State of California
The Resources Agency
DEPARTMENT OF WATER RESOURCES
Division of Operations and Maintenance

STATE WATER PROJECT ANNUAL REPORT OF OPERATIONS

1980

APRIL 1987

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FOREWORD

This is the seventh in a series of annual reports summarizing the water and power operation of the California State Water Project.[1]

Since January 1965, a "State Water Project, Report of Operations" has been published monthly. From October 1984, the publication name was changed to "State Water Project, Operations Data". These reports are limited to tabulations of daily and monthly data on reservoirs, pumping and generation plant operation, plus data on water quality and water deliveries. The monthly report will continue to provide daily and monthly information to State Water Service Contractors, public agencies, and others.

This annual report summarizes Project facilities in operation during 1980, operational constraints and outages, and significant operations and maintenance events within the five field divisions. Operational data are shown in the form of summaries for the year. Where relevant for comparison, the current and past years' data are shown in charts and tables. Revisions to the data published in the monthly "State Water Project, Report of Operations" are included.

The history, planning, and description of the State Water Project Facilities are detailed in "California State Water Project, Bulletin No. 200, Volumes I-VI," published by the Department of Water Resources.

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[1] Annual publications of the Department of Water Resources on the State Water Project activities include: (1) State Water Project, Annual Report of Operations, 1980; (2) The California State Water Project - Current Activities and Future Management Plans (1980), Bulletin 132-81.

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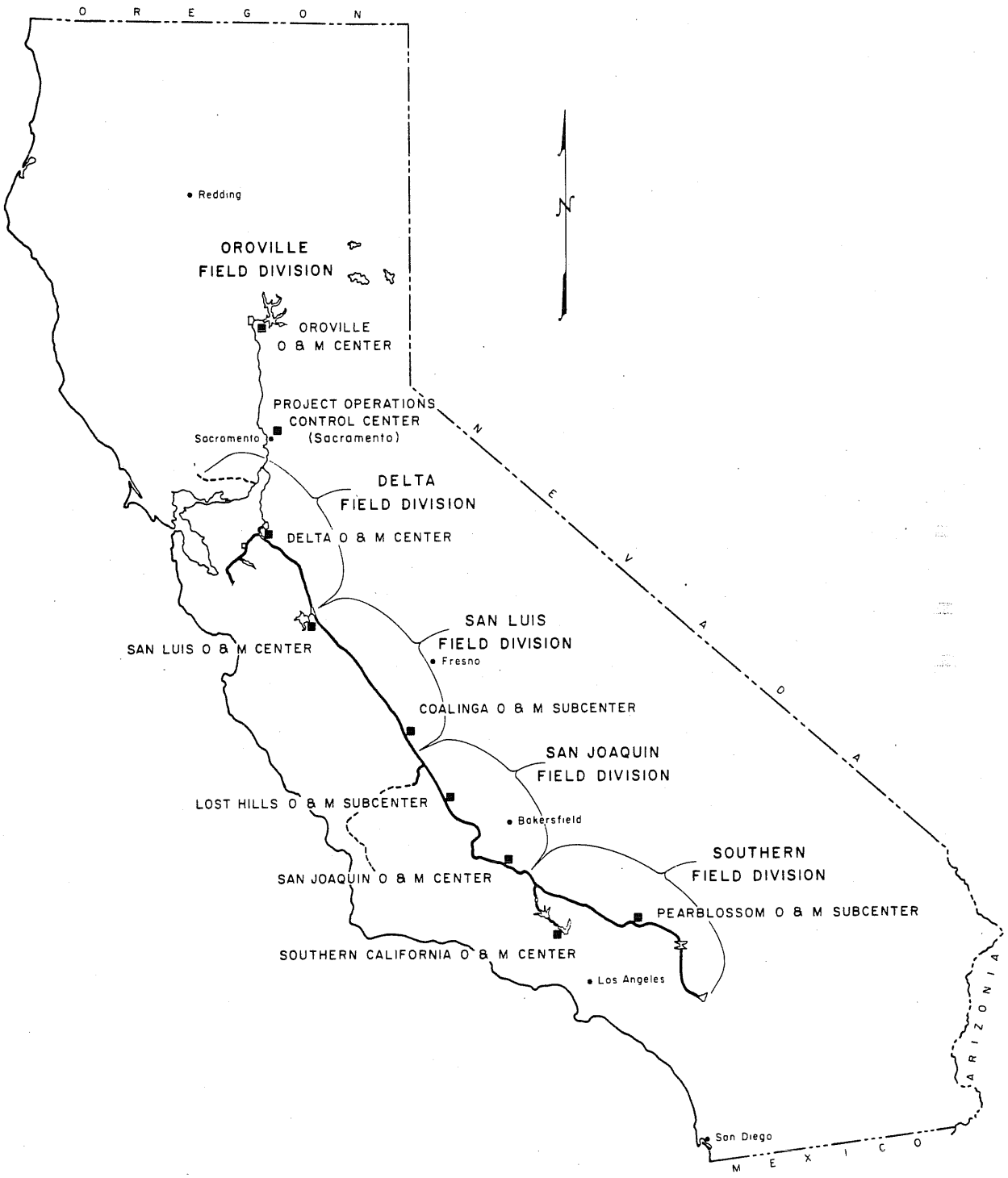
MAP 1
FIELD DIVISION BOUNDARIES



