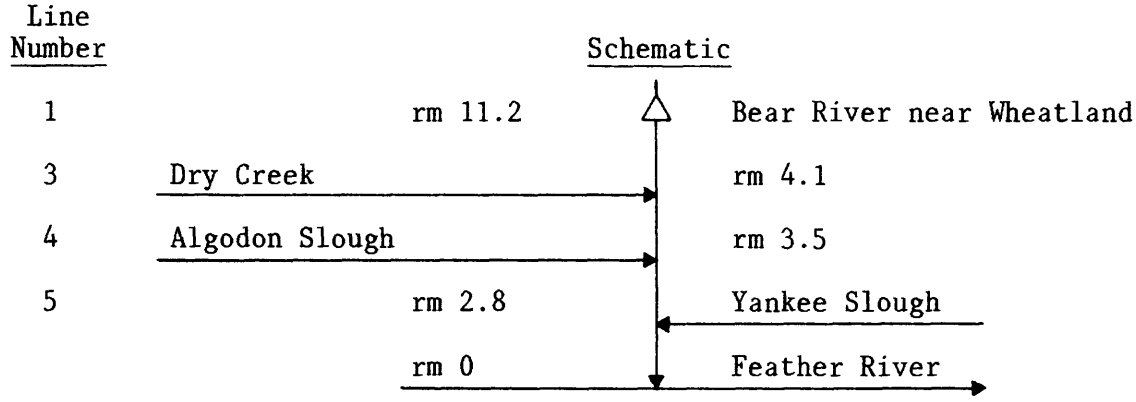
1 11446500 Gaged flow on American River at Fair Oaks.
2 Ungaged inflow from five tributaries, estimated by using regression equations.
3 Diversions between American River at Fair Oaks and American River at Sacramento. Years 1961-70 (DWR), 1971-77 estimated the same as the 1961-70 average.
4 Theoretical flow to American River at Sacramento, the sum of lines 1 and 2 minus line 3.
5 Loss between American River at Fair Oaks and American River at Sacramento, line 4 minus line 6.
6 AO-7140 Gaged flow at American River at Sacramento. Years 1962-69, (DWR, 1974) and Will Nashima, (Sacramento County, oral commun., 1982). Years 1961, 1970-77 estimated by using the 1962-69 correlation with American River at Fair Oaks.
7 Ungaged inflow from Strong Ranch and Chicken Ranch Sloughs. Estimated by using regression equations.
8 Diversions between American River at Sacramento and mouth at Sacramento River. Years 1961-70 (DWR), 1971-77 estimated the same as the 1961-70 average.
9 Theoretical flow to mouth at the Sacramento River, the sum of lines 6 and 7 minus line 8.

Water budget for American River, 1961-77

[Thousands of acre-feet]

LINE	MEAN	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
1	2612.6	1198.0	2028.0	3299.0	1736.0	4200.0	1380.0	3796.0	2009.0	4222.0	3613.0	2905.0	2040.0	2964.0	4357.0	2704.0	1400.0	563.5
2	1.0	0.4	1.0	1.4	0.5	1.2	0.6	1.7	0.6	2.4	1.2	1.0	0.6	1.9	1.3	0.9	0.4	0.3
3	34.6	8.6	9.3	7.7	27.6	41.8	43.5	40.6	43.3	41.6	44.6	40.0	40.0	40.0	40.0	40.0	40.0	40.0
4	2579.0	1189.9	2019.7	3292.7	1709.0	4159.5	1337.1	3757.1	1966.3	4182.8	3569.6	2865.9	2000.5	2925.9	4318.3	2664.9	1360.4	523.7
5	381.8	299.9	175.7	368.7	212.0	411.5	251.1	486.1	423.3	693.8	469.6	415.9	340.5	425.9	618.3	394.9	280.4	223.7
6	2197.2	890.0	1844.0	2924.0	1497.0	3748.0	1086.0	3271.0	1543.0	3489.0	3100.0	2450.0	1660.0	2500.0	3700.0	2270.0	1080.0	300.0
7	1.5	0.6	1.4	2.0	0.8	1.7	0.9	2.4	0.8	3.4	1.7	1.4	0.8	2.7	1.8	1.3	0.6	0.4
8	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	2198.6	890.5	1845.3	2926.0	1497.7	3749.7	1086.8	3273.4	1543.8	3492.4	3101.7	2451.3	1660.8	2502.6	3701.8	2271.3	1080.6	300.3

BEAR RIVER


Line Number
Schematic
1
rm 11.2
Bear River near Wheatland
3
Dry Creek
rm 4.1
4
Algodon Slough
rm 3.5
5
rm 2.8
Yankee Slough
rm 0
Feather River

BEAR RIVER

Line Number

Explanation for water-budget table

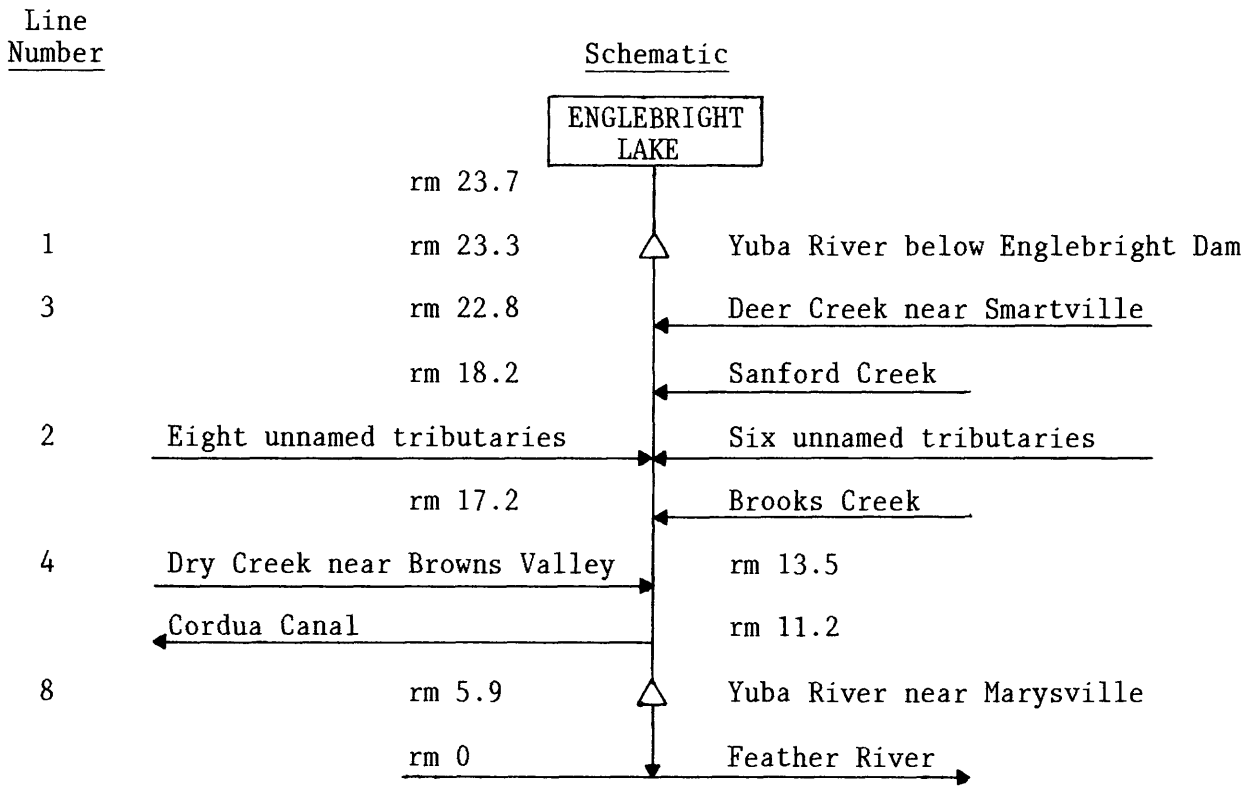
1 11424000 Gaged flow on Bear River near Wheatland.
2 Diversions between Bear River near Wheatland and mouth. Years 1961-69 (DWR), 1970-77 diversions not measured, assume zero.
3 11424500 Inflow from Dry Creek near Wheatland. Years 1963-77 estimated by correlation with Bear River near Wheatland.
4 Ungaged inflow from Algodon Slough, estimated by using regression equations.
5 Ungaged inflow from Yankee Slough, estimated by using regression equations.
6 Theoretical flow to mouth at the Feather River, the sum of lines 1, 3, 4, and 5 minus line 2.