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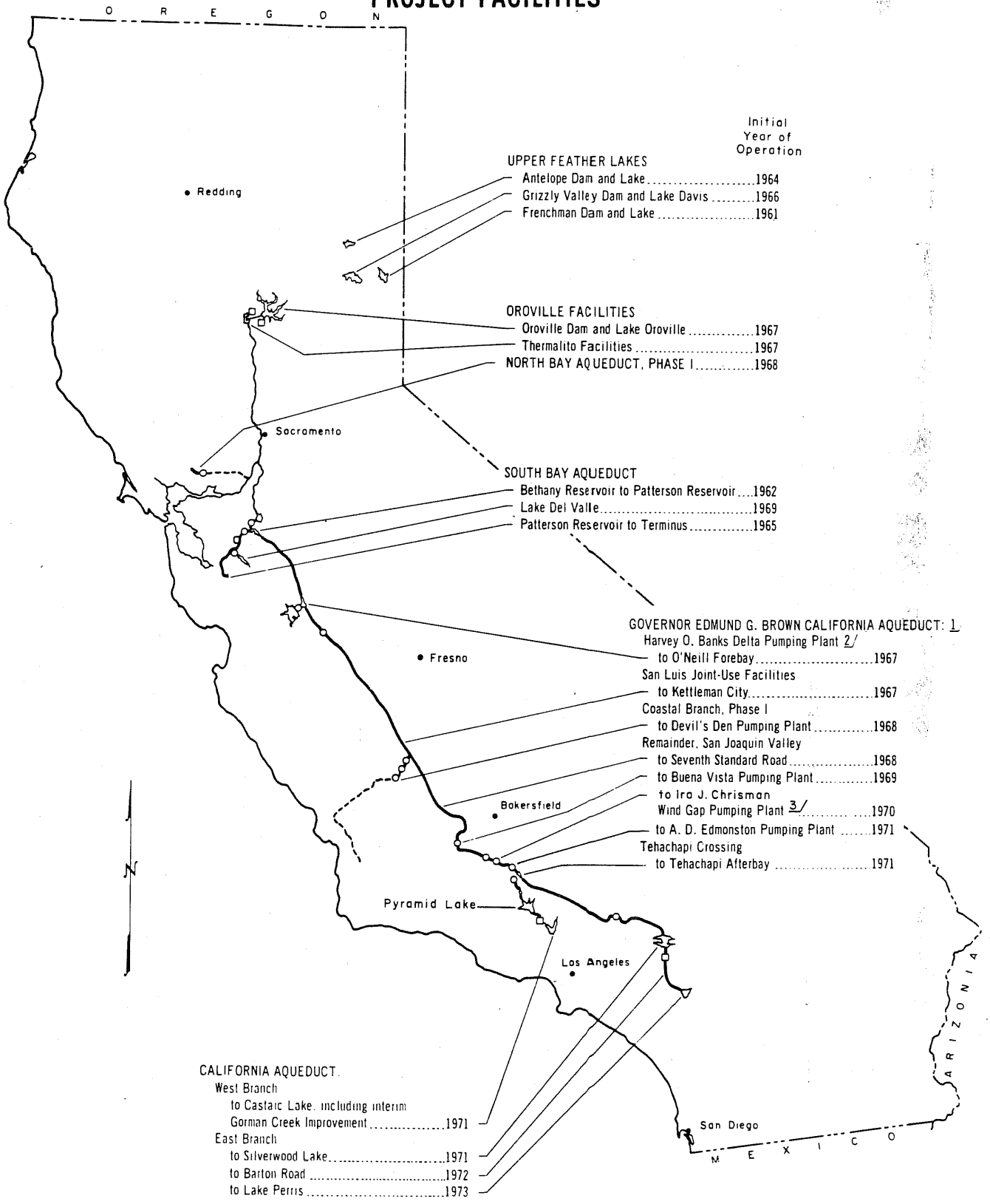

1/ This title became effective on Nov. 19, 1982.
2/ This title became effective on June 3, 1981.
3/ This title became effective on Jan. 9, 1986

INTRODUCTION

The 1980 Annual Report of Operations for the State Water Project is divided into four parts. The first two parts, "Highlights of 1980 Operation" and "Project Status in 1980", cover conditions and events of statewide significance, in detail where appropriate and in summary when the item is discussed in more detail in the following sections. The third part, "Sacramento-San Joaquin Delta Operations", gives special emphasis to a key aspect of State Water Project operations. The last part, "Project Operations", provides further detail on operational conditions and activities by field division.

Also, the report includes seven additional sections, tabulating and depicting Project operations. Section I covers water deliveries. Sections II through V cover operations of the Governor Edmund G. Brown California Aqueduct, Project pumping plants, San Luis Joint-Use Facilities, and Project reservoirs. Section VI covers Project power supply and use. Section VII covers various types of water quality measurement analyses for selected stations throughout the Project.

HIGHLIGHTS OF 1980 OPERATION

Water Quality Standards

From 1976 through 1978, operation of the State Water Project (SWP) was governed successively by at least seven different sets of water quality standards for the Sacramento-San Joaquin Delta. This was due mostly to the pronounced changes in hydrologic conditions leading into and out of California's record drought of 1977 and led, finally, to the adoption by the State Water Resources Control Board (SWRCB) in August 1978 of Water

Right Decision 1485 (D-1485), setting water quality standards for the Delta and Suisun Marsh. As described in more detail under Sacramento-San Joaquin Delta Operations, all Delta water quality standards were met in 1980, the second full year in which the D-1485 requirements were in effect.

Water Conditions [1]

Statewide precipitation during the 1979-80 water year was about 135 percent of average,[2] compared to 90 percent of average for the corresponding 1978-79 period. Precipitation in all hydrographic areas was above average.[3] Hydrographic areas representative of these conditions are:

- o North Coastal - 115% of average
- o Sacramento Valley - 125% of average
- o San Joaquin Valley - 145% of average
- o South Coastal - 185% of average

Statewide snowpack accumulation reached maximum values during the first week of April. Snowpack water content measurements were at average levels in the watersheds of the Sacramento Valley and were 165 percent of average in the San Joaquin Valley watersheds.

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[1] Taken from Bulletin 120-80, "Water Conditions in California", Report No. 4, May 1, 1980.

[2] Averages are based on the period, 1931 - 1975 (45 years).

[3] Comparisons are based on April 1 snow data which are major indexes of precipitation and historically reflect near maximum seasonal accumulation which is representative of the entire water year.

Runoff for the 1979-80 water year was above average throughout California. Variation in runoff ranged from about 120 percent of average in the North Coastal hydrographic area to in excess of 160 percent of average throughout the southern portion of the Central Valley. Statewide runoff for the water year was 138 percent of average.

Based on criteria in D-1485, the 1979-80 water year was classified as a "wet" year. The final determination of year classification is made in May, based on current water-year forecasts of the Sacramento Valley unimpaired runoff for the sum of the following locations: Sacramento River above Bend Bridge, near Red Bluff; Feather River, total inflow to Oroville Reservoir; Yuba River at Smartville; American River, total inflow to Folsom Reservoir. The forecasted (and actual, in parentheses) combined runoff for these basins was 22,895,000 (22,232,000) acre-feet for the water year, 134(131) percent of average for the four basins.

In the Feather River Basin, the primary source of supply for the State Water Project, 1979-80 water year precipitation[1] was 120 percent of average, maximum snowpack water content[2] was 99 percent of average, and unimpaired runoff[1] was 140 percent of average.

Reservoir Storage

At the beginning of 1980, storage in SWP reservoirs was above average despite the below average runoff in 1979. Storage was well above average at the close of the water year, partly because of

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[1] Through April 30, 1980.

[2] From snow survey calculation sheets, using selected snow courses and sensors.

the high precipitation. Local water supplies in Southern California were also well above normal. Overall, total combined storage in the Project's seven major reservoirs increased 231,228 ac-ft (five percent) during the year. These seven reservoirs are Lake Oroville, Lake Del Valle, San Luis Reservoir, Silverwood Lake, Lake Perris, Pyramid Lake, and Castaic Lake.

Lake Oroville reached a maximum storage of 3,362,945 ac-ft on June 6 and a minimum storage of 2,595,808 ac-ft on October 30. Total inflow to the reservoir in 1980 was 4,732,667 ac-ft. Additional information is given in Project Operations, Oroville Field Division.

State Water Project storage in San Luis Reservoir ranged from 1,076,915 ac-ft on March 6, down to 858,852 ac-ft on August 31. Joint filling of the reservoir was completed by the end of May with total storage reaching 98 percent of capacity.

Maximum and minimum storage values for the southern reservoirs in 1980 were:

	Maximum (ac-ft)	Date	Minimum (ac-ft)	Date
West Branch				
Castaic Lake	320,579	3/6-7	214,697	12/31
Pyramid Lake	169,514	3/30	127,538	8/29*
East Branch				
Silverwood Lake	73,032	5/16	58,166	10/6
Lake Perris	123,556	5/5	70,572	9/8-10,14

*Elevation restricted because of construction activity.

Two ground water recharge demonstration programs initiated in 1978 were continued in 1980. During 1978, 23,684 ac-ft of SWP water had been delivered to the Mojave Water Agency for storage in the Mojave Ground Water Basin. In 1979, 4,000 ac-ft of this water was withdrawn and delivered for the agency's use in lieu of its receiving SWP water then from the California Aqueduct. During 1980, an additional 4,000 ac-ft was withdrawn, leaving a stored balance of 15,684 ac-ft.

In the second demonstration program, 150 ac-ft of SWP water was stored during 1980 by the San Bernardino Valley Municipal Water District (SBVMWD). This supplemented the 13,275 ac-ft that had been previously received by SBVMWD for ground water storage. Thus, total water stored at the end of 1980 amounted to 13,425 ac-ft. Under the conservation project, up to 50,000 ac-ft of SWP water may be stored by SBVMWD for later withdrawal, in lieu of surface deliveries.

Water Deliveries

Project water supplies in 1980 were sufficient to meet all water service contractor requests for SWP water deliveries.

Water deliveries from SWP facilities in 1980 totaled 1,982,413 ac-ft, excluding deliveries to satisfy prior water rights and federal customers. This total, a decrease of 17 percent from the record water deliveries made during 1979, is tabulated by type on page 22.

Besides State water service contractors' entitlement water and local water, the 1980 deliveries included the following other types of water:

- Water delivered under wet weather contract provisions.
- Repayment water for preconsolidation water used during construction.
- Water from ground water recharge.
- Surplus water.
- Extra surplus water.
- Recreation and mitigation water.

Also, as a carryover from the 1977 drought conditions, the 1980 water delivery total included:

- Makeup water.
- Emergency relief water.
- Empire West Side I. D. carryover water.

Federal water delivered to federal customers from the Joint-Use Facilities totaled 1,253,347 ac-ft for the year, 3 percent lower than deliveries made in 1979. This amount excludes 609 ac-ft of recreation and mitigation water. During 1980, no water was wheeled to Kern County Water Agency's Cross Valley Canal. However, 269 ac-ft of water was pumped at Harvey O. Banks Delta Pumping Plant to replace water delivered from O'Neill Forebay for Cross Valley Canal customers in 1979. Under a letter agreement dated January 15, 1980, the Department also wheeled 57,000 ac-ft of federal water during January. This agreement was made to provide water to federal customers for which the CVP did not have delivery capacity while its Delta-Mendota Canal was out of service for maintenance. This occurred between November 10, 1979 and February 1, 1980.

Water delivered from SWP facilities to satisfy prior water rights within the Feather River Service Area totaled 860,667[1] ac-ft, or less than a one percent decrease from the previous year. In addition, 136,451 ac-ft of natural flow was released through the Project's southern reservoirs, a 69 percent increase over the releases in 1979. This was caused primarily by above-average precipitation.

The Kern River Intertie was operated for the second time since its completion to divert flood water from the Kern River to the California Aqueduct. A total of 138,816 ac-ft was diverted between March 7 and July 17. This operation was mainly to relieve Lake Isabella, so it could contain runoff and prevent possible flooding of areas in the San Joaquin Valley.

In 1980, 72,457 ac-ft of extra surplus water was delivered in January, February, and March. Extra surplus water is water in excess of that required to meet Delta water quality requirements and all SWP needs. It can be delivered to contractors when delivery capability is available. The water must be used primarily for groundwater replenishment or for agricultural use in lieu of groundwater pumping. It can also be delivered for pre-irrigation, if more is available than needed for the previous purposes.

The extra surplus water program was developed as a result of contractor requests, to utilize excess water on an as-available basis before it is known if surplus water requests can be met. In

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[1] This amount is from Lake Davis (923 ac-ft), Palermo Canal (8,166 ac-ft), and Thermalito Afterbay deliveries (851,578 ac-ft).

1980, eight contractors signed contracts to receive extra surplus water. Five of these contractors took delivery of extra surplus water in 1980.

A summary of water deliveries from SWP facilities by years to individual agencies is shown on page I-2.

Project Energy Generation and Use

Energy generation from the SWP's five power plants during 1980 grossed almost 3.0 million megawatthours (MWh) (see chart titled "Project Gross Power Generation", page VI-1). The 1980 generation at the Oroville-Thermalito Complex and the SWP's other power recovery plants (San Luis, Castaic, and Devil Canyon) was 24 percent greater than the 1979 generation. Monthly generation totals for each plant are shown in Section VI.

The SWP's use of energy in 1980 was about 3.35 million MWh. This was 91 percent of the amount used in 1979. SWP energy uses by field divisions and sources of energy are shown on the chart titled "Project Power Operations", page VI-2. Summaries, by month, of Project power supply and use are in Section VI.

PROJECT STATUS IN 1980

Project Facilities

The State Water Project conserves water for distribution to much of California's population and to irrigated agriculture. It also provides flood control, water quality control, electrical power generation, new recreational opportunities, and enhancement of sport fisheries and wildlife habitat.

The first SWP facilities to become operational were Frenchman Dam and Lake in the Upper Feather River Division and the South Bay Aqueduct in the San Francisco Bay Area in 1962. By 1973, construction of the initial facilities of the SWP was complete. This provided for operation of the entire SWP from Plumas County in the north to Riverside County in the south.

SWP facilities in operation during 1980 included: 22 reservoirs with a gross capacity of 6,797,171 ac-ft; 5 power plants with a total output capacity of 1,556 megawatts;[1] 16 pumping plants housing 109 units with a total motor rating of 2,487 MW:[2] and 537 miles of aqueduct.

During 1980, water was delivered from SWP facilities to:

- o 23 State long-term water service contractors.
- o 4 short-term contractors.
- o 10 local agencies receiving water to satisfy prior water rights.

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[1] Includes 202 MW of federal power generation output at San Luis Pumping-Generating Plant.

[2] Includes 261 MW of federal pumping capacity at San Luis Pumping-Generating Plant and Dos Amigos Pumping Plant.

In addition, SWP facilities were used to deliver federal water to 5 USBR customers along the San Luis Division joint-use facilities.

Outages and Operating Limitations

Major outages and operating limitations of SWP facilities during 1980 follow:

o During February, flood operations affected the State Water Project in varying degrees throughout the State:

- Following a spill of over 720,000 ac-ft in January, Lake Oroville spilled another 353,000 ac-ft in a nine-day period starting February 18. Operations at Lake Oroville are discussed in more depth in the section on Oroville Field Division.