Water budget for Bear River, 1961-77

[Thousands of acre-feet]

LINE	MEAN	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
1	269.4	57.8	225.1	473.6	64.6	364.4	104.7	414.2	142.0	502.7	433.9	390.3	126.4	414.5	611.8	223.0	28.9	2.5
2	0.2	0.8	0.5	0.3	0.8	0.3	0.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	51.1	13.6	35.6	70.0	18.0	51.0	27.0	84.0	25.0	105.0	77.0	83.0	27.0	84.0	115.0	50.0	3.8	0.2
4	20.8	5.9	19.3	34.7	10.8	30.0	9.8	33.0	13.8	41.8	28.0	18.9	7.5	31.9	44.6	20.2	2.9	1.0
5	2.4	0.7	2.2	3.9	1.2	3.4	1.1	3.8	1.6	4.7	3.2	2.1	0.8	3.6	5.1	2.3	0.3	0.1
6	343.6	77.2	281.6	581.8	93.8	448.5	142.2	534.7	182.4	654.2	542.1	494.3	161.7	534.0	776.5	295.5	35.9	3.9

YUBA RIVER


Line Number
Schematic
ENGLEBRIGHT LAKE
rm 23.7
1
rm 23.3
Yuba River below Englebright Dam
3
rm 22.8
Deer Creek near Smartville
rm 18.2
Sanford Creek
2
Eight unnamed tributaries
Six unnamed tributaries
rm 17.2
Brooks Creek
4
Dry Creek near Browns Valley
rm 13.5
Cordua Canal
rm 11.2
8
rm 5.9
Yuba River near Marysville
rm 0
Feather River

Line Number

Explanation for water-budget table

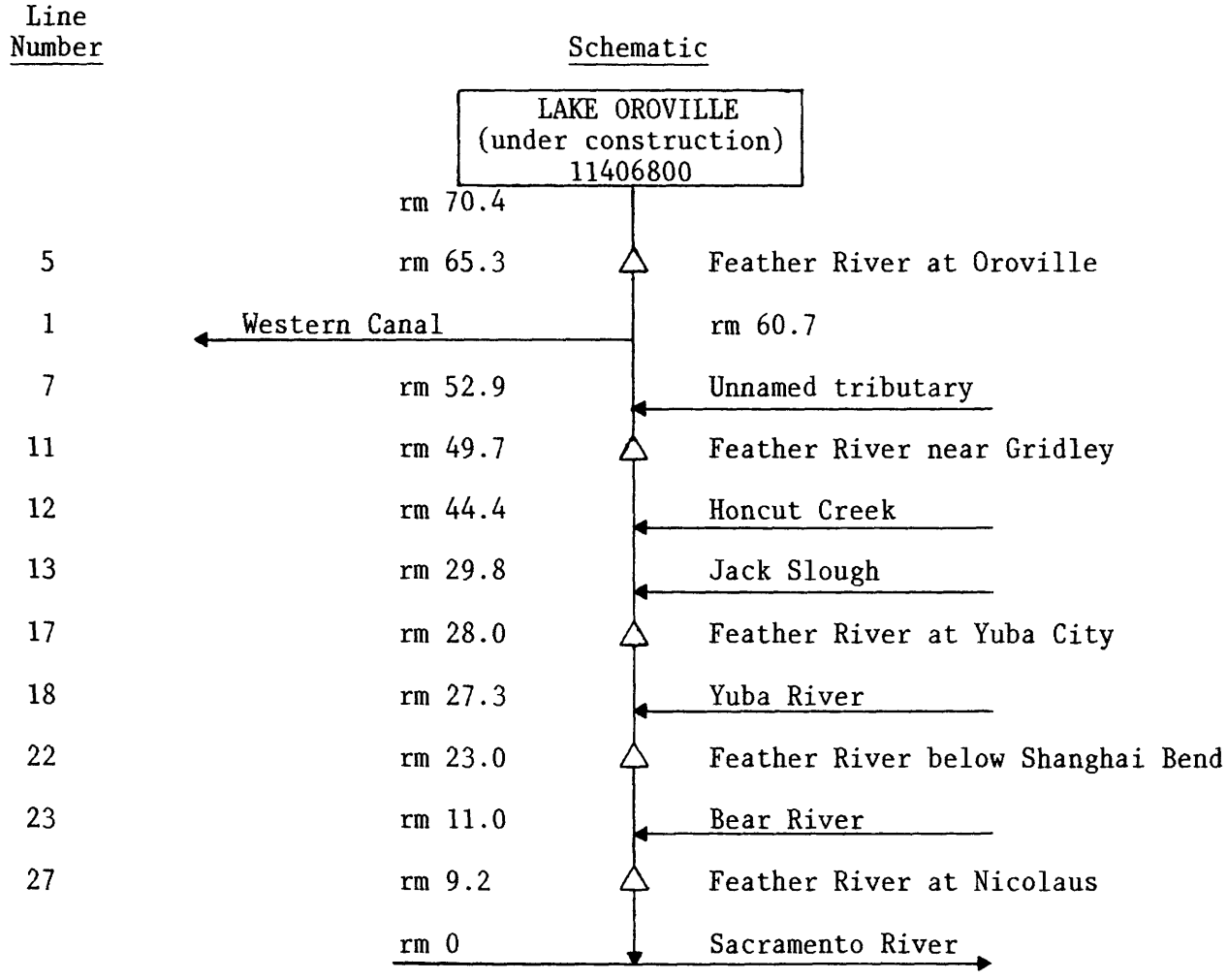
1 11418000 Gaged flow on Yuba River below Englebright Dam.
2 Ungaged inflow from 16 tributaries. Estimated by using regression equations.
3 11418500 Gaged inflow from Deer Creek near Smartville.
4 11420700 Gaged inflow from Dry Creek near Browns Valley. Water year 1961 used flow at 11420500, Dry Creek at Virginia Ranch. Years 1962-64 estimated by correlation with Deer Creek near Smartville.
5 Diversions between Yuba River below Englebright Dam and Yuba River near Marysville. Years 1961-75 (DWR). Years 1976-77 estimated based on monthly values and a comparison with the previous years trend.
6 Theoretical flow to Yuba River near Marysville, the sum of lines 1, 2, 3, and 4 minus line 5.
7 Loss between Yuba River below Englebright Dam and Yuba River near Marysville, line 6 minus line 8. The average gain of about 49,000 acre-ft/yr was caused by the inflow from 50.5 mi^2 that was not included in the computations of ungaged inflow.
8 11421000 Gaged flow on Yuba River near Marysville.
9 Diversions between Yuba River near Marysville and mouth at Feather River. Years 1961-69 (DWR), 1970-75 estimated as 3,400 acre-ft based on 1961-69 average, 1976 and 1977 based on correspondence with DWR.
10 Theoretical flow to mouth at the Feather River, line 8 minus line 9.