- Inflows into the Yolo Bypass started on February 18, peaked on February 22 at 183,020 cubic feet per second, and continued into March. More detail on Yolo Bypass operation is given in the Sacramento-San Joaquin Delta Operations section.

- Lake Del Valle storage reached 51,236 ac-ft on February 21, 1980, the highest of record. This was from an increase in storage of over 18,300 ac-ft in less than five days. Maximum downstream releases to Arroyo Valle were held to 2,000 cfs.

- Inflow into Los Banos Reservoir reached 2,170 cfs on February 21. Downstream releases were held to 600 cfs. Releases during the February storms totaled about 7,500 ac-ft. Inflow into the San Luis Canal reached a peak of 825 cfs on February 21. Inflow into the Aqueduct at Gayle Avenue during the February storms totaled about 6,000 ac-ft.

- Downstream releases of flood water from Pyramid Lake to Piru Creek reached a peak of 3,190 cfs on February 16 as inflow approached 10,000 cfs. Conversely, releases of local inflow from Castaic Dam to Castaic Creek were halted on February 8 when local inflow into Castaic Lake exceeded 100 cfs.

- Release of local runoff from Silverwood Lake to the Mojave River was held to 3,000 cfs, although flood inflow peaked at 4,600 cfs.

- Emergency service was provided on four occasions to Pacific Gas and Electric Company (PGandE) and on one occasion to Southern California Edison Company (SCE) during 1980. On September 29, a total pump load of 277.9 megawatts (MW) was dropped. Of this amount, 159.9 MW was dropped in the SCE area and 118.0 MW in the PGandE area. In addition, 152.0 MW of capacity was provided to PGandE from San Luis Pumping-Generating Plant and 13.0 MW to SCE from Devil Canyon Generating Plant. During October, four San Luis generators were placed in service for PGandE on three different dates. On October 2, maximum capacity provided was 144 MW and the associated energy was 362,368 kWh. On October 3, maximum capacity provided was 147 MW and the associated energy was 161,280 kWh. On October 7, a maximum capacity of 152 MW and associated energy of 421,632 kWh was provided.

SACRAMENTO-SAN JOAQUIN DELTA OPERATIONS

All Delta water quality standards established by D-1485 were met in 1980, the first year in which the D-1485 "wet year" requirements were in effect. The 1978-79 water year had been classified as a "dry" year under the D-1485 procedure. With little rainfall by mid-December of 1979, the 1979-80 water year initially appeared to be dry, also. However, beginning on December 19, 1979, a series of storms swept across California resulting in above-normal precipitation in most of the State and flooding in many areas.

During January and February, the Delta outflow index, including Yolo Bypass flows, averaged over 100,000 cfs. Peak flows approached 300,000 cfs in February. Figure A, page 16, "Water Quality Conditions at Selected Delta Stations and Other Pertinent Data, 1980", shows plots of some of the controlling Delta water quality standards and corresponding recorded daily values. Additional information on water quality can be found in Section VII.

Coordinated operations between the CVP and SWP took place from June 6 through August 31. During this period, the USBR and DWR mutually agreed that "balanced water conditions"[1] existed and that flows in the Delta were to be controlled by releases from the upstream reservoirs of the two agencies. The determination for apportioning each agency's share of responsibility for reservoir releases is based on the draft agreement "Supplemental Agreement

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[1] "Balanced water conditions" occur when it is agreed by USBR and DWR that the releases of water from upstream CVP and SWP reservoirs, plus other inflows, approximately equal the water supply needed to meet Sacramento Valley in-basin uses, including water quality objectives, plus exports.

Between the United States of America and the State of California for Coordinated Operation of the Central Valley Project and the State Water Project", dated May 13, 1971. Each year, both agencies have agreed to operate as if this coordination agreement had been executed, except for agreed-upon specific modifications. The February 21, 1980 letter of agreement between DWR and USBR extended the interim coordinated operation of the CVP and SWP through calendar year 1980. Figure B, pages 17, 18, and 19, shows CVP-SWP coordinated operations for 1980. These figures show "lagged storage withdrawals", which term means that the storage withdrawals have been adjusted for the travel time (or "lag"), to the nearest whole day, for reservoir releases to reach the Delta, where water data at the Delta will then be on the same time basis. For data comparisons and calculations at the Delta, storage withdrawals from Whiskeytown and Shasta Lakes are time lagged by five days, those from Lake Oroville are lagged by two days, and those from Folsom Lake are lagged by zero days.

Table 1, page 20, tabulates, by months, the routing of water released to the Sacramento, Feather, and American Rivers from CVP-SWP upstream reservoirs. The water flowing to the ocean, represented by the Delta outflow index, provides a fresh-water barrier to the more-saline water of Suisun Bay, and thus maintains required levels of Delta water quality. During the periods of balanced water conditions, any water in excess of that needed for in-basin use (including Delta consumptive use and the Delta outflow index) is available for export from the Delta in accordance with the terms of the coordination agreement.

In 1980, Banks Pumping Plant was operated at full capacity from January through early February. The lowest exports of the year occurred during March, April, and May, followed by an increase in June. Exports dropped again in July, increased dramatically in August, then dropped steadily through November with an increase in December. There was some export of additional water from the Delta by the SWP for USBR customers in exchange for CVP water stored in San Luis Reservoir during January. This was related to the closure of the CVP Delta-Mendota Canal in late 1979.

To protect the striped bass fishery in the Sacramento River during the critical spawning period, D-1485 limits exports from the Delta to 3,000 cfs average monthly flow per project from both the CVP and the SWP during May and June, plus a limit of 4,600 cfs average monthly flow for the SWP for July. These limits were not exceeded in 1980. Total exports for the year from the Delta by SWP facilities were about 2.2 million ac-ft, which included 250,859 ac-ft of CVP water pumped for the USBR.

Operation of the SWP in 1980 increased the mean Delta outflow index (i.e., Delta exports exceeded the augmentation of Delta inflows by upstream reservoir releases) during June and July and reduced the Delta outflow index in the other months. The months with the highest reductions in Delta outflow were April, May, and December. Despite these reductions, the Delta outflow index remained above the level required by D-1485 throughout the year. Table 2 on page 21 provides a tabulation of the daily computed Delta outflow index, reflecting flows in the Sacramento River at "I" St. Bridge and in the San Joaquin River at Vernalis, plus Yolo Bypass

flows from Fremont and Sacramento Weirs in January, February, and March.

If low San Joaquin River flows indicate it is needed, a rock barrier is installed at the head of Old River to enhance the fall salmon spawning run in the San Joaquin River in areas upstream of Stockton. The barrier increases flows in the river and also raises dissolved oxygen levels in the water. The barrier is removed when river flows increase in early winter. During 1980, the Old River barrier was not needed since flows at Stockton were greater than 500 cfs throughout the fall.

For further information and data on 1980 Delta operations, see DWR Bulletin 132-81, "The California State Water Project, Appendix E, Water Operations in the Sacramento-San Joaquin Delta During 1980".