Water budget for Yuba River, 1961-77

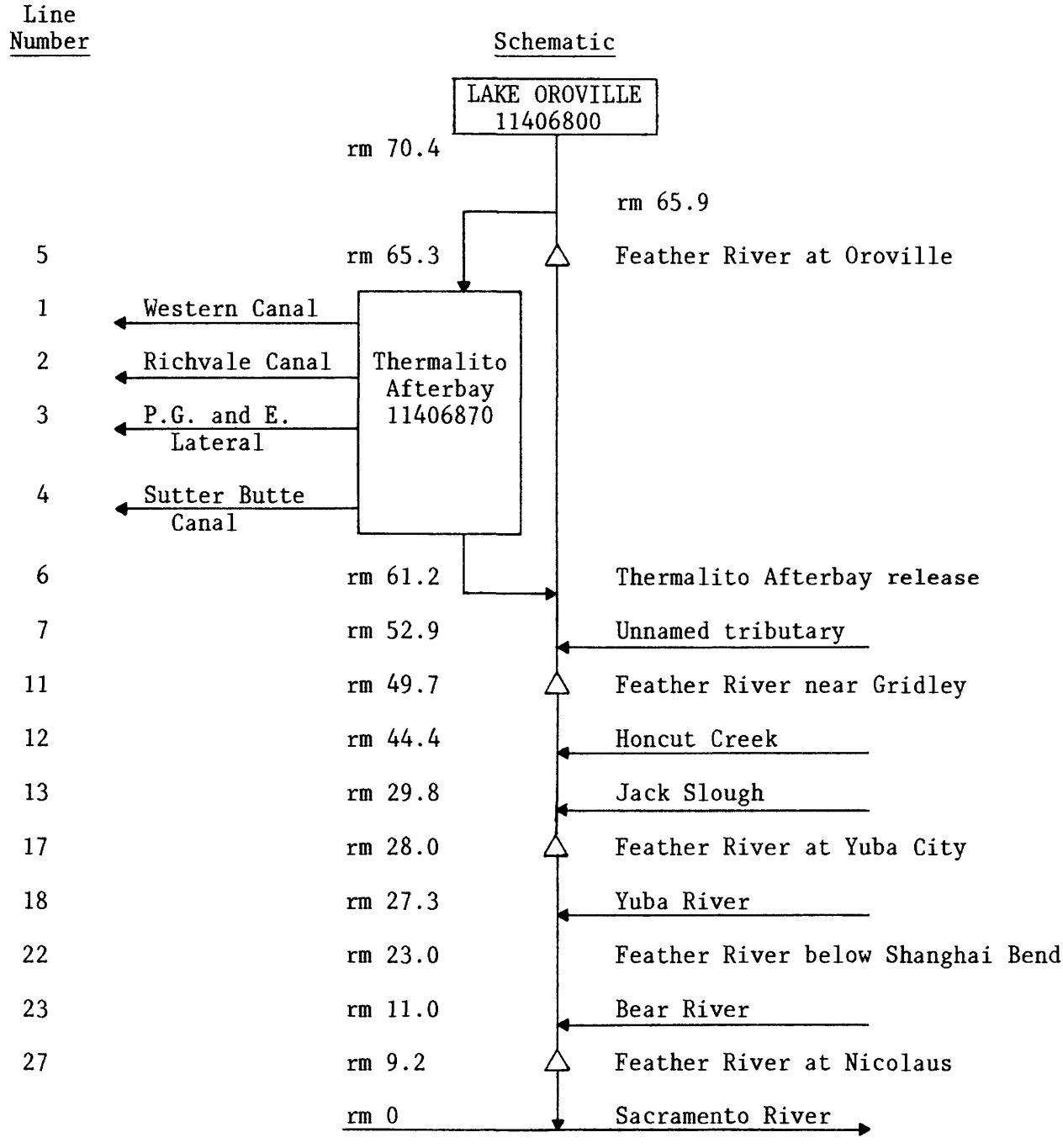
[Thousands of acre-feet]

LINE	MEAN	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
1	1710.8	768.3	1413.0	2685.0	987.4	3228.0	959.8	2525.0	1030.0	2309.0	2042.0	2147.0	1147.0	1861.0	3045.0	1839.0	797.9	299.8
2	1.1	0.3	1.0	1.9	0.6	1.6	0.5	1.8	0.7	2.3	1.5	1.0	0.4	1.7	2.4	1.1	0.2	0.1
3	79.2	22.3	73.5	132.0	40.9	114.0	37.2	125.1	52.5	158.8	106.5	71.6	28.5	120.9	169.7	77.1	11.1	4.0
4	56.7	24.2	65.0	115.0	39.0	55.8	19.9	80.6	19.2	110.9	87.4	52.6	5.8	92.8	138.1	51.8	3.9	1.8
5	188.3	175.0	197.4	163.0	188.0	176.9	201.6	168.9	272.0	200.5	210.1	195.0	219.4	164.9	163.0	172.9	161.5	171.4
6	1659.5	640.1	1355.1	2770.8	879.9	3222.5	815.8	2563.6	830.5	2380.4	2027.3	2077.2	962.3	1911.6	3192.2	1796.1	651.5	134.1
7	-49.0	1.3	-37.9	47.8	27.2	-42.5	-23.5	-112.4	-187.5	-218.5	-99.7	2.2	-34.1	-15.4	-80.8	-31.9	5.1	-31.5
8	1708.4	638.8	1393.0	2723.0	852.7	3265.0	839.3	2676.0	1018.0	2599.0	2127.0	2075.0	996.4	1927.0	3273.0	1828.0	646.4	165.6
9	3.5	5.2	4.9	2.6	3.4	3.3	4.0	2.4	2.6	2.5	3.4	3.4	3.4	3.4	3.4	3.4	3.7	4.5
10	1704.9	633.6	1388.1	2720.4	849.3	3261.7	835.3	2673.6	1015.4	2596.5	2123.6	2071.6	993.0	1923.6	3269.6	1824.6	642.7	161.1

FEATHER RIVER
(1961-67)



FEATHER RIVER
(1968-77)



FEATHER RIVER

Line Number	Explanation for water-budget table
1	11406880, AO-5984 Gaged diversion to Western Canal at intake. Prior to 1968 station was located at rm 60.7 and was included in the diversions on line 8.
2	11406890, AO-5982 Gaged diversion to Richvale Canal outlet. Flow began in April 1968.
3	11406900, AO-5979 Gaged diversion to Pacific Gas and Electric Company Lateral at intake. Flow began in April 1968.
4	11406910, AO-5977 Gaged diversion to Sutter Butte Canal at intake. Diversion began at Thermalito Afterbay in November 1967. Prior to the 1968 water year, the flow was included in the joint water districts diversion.
5	11407000, AO-5191 Gaged flow on Feather River at Oroville. Includes diversion for fish hatchery.
6	11406920, AO-5975 Gaged inflow from Thermalito Afterbay release to Feather River.
7	Ungaged inflow from one tributary. Estimated using regression equations.
8	Diversions between Feather River at Oroville and Feather River near Gridley. Years 1961-69 (DWR), 1970-75 estimated assuming diversions are equal to 1961-69 average, 1976-77 partially estimated.
9	Theoretical flow to Feather River near Gridley, the sum of lines 5, 6, and 7 minus line 8.
10	Loss between Feather River at Oroville and Feather River near Gridley, line 9 minus line 11. There are about 50 mi^2 of drainage area for which no estimate of inflow was made. This drainage area contributes to the negative loss (gain) in flow.
11	11407150, AO-5165 Gaged flow on Feather River near Gridley.
12	Inflow from Honcut Creek. Computed as the sum of 11407300, AO-5735 North Honcut Creek near Bangor except 1963 estimated by correlation with 11407500 South Honcut Creek near Bangor, and ungaged inflow of 133.3 mi^2 on Honcut Creek between Honcut Creek gages and mouth at Feather River estimated by regression computations with comparison to South Honcut Creek gage. The above "sum of" refers to North Honcut Creek plus South Honcut Creek plus ungaged flow from 133 mi^2.
13	Inflow from Jack Slough. Estimated by regression computations with comparison to South Honcut Creek gage.
14	Diversions between Feather River at Gridley and Feather River at Yuba City (DWR). During years 1970-75, many values were estimated based on 1961-69 data.
15	Theoretical flow to Feather River at Yuba City, the sum of lines 11, 12, and 13 minus line 14.
16	Loss between Feather River at Gridley and Feather River at Yuba City, line 15 minus line 17. There are about 33 mi^2 of drainage area for which no estimate of inflow was made. Large negative values indicate significant irrigation-return flow.

Water budget for Feather River, 1961-77

[Thousands of acre-feet]

LINE	MEAN	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
1	217.9	-	-	-	-	-	-	-	234.7	186.9	183.6	183.5	207.3	196.4	203.6	282.9	238.4	261.8
2	81.1	-	-	-	-	-	-	-	63.6	68.4	64.5	77.1	73.1	104.9	105.9	100.8	94.7	58.0
3	3.4	-	-	-	-	-	-	-	2.8	3.4	3.0	3.2	3.1	3.0	3.3	4.0	3.9	3.7
4	478.4	-	-	-	-	-	-	-	523.1	495.0	475.9	480.8	502.4	457.2	479.3	519.9	555.4	295.4
5	674.0	2323.0	3259.0	5673.0	2349.0	6449.0	2844.0	5739.0	551.7	963.2	1737.0	354.1	300.8	491.1	1367.0	388.9	293.2	293.1
6	2798.8	-	-	-	-	-	-	-	311.6	3544.0	3571.0	4171.0	2035.0	2908.0	6066.0	2821.0	1760.0	800.4
7	0.3	0.1	0.2	0.5	0.1	0.3	0.1	0.4	0.2	0.5	0.4	0.3	0.1	0.4	0.5	0.3	0.0	0.0
8	2.4	676.4	728.6	601.5	700.5	708.4	733.4	636.5	2.7	2.6	2.1	2.1	2.1	2.1	2.1	2.1	3.3	2.4
9	3444.7	1646.6	2530.6	5072.0	1648.6	5740.9	2110.8	5102.9	860.7	4505.1	5306.3	4523.2	2333.7	3397.4	7431.4	3208.0	2049.9	1091.1
10	-10.9	71.6	26.6	-7.0	5.6	31.9	-24.2	-19.1	5.7	-106.9	-64.7	-51.8	-23.3	-72.6	-78.6	-45.0	84.9	82.1
11	3455.5	1575.0	2504.0	5079.0	1643.0	5709.0	2135.0	5122.0	855.0	4612.0	5371.0	4575.0	2357.0	3470.0	7510.0	3253.0	1965.0	1009.0
12	85.4	35.9	75.2	161.4	37.5	100.8	37.8	134.6	51.0	151.1	136.7	83.5	19.8	148.5	165.5	90.5	12.4	9.0
13	9.3	3.5	8.5	17.5	4.2	11.3	4.0	14.0	5.4	16.5	14.0	9.5	2.3	15.7	19.0	9.9	1.3	1.0
14	42.0	26.0	43.2	30.8	38.7	43.6	56.0	27.0	60.7	47.0	41.1	35.7	55.4	57.0	41.7	34.8	35.0	40.7
15	3508.2	1588.4	2544.6	5227.1	1646.1	5777.5	2120.8	5243.6	850.8	4732.6	5480.6	4632.4	2323.8	3577.2	7652.8	3318.5	1943.7	978.3
16	-178.2	-311.6	-165.4	-261.9	-53.9	-353.5	99.8	-341.4	-278.2	-169.4	-106.4	-176.6	-127.2	-231.8	-295.2	-179.5	-55.3	-21.7

NOTE: The mean for lines 1-6 and 8 is a 10-year average.