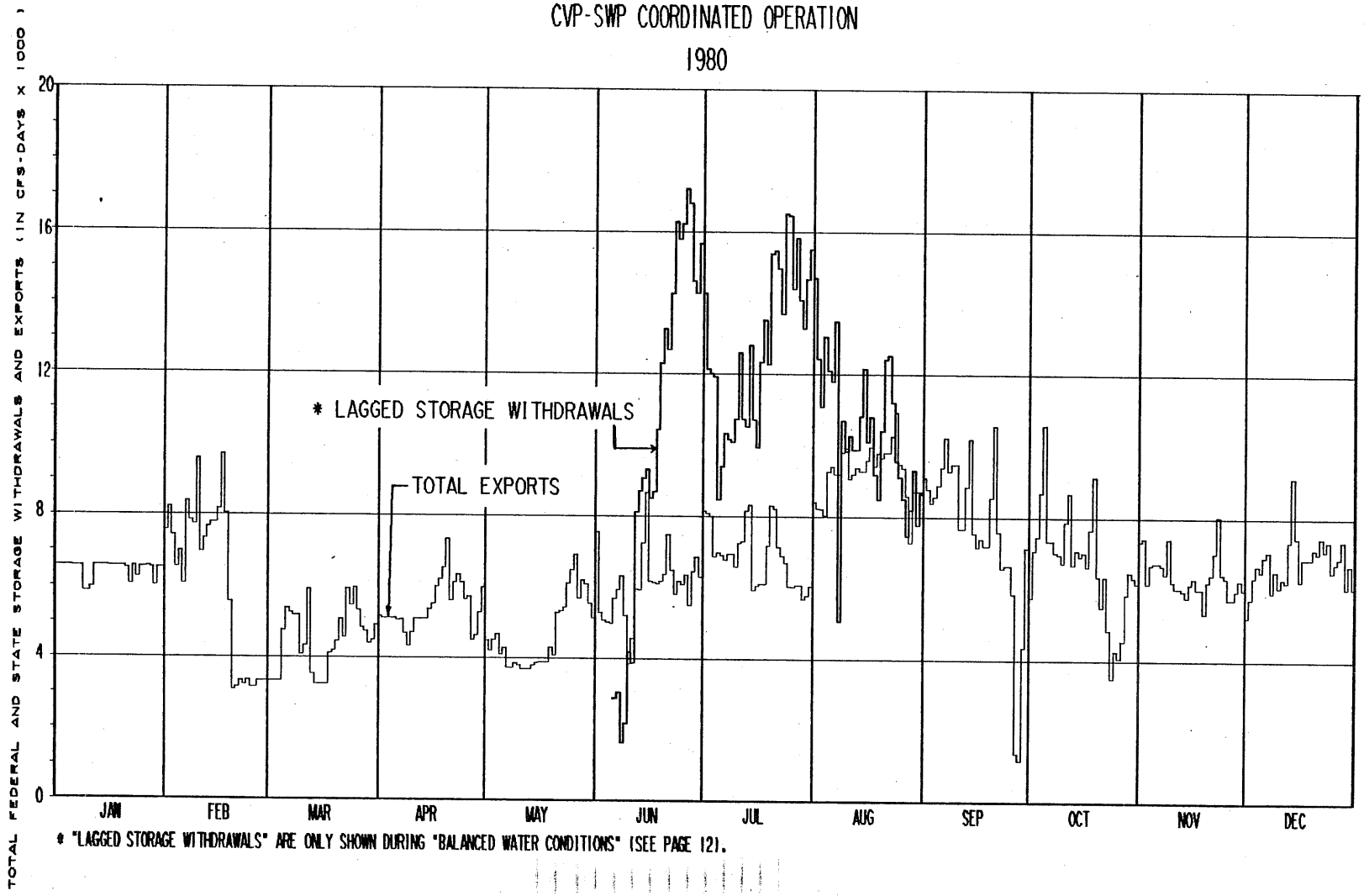
FIGURE A

WATER QUALITY CONDITIONS AT SELECTED DELTA STATIONS & OTHER PERTINENT DATA 1980

FIGURE B-1

CVP-SWP COORDINATED OPERATION

1980



* "LAGGED STORAGE WITHDRAWALS" ARE ONLY SHOWN DURING "BALANCED WATER CONDITIONS" (SEE PAGE 12).