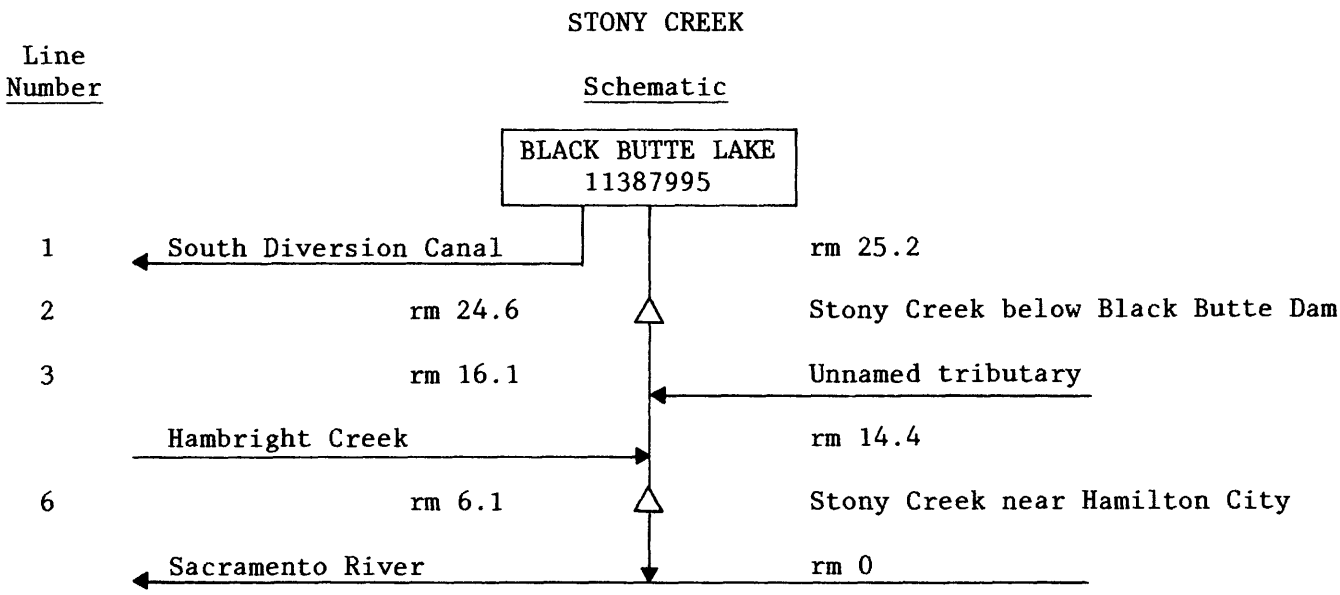
FEATHER RIVER--Continued

17 11407700, AO-5135 Gaged flow on Feather River at Yuba City. Water year 1977 estimated by correlation with Feather River below Shanghai Bend.
18 Yuba River inflow (refer to Yuba River water budget).
19 Diversions between Feather River at Yuba City and Feather River below Shanghai Bend (DWR), 1961-62 and 1970-75 estimated based on 1963-69 data.
20 Theoretical flow to Feather River below Shanghai Bend, the sum of lines 17 and 18 minus line 19.
21 Loss between Feather River at Yuba City and Feather River below Shanghai Bend, line 20 minus line 22.
22 11421700, AO-5120 Gaged flow on Feather River below Shanghai Bend.
23 Bear River inflow (refer to Bear River water budget).
24 Diversions between Feather River below Shanghai Bend and Feather River at Nicolaus. Years 1961-69 (DWR), 1970-75 major diversions from DWR, minor diversions estimated based on the 1961-69 average, 1976-77 partially estimated with significant diversions furnished by DWR.
25 Theoretical flow to Feather River at Nicolaus, the sum of lines 22 and 23 minus line 24.
26 Loss between Feather River below Shanghai Bend and Feather River at Nicolaus, line 25 minus line 27.
27 11425000 Gaged flow on Feather River at Nicolaus.
28 Diversions between Feather River at Nicolaus and mouth at Sacramento River. Years 1961-69 (DWR), 1970-75 estimated same as 1961-69 average, 1976-77 partially estimated with most significant diversions furnished by DWR.
29 Theoretical flow to mouth of Feather River, line 27 minus line 28.

Water budget for Feather River, 1961-77--Continued

17	3686.4	1900.0	2710.0	5489.0	1700.0	6131.0	2021.0	5585.0	1129.0	4902.0	5587.0	4809.0	2451.0	3809.0	7948.0	3498.0	1999.0	1000.0
18	1704.9	633.6	1388.1	2720.4	849.3	3261.7	835.3	2673.6	1015.4	2596.5	2123.6	2071.6	993.0	1923.6	3269.6	1824.6	642.7	161.1
19	0.7	0.4	0.4	0.3	0.5	0.4	0.5	0.4	0.8	0.5	0.6	0.6	0.6	0.6	0.6	0.6	1.1	1.8
20	5390.6	2533.2	4097.6	8209.1	2548.8	9392.3	2855.8	8258.2	2143.5	7498.0	7709.9	6879.9	3443.3	5731.9	11217.0	5321.9	2640.5	1159.3
21	-3.9	11.2	-25.4	-130.9	-94.2	296.3	-268.2	86.2	165.5	121.0	-5.0	-6.0	-3.6	-4.0	86.9	-161.0	-93.5	-40.7
22	5394.5	2522.0	4123.0	8340.0	2643.0	9096.0	3124.0	8172.0	1978.0	7377.0	7715.0	6886.0	3447.0	5736.0	11130.0	5483.0	2734.0	1200.0
23	343.6	77.2	281.6	581.8	93.8	448.5	142.2	534.7	182.4	654.2	542.1	494.3	161.7	534.0	776.5	295.5	35.9	3.9
24	56.6	44.4	46.0	36.2	47.8	53.9	63.0	49.4	63.2	56.4	56.6	56.8	67.4	58.7	62.1	71.0	84.1	44.6
25	5681.4	2554.7	4358.6	8885.6	2689.0	9490.6	3203.2	8657.3	2097.2	7974.8	8200.6	7323.5	3541.4	6211.3	11844.4	5707.6	2685.8	1159.2
26	-185.6	-16.3	-29.4	-265.4	-50.0	-130.4	-57.8	-290.7	-91.8	-484.2	-621.4	-122.5	-132.6	-275.7	-625.6	187.6	-75.2	-73.8
27	5867.1	2571.0	4388.0	9151.0	2739.0	9621.0	3261.0	8948.0	2189.0	8459.0	8822.0	7446.0	3674.0	6487.0	12470.0	5520.0	2761.0	1233.0
28	9.8	8.1	8.2	6.9	12.3	8.9	12.0	9.1	9.9	8.7	9.4	9.4	9.4	9.4	9.4	9.4	12.7	13.4
29	5857.3	2562.9	4379.8	9144.1	2726.7	9612.1	3249.0	8938.9	2179.1	8450.3	8812.6	7436.6	3664.6	6477.6	12460.6	5510.6	2748.3	1219.6