FIGURE B-2

1980

CVP-SWP COORDINATED OPERATION

LAGGED STORAGE WITHDRAWALS

DURING BALANCED WATER CONDITIONS

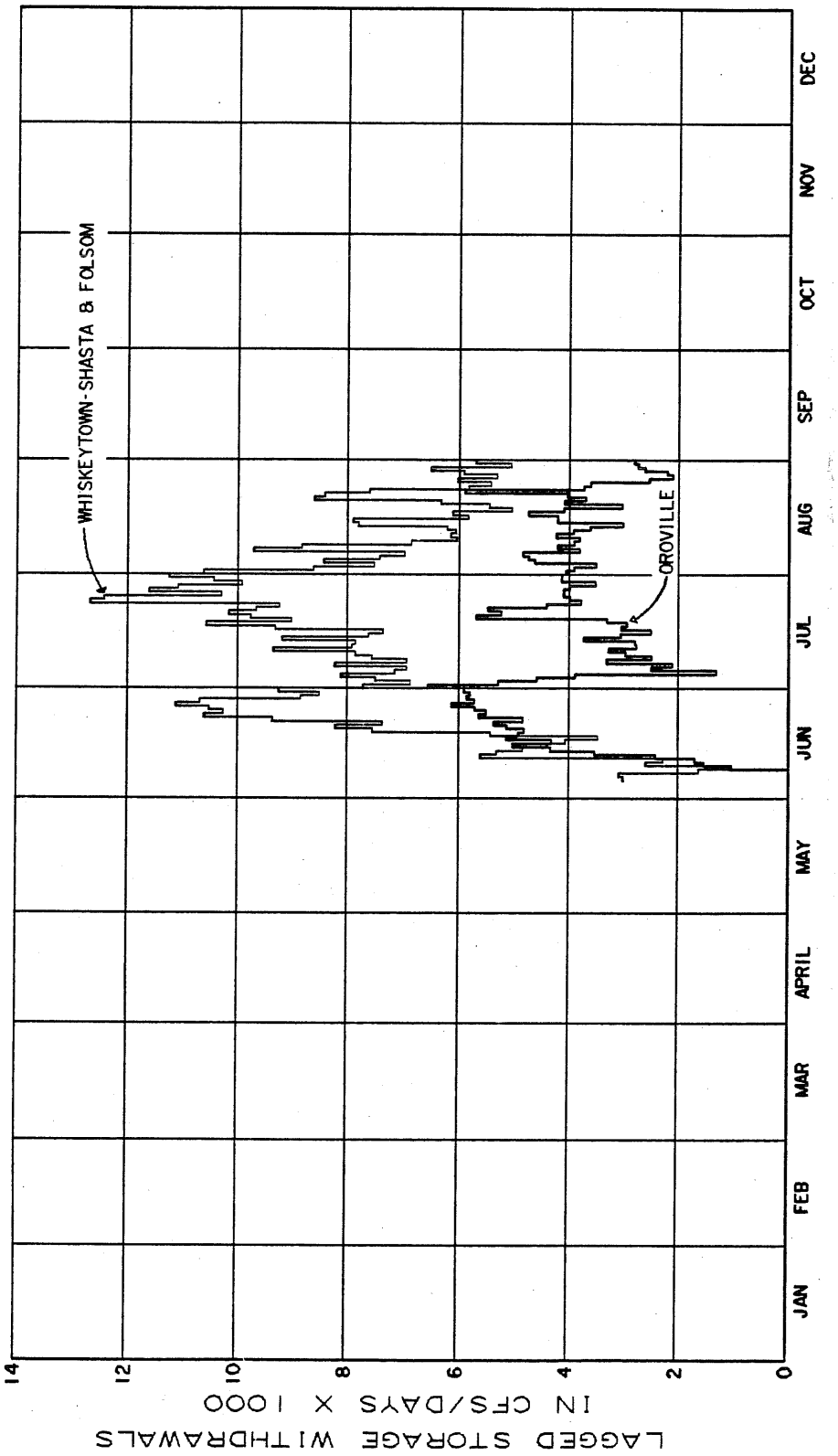


FIGURE B-3

1980 CVP - SWP COORDINATED OPERATION

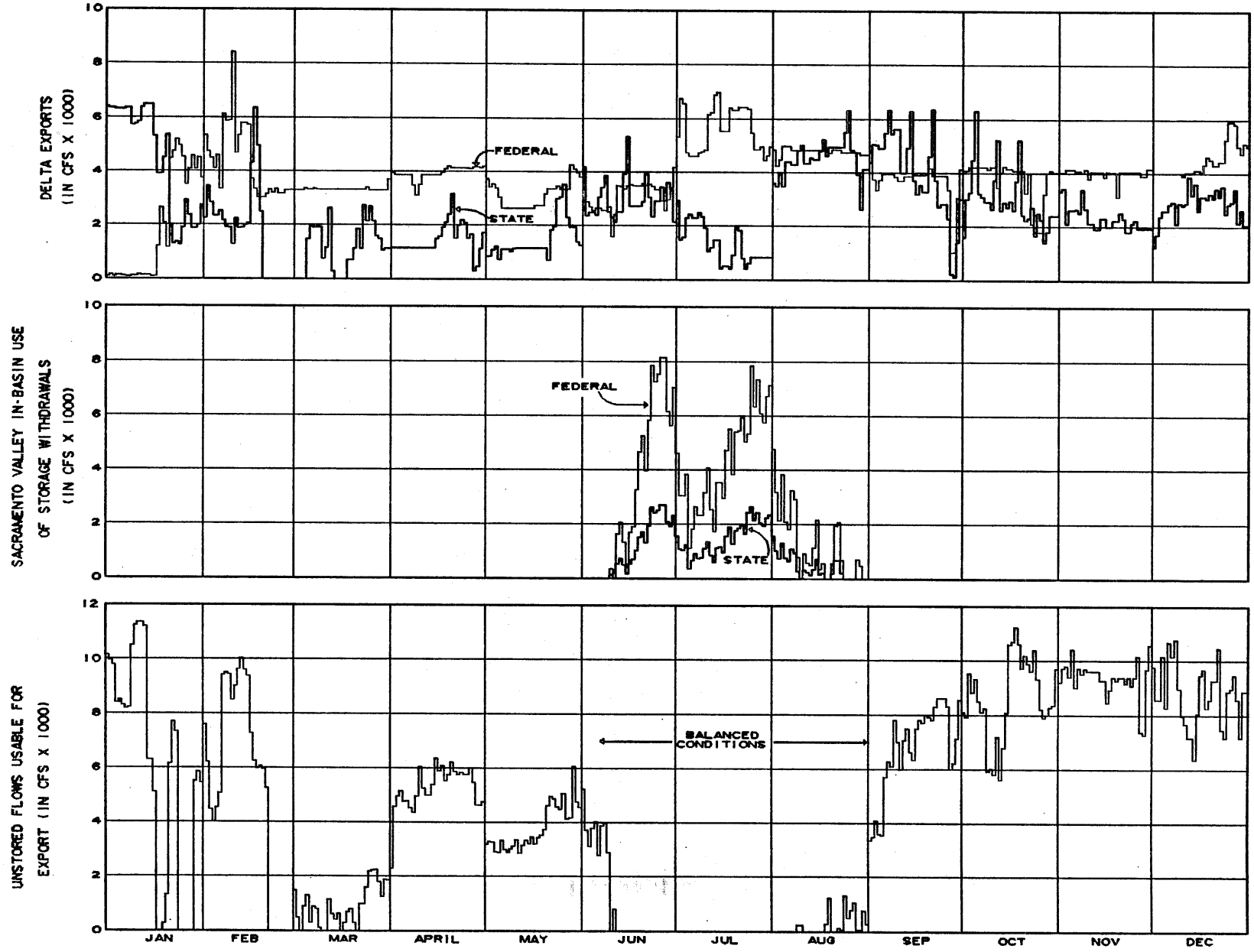


TABLE 1

SACRAMENTO BASIN AND SACRAMENTO-SAN JOAQUIN DELTA

OPERATION FOR 1980

(thousands of acre-feet except as noted)

MONTH	UPSTREAM RESERVOIR RELEASE			SACRAMENTO RIVER IN-BASIN USE 2/	DELTA INFLOW			DELTA USES			DELTA EXPORTS		
	KESWICK 1/	OROVILLE 1/	NIMBUS 1/		SACRAMENTO RIVER AT 3/ SACRAMENTO	SAN JOAQUIN RIVER AT 3/ VERNALIS	TOTAL DELTA INFLOW	DELTA CONSUMPTIVE USE 4/	DELTA OUTFLOW INDEX		TOTAL EXPORTS	EXPORTED BY STATE-DWR	EXPORTED BY FEDERAL-USBR
									TOTAL	AVERAGE CFS			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
JANUARY	1,020	1,312	987	2,742	3,620	757	4,377	-56	4,041	65,727	391	274	117
FEBRUARY	1,007	863	667	3,204	3,026	1,031	4,057	-38	3,739	67,328	350	102	248
MARCH	1,428	611	461	1,870	3,477	1,471	4,949	-10	4,691	76,288	273	71	202
APRIL	380	97	346	506	1,330	608	1,939	63	1,558	26,178	320	87	233
MAY	433	80	277	172	963	607	1,570	121	1,634	18,924	283	90	193
JUNE	588	229	216	2	1,061	317	1,378	191	834	14,022	358	178	180
JULY	686	218	281	-90	109	211	1,306	268	616	10,019	422	85	337
AUGUST	572	200	122	-19	910	127	1,306	252	216	3,517	567	275	292
SEPTEMBER	402	107	138	265	912	215	1,127	174	497	8,356	455	238	217
OCTOBER	318	107	113	133	671	238	909	118	379	6,160	413	184	229
NOVEMBER	315	101	88	89	594	175	769	55	330	5,545	383	147	236
DECEMBER	395	104	147	342	989	161	1,150	2	732	11,902	418	180	238
TOTAL	7,544	4,029	3,843	9,216	17,662	5,918	24,837	1,140	19,267	313,966	4,633	1,911	2,722

1/ Releases to river

2/ Positive values show accretions; negative values show depletions.

3/ Column 5 and 6 are based on daily 6 a.m. readings. Columns 1, 2, 3, 12 and 13 are based on measured total daily flow.

4/ From Consumptive Use Table dated April 9, 1979.

TABLE 2

DELTA OUTFLOW INDEX WITH BYPASS

1980

(Values in cfs-days Except Where Noted)

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	31,475	58,254	143,410	38,564	19,292	13,359	11,222	5,076	3,490	8,378	3,455	8,140
2	36,255	53,087	136,895	36,300	20,056	13,062	10,831	5,090	5,073	7,585	3,999	7,913
3	36,935	51,233	129,501	32,746	19,254	13,616	10,341	5,628	5,696	6,916	5,263	7,490
4	36,682	47,746	126,082	31,514	17,743	13,551	10,814	5,842	6,472	7,286	4,007	8,799
5	34,389	44,509	122,389	30,707	17,719	12,949	10,080	5,092	6,580	6,288	4,630	15,392
6	32,086	44,934	125,214	31,976	17,193	12,048	10,060	5,021	6,226	7,972	5,188	22,582
7	32,076	40,340	129,822	32,034	17,431	12,327	9,827	5,018	6,217	9,274	4,456	23,225
8	29,692	36,471	124,496	31,963	17,203	12,551	9,469	5,076	6,102	9,104	4,098	20,713
9	29,528	34,186	114,409	31,624	17,719	12,856	9,794	3,714	6,133	8,976	4,263	17,366
10	29,947	30,678	107,003	29,604	17,846	14,454	10,004	3,983	6,222	9,084	5,219	15,795
11	30,717	29,201	98,096	27,850	20,125	16,011	9,983	3,991	8,326	7,985	4,977	14,127
12	31,691	29,530	93,689	26,871	22,124	13,689	9,911	4,019	9,019	6,337	5,249	13,240
13	60,028	27,880	92,599	25,879	23,273	13,293	8,929	3,253	8,134	7,133	5,616	11,365
14	159,877	26,505	88,361	25,320	23,352	11,187	8,326	3,020	7,875	6,766	5,544	10,019
15	244,880	26,167	84,632	25,152	22,904	12,086	9,873	2,996	8,303	5,954	5,623	10,108
16	265,046	29,968	81,244	24,933	22,759	14,516	9,839	2,603	9,790	6,256	5,050	10,415
17	266,982	40,897	78,637	24,150	22,470	14,501	9,931	2,049	9,661	6,068	6,050	9,436
18	260,281	62,124	76,614	23,930	22,203	15,071	10,066	2,461	9,869	3,934	5,600	9,541
19	222,336	111,353	74,405	23,415	21,501	15,358	9,878	2,513	9,926	1,919	6,501	9,597
20	190,594	216,130	71,257	22,263	21,284	15,230	8,941	2,572	8,564	2,797	5,844	9,107
21	156,354	272,469	70,213	21,708	20,082	15,565	9,961	2,585	7,354	3,949	5,705	9,146
22	128,062	294,742	67,155	21,281	19,172	15,276	10,533	2,495	8,337	2,875	5,109	9,655
23	114,102	289,708	60,144	20,951	18,248	14,948	10,381	2,378	9,902	5,684	4,590	9,792
24	108,323	262,800	54,046	20,991	17,393	15,169	10,291	2,535	9,839	6,733	6,345	10,455
25	101,369	231,187	50,264	20,757	16,571	14,624	10,485	2,490	8,932	5,816	6,940	11,834
26	92,588	209,923	47,251	20,349	16,190	15,300	10,356	2,452	9,679	6,289	7,134	11,381
27	83,004	182,087	47,786	20,892	15,299	15,509	10,232	2,841	14,299	5,503	7,746	9,866
28	80,045	162,433	44,873	21,159	15,415	14,784	10,379	3,014	16,085	5,162	7,760	10,129
29	75,554	149,060	43,133	20,712	15,598	14,421	10,161	2,966	12,172	4,266	6,973	11,212
30	70,527		41,621	19,733	14,618	13,347	9,665	3,012	6,392	4,296	7,423	9,907
31	65,178		40,237		14,600		10,031	3,258		4,364		11,221
TOTAL	3,136,603	3,095,602	2,665,478	785,328	586,637	420,658	310,594	109,043	250,669	190,949	166,357	368,968
AVE	101,181	106,745	85,983	26,178	18,924	14,022	10,019	3,518	8,356	6,160	5,545	11,902
MAX	266,982	294,742	143,410	38,564	23,352	16,011	11,222	5,842	16,085	9,274	7,760	23,225
MIN	29,528	26,167	40,237	19,733	14,600	11,187	8,326	2,049	3,490	1,919	3,455	7,490
TOTAL IN AF	6,221,452	6,140,127	5,286,976	1,557,698	1,163,594	834,375	616,063	216,287	497,202	378,747	329,969	731,848

ANNUAL- **Total Delta Outflow Index With Bypass:** 12,086,886 cfs-days
23,974,337 acre-feet

Delta Outflow Index: Average 33,024 cfs-days
Maximum 294,742 cfs-days
Minimum 1,919 cfs-days

SWP water delivered in 1980 totaled 1,942,313 ac-ft, an 18 percent decrease from Project water delivered in 1979. In addition, local water delivered from SWP facilities totaled 40,100 ac-ft, up 46 percent from the amount delivered in 1979. Project and local water delivered to each of the field divisions during 1980 and as compared to 1979 deliveries were:

1980 Deliveries

Field Division	Amount (in ac-ft)	Percent Change from 1979 Deliveries
Oroville	13,689	33
Delta	164,161	1
San Luis	744	5
San Joaquin	1,163,295	-28
Southern	640,524	7
Total	1,982,413	-17

A tabulation of 1980 water deliveries by type follows:

Type	Amount (in ac-ft)
Entitlement	1,511,313
Surplus	332,100
Extra Surplus	72,457
Makeup and Wet Weather	14,258
Stored Carryover	178
Emergency Relief	3,200
Repayment	3,159
Ground Water Demonstration	4,000
Recreation	1,648
Subtotal	1,942,313
Local Supply (non-Project water)	40,100
Total	1,982,413

A table showing water deliveries by year for individual agencies is presented on page I-2; however, not shown are natural flow releases through the Project's southern reservoirs and prior water right entitlement releases at the upper Feather River lakes. These releases are summarized on page 7.