STONY CREEK


Line Number
Schematic
BLACK BUTTE LAKE
11387995
1
South Diversion Canal
rm 25.2
2
rm 24.6
Stony Creek below Black Butte Dam
3
rm 16.1
Unnamed tributary
Hambright Creek
rm 14.4
6
rm 6.1
Stony Creek near Hamilton City
Sacramento River
rm 0

Line Number

Explanation for water-budget table

1 11387990 Gaged diversion to South Diversion Canal near Orland. Not used in computations.

2 11388000 Gaged flow on Stony Creek below Black Butte Dam.

3 Ungaged inflow from Hambright Creek and one small unnamed tributary, estimated by using regression equations. Inflow from the remaining 13.1 mi^2 was not estimated.

4 Theoretical flow to Stony Creek near Hamilton City, the sum of lines 2 and 3, assuming negligible diversions.

5 Loss between Stony Creek below Black Butte Dam and Stony Creek near Hamilton City, line 4 minus line 6.

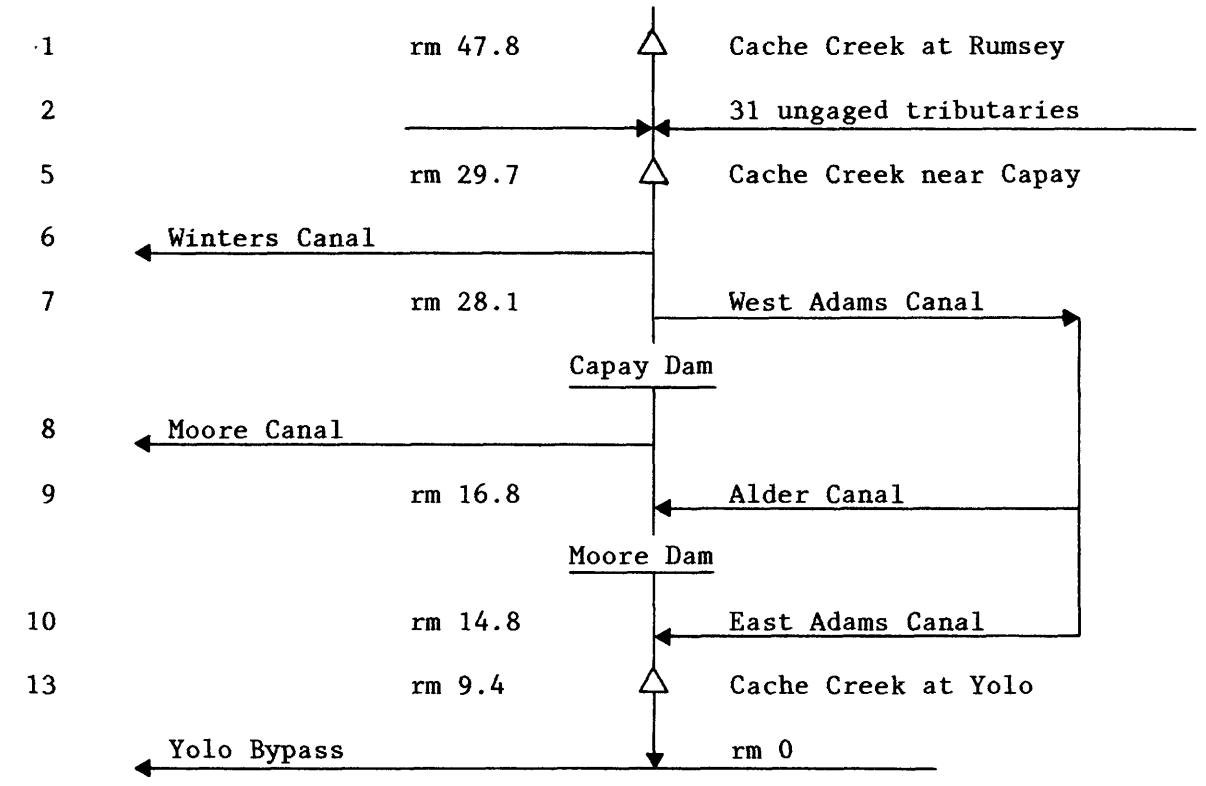
6 11388500 Gaged flow on Stony Creek near Hamilton City. Years 1974-77 estimated by correlation with Stony Creek below Black Butte Dam.

Water budget for Stony Creek, 1961-77

[Thousands of acre-feet]

LINE	MEAN	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
1	72.7	76.6	83.9	75.5	50.0	73.4	90.3	74.4	83.5	79.2	85.4	81.7	69.5	83.3	85.5	84.4	39.4	20.1
2	346.1	146.9	183.9	427.1	37.0	585.6	239.5	474.8	240.3	687.4	578.7	363.7	98.8	634.9	695.1	434.7	41.8	14.3
3	2.6	0.3	1.5	1.3	0.1	1.3	0.8	4.7	2.9	9.0	6.4	1.2	0.0	11.9	1.7	1.3	0.0	0.0
4	348.8	147.3	185.4	428.4	37.1	586.9	240.3	479.5	243.2	696.4	585.1	364.9	98.8	646.8	696.8	436.0	41.8	14.3
5	49.1	48.9	49.0	73.8	36.8	22.2	56.1	40.6	69.8	64.3	36.8	36.3	69.8	52.4	46.8	76.0	41.4	14.3
6	299.6	98.3	136.4	354.6	0.3	564.7	184.2	438.9	173.4	632.1	548.3	328.6	29.0	594.4	650.0	360.0	0.4	0.0

CACHE CREEK


Line Number
Schematic
1
rm 47.8
Cache Creek at Rumsey
2
31 ungaged tributaries
5
rm 29.7
Cache Creek near Capay
6
Winters Canal
7
rm 28.1
West Adams Canal
Capay Dam
8
Moore Canal
9
rm 16.8
Alder Canal
Moore Dam
10
rm 14.8
East Adams Canal
13
rm 9.4
Cache Creek at Yolo
Yolo Bypass
rm 0

Line Number

Explanation for water-budget table

1 11451760, AO-1200 Gaged flow on Cache Creek at Rumsey. Years 1963-65 and 1974-75 estimated by correlating losses to Cache Creek at Capay. Water year 1976 estimated based on daily record after Dec. 16, 1975 and upstream records.
2 Ungaged inflow from 31 tributaries. Estimated by using regression equations.
3 Theoretical flow to Cache Creek near Capay, the sum of lines 1 and 2.
4 Loss between Cache Creek at Rumsey and Cache Creek near Capay, line 3 minus line 5. There are about 34 mi^2 of drainage area for which no estimate of inflow was made.
5 11452000 Gaged flow on Cache Creek near Capay. Water year 1976 estimated based on daily record after Nov. 30, 1975 and upstream records. Water year 1977 estimated based on Cache Creek at Rumsey.
6 Diversion to Winters Canal, Yolo County Flood Control District (YCFC).
7 Diversion to West Adams Canal (YCFC).
8 Diversion to Moore Canal (YCFC).
9 Inflow from Alder Canal (YCFC). Years 1968-77 estimated by correlation with Moore Canal.
10 Inflow from East Adams Canal (YCFC). Years 1961-67 estimated based on 1968-76 average.
11 Theoretical flow to Cache Creek at Yolo, the sum of lines 5, 9, and 10 minus lines 6, 7, and 8.
12 Loss between Cache Creek at Capay and Cache Creek at Yolo, line 11 minus line 13.
13 11452500 Gaged flow on Cache Creek at Yolo.

(p. 85 follows)

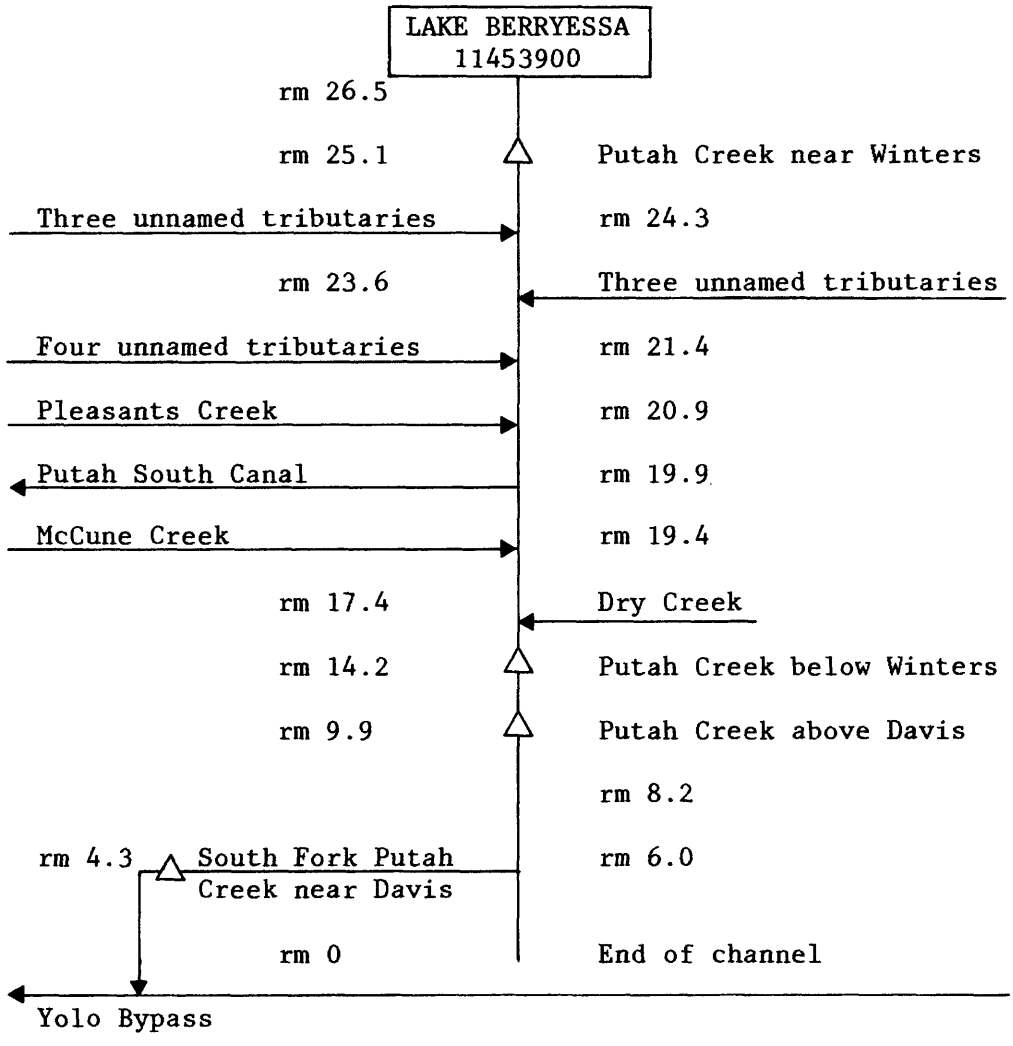
Water budget for Cache Creek, 1961-77

[Thousands of acre-feet]

LINE	MEAN	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
1	501.4	230.4	382.2	565.9	169.6	737.1	415.0	688.7	423.3	923.2	904.0	513.4	120.3	800.2	1087.1	445.8	116.4	1.8
2	6.2	1.8	4.3	7.1	1.2	8.0	4.2	10.4	6.1	11.9	12.5	6.0	0.8	14.5	9.9	6.5	0.2	0.1
3	507.6	232.2	386.4	573.0	170.8	745.1	419.2	699.1	429.4	935.1	916.5	519.4	121.1	814.7	1097.0	452.3	116.6	1.9
4	-0.2	20.4	52.0	-4.2	10.0	-13.0	12.1	-25.9	8.6	-11.3	-8.6	-14.4	8.2	-18.5	-26.0	4.0	1.7	1.8
5	507.8	211.8	334.4	577.2	160.8	758.1	407.1	725.0	420.8	946.4	925.1	533.8	112.9	833.2	1123.0	448.3	114.9	0.1
6	78.3	75.5	73.8	67.5	81.6	80.7	92.8	73.0	94.3	88.7	90.9	104.9	48.8	101.1	92.6	97.7	67.6	0.0
7	36.3	33.6	34.5	33.4	39.2	36.7	36.8	36.4	42.5	42.4	35.6	52.3	28.6	43.1	44.7	40.8	36.5	0.0
8	19.1	19.7	19.5	17.7	20.7	18.2	20.9	14.3	27.2	25.2	21.1	26.6	13.6	18.5	24.1	20.9	16.7	0.0
9	19.9	19.0	20.2	11.7	23.3	19.1	23.8	15.3	30.8	27.9	22.3	29.9	11.8	18.7	26.5	22.0	16.1	0.0
10	2.3	2.5	2.5	2.5	2.5	2.5	2.5	2.5	1.7	3.1	2.0	3.0	2.7	2.2	1.5	3.3	3.0	0.0
11	396.3	104.6	229.3	472.8	45.0	644.2	282.9	619.1	289.3	821.2	801.7	382.9	36.4	691.3	989.6	314.2	13.2	0.1
12	23.2	36.6	25.5	6.6	16.7	36.8	47.2	10.0	37.0	18.2	39.1	30.4	16.6	11.0	59.9	-10.5	13.1	0.1
13	373.1	68.0	203.8	466.2	28.4	607.4	235.7	609.1	252.3	803.0	762.6	352.5	19.7	680.3	929.7	324.7	0.0	0.0

PUTAH CREEK

Schematic



PUTAH CREEK

Line Number	Explanation for water-budget table
1	11454000 Gaged flow on Putah Creek near Winters.
2	Ungaged inflow from 10 tributaries. Estimated by using regression equations.
3	Inflow from Pleasants Creek. Years 1961-69 (U.S. Bureau of Reclamation (USBR) Solano Project Papers), 1970-77 estimated by correlation with A9-5010 Pope Creek near Pope Valley.
4	BO-1990 Gaged diversion to Putah South Canal (USBR Solano Project Papers).
5	Inflow from McCune Creek. Years 1961, 1963-69 (USBR Solano Project Papers), 1962, 1970-77 estimated by correlation with Pope Creek near Pope Valley.
6	Inflow from Dry Creek. Years 1961-69 (USBR Solano Project Papers), 1970-77 estimated by correlation with Pope Creek near Pope Valley.
7	Diversions between Putah Creek near Winters and Putah Creek below Winters. Years 1961-69 (DWR), 1970-77 estimated the same as the 1961-69 average.
8	Theoretical flow to Putah Creek below Winters, the sum of lines 1, 2, 3, 5, and 6 minus lines 4 and 7.
9	Loss between Putah Creek near Winters and Putah Creek below Winters, line 8 minus line 10.
10	AO-9160 Gaged flow on Putah Creek below Winters. No data available for 1969-77.
11	Diversions between Putah Creek below Winters and Putah Creek above Davis (DWR). No data available for 1970-75, diversions estimated.
12	Theoretical flow to Putah Creek above Davis, line 10 minus line 11.
13	Loss between Putah Creek below Winters and Putah Creek above Davis, line 12 minus line 14.
14	AO-9145 Gaged flow on Putah Creek above Davis. No data available for 1969-77.
15	Diversions between Putah Creek above Davis and South Fork Putah Creek near Davis (DWR). No data available for 1970-75, diversions estimated.
16	Theoretical flow to South Fork Putah Creek near Davis, line 14 minus line 15.
17	Loss between Putah Creek above Davis and South Fork Putah Creek near Davis, line 16 minus line 19.
18	Loss between Putah Creek near Winters and South Fork Putah Creek near Davis, the sum of lines 1, 2, 3, 5, and 6 minus lines 4, 7, 11, 15, and 19.
19	AO-9115 Gaged flow on South Fork Putah Creek near Davis. No data available for 1976-77.
20	Diversions below South Fork Putah Creek near Davis. Years 1961-70 (DWR), 1971-75 estimated based on 1961-70 record except 1972 assumed zero acre-ft because of no flow for that year at South Fork Putah Creek near Davis.
21	Theoretical flow to mouth at the Yolo Bypass, line 19 minus line 20.

Water budget for Putah Creek, 1961-77

[Thousands of acre-feet]

LINE	MEAN	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
1	336.0	128.3	135.3	154.9	177.5	406.8	255.2	548.5	285.1	594.1	691.2	310.8	264.7	283.0	616.2	336.7	296.0	228.4
2	0.6	0.2	0.6	1.0	0.2	1.0	0.5	1.0	0.4	1.2	1.3	0.7	0.1	1.0	1.2	0.6	0.0	0.0
3	7.2	0.5	4.8	12.1	1.9	9.2	3.4	16.4	1.5	13.4	19.0	5.9	0.9	11.0	17.2	5.2	0.0	0.0
4	180.8	99.8	113.2	96.9	141.2	147.3	188.3	149.2	220.5	178.8	185.9	216.2	238.9	196.9	205.0	222.5	263.5	208.9
5	0.4	0.1	0.6	1.0	0.1	0.4	0.0	0.2	0.1	1.3	1.4	0.2	0.0	0.5	1.1	0.1	0.0	0.0
6	1.9	0.1	1.8	3.1	0.3	2.2	0.5	4.8	0.3	3.8	4.6	1.3	0.1	3.1	4.3	1.2	0.0	0.0
7	0.6	0.5	0.5	0.4	0.6	0.5	0.7	0.5	0.7	0.9	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
8	164.8	28.9	29.5	74.9	38.2	271.8	70.6	421.2	66.2	434.2	531.0	102.1	26.3	101.1	434.4	120.7	32.0	18.9
9	-	15.8	4.8	8.4	18.3	20.3	19.2	10.6	13.5	-	-	-	-	-	-	-	-	-
10	-	13.1	24.7	66.5	19.9	251.5	51.4	410.6	52.8	-	-	-	-	-	-	-	-	-
11	-	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.4	0.5	0.1	0.1	0.1	0.1	0.1	0.1	-	-
12	-	13.1	24.7	66.5	19.8	251.5	51.4	410.6	52.4	-	-	-	-	-	-	-	-	-
13	-	1.9	3.3	-1.0	1.6	10.5	2.1	-9.9	1.6	-	-	-	-	-	-	-	-	-
14	-	11.2	21.3	67.4	18.2	241.0	49.2	420.5	50.8	-	-	-	-	-	-	-	-	-
15	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-
16	-	11.2	21.3	67.4	18.2	241.0	49.2	420.5	50.8	-	-	-	-	-	-	-	-	-
17	-	4.3	5.8	5.0	7.7	0.6	0.3	7.5	-5.9	-	-	-	-	-	-	-	-	-
18	18.1	22.1	14.0	12.4	27.6	31.4	21.6	8.2	9.1	6.8	26.8	17.2	26.3	1.7	41.9	4.9	-	-
19	165.2	6.8	15.5	62.4	10.5	240.4	49.0	413.0	56.7	426.8	504.2	84.9	0.0	99.4	392.4	115.9	-	-
20	1.0	0.2	0.4	0.6	1.6	1.2	0.8	1.3	1.8	2.6	0.4	1.1	0.0	1.1	1.1	1.1	-	-
21	164.2	6.6	15.1	61.9	8.9	239.2	48.2	411.7	55.0	424.2	503.8	83.8	0.0	98.3	391.3	114.8	-	-

NOTE: The mean for lines 18-21 is for years 1961-75.