Following is a tabulation of 1980 regulated deliveries of local water supplies:

Agency	Amount (in ac-ft)
Last Chance Creek W.D.	11,795
Thermalito I.D.	1,327
Napa Co. F.C. & W.C.D.	6,707
Alameda Co. W.D.	15,934
Alameda Co. F.C. & W.C.D., Zone 7	4,332
	40,100

Fifty-seven thousand ac-ft of CVP water was wheeled by the State for the USBR. See page 6 for a more detailed discussion.

Oroville Field Division

Upper Feather River Reservoirs

Of the three upper Feather River reservoirs, only Antelope Lake filled and spilled in 1980. Spill took place during a six-month period from late January to early July. Antelope Lake has spilled every year except 1977 since its original filling in 1965. The following table shows the 1980 range of storages of the three upper Feather River reservoirs:

Upper Feather River Reservoir Storage

Reservoir	Maximum (in ac-ft)	Date	% of Capacity	Minimum (in ac-ft)	Date	% of Capacity
Antelope Lake	23,819*	4/29	105*	16,122	11/30	71
Frenchman Lake	39,122	6/10	70	13,262	1/1	24
Lake Davis	78,298	6/6	93	48,012	1/1	57

* Includes surcharge storage.

Monthly operation tables for the upper Feather River reservoirs are on page V-1.

Lake Oroville

Following is a summary of Lake Oroville 1980 operations data. More detailed information on operations can be found in Section V.

Lake Oroville Operations Summary

Parameter	Amount	Date
Storage		
Maximum	3,362,945 ac-ft	June 6
Minimum	2,595,808 ac-ft	Oct. 30
Daily Inflow		
Maximum	242,834 ac-ft	Jan. 13
Oroville Complex Total Release to Feather River		
Maximum Daily	160,330 ac-ft	Jan. 15
Surface Water Temperature		
Maximum	76°F	Aug. 20

The computed inflow to Lake Oroville during 1980 was 4,732,667 ac-ft. Included in this computed inflow amount are releases from Ponderosa Dam (231,550 ac-ft) and Lake Wilenor (3,984 ac-ft).

Water Deliveries

Diversions and releases from the Oroville-Thermalito complex during 1980 are shown in the following table. Other Project deliveries in the Oroville Field Division are shown on page I-2.

Oroville-Thermalito Complex Diversions and Releases
(in ac-ft)

Diversions:		
	Palermo Canal	8,166
	Thermalito Irrigation District	1,327
	County of Butte	267
	Thermalito Afterbay deliveries	
	Sutter-Butte Canal	488,578
	PGandE Lateral	4,151
	Richvale Canal	94,163
	Western Canal	264,686
Releases:	Thermalito Afterbay river outlet, Fish Hatchery, and Fish Barrier Dam	4,053,711
	Total	4,915,049

Figure C, page 27, presents a graph of the 1980 inflow, releases, and diversions for the Oroville-Thermalito complex. The inflow used for the graph is the computed inflow to Lake Oroville.

Hyatt-Thermalito Powerplants

Gross generation at the Hyatt-Thermalito power complex during the year totaled 2,369,400 MWh. Energy consumed for power plant use and pumpback requirements totaled 131,730 MWh. A graph showing the Edward Hyatt and Thermalito Powerplants' monthly gross

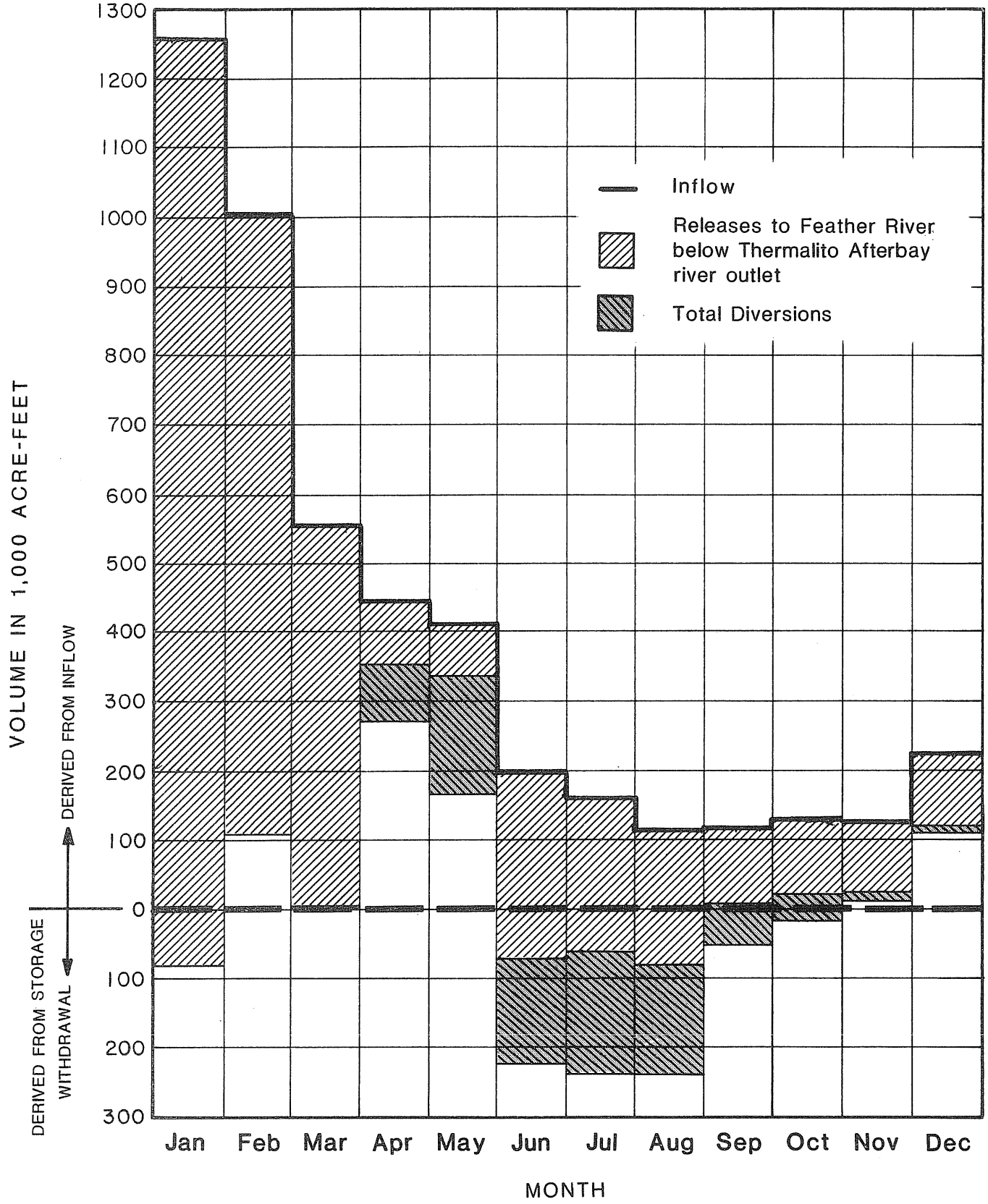
generation is presented on page VI-3. Tables of monthly power operations are tabulated in Section VI.

Annual Inspection

The annual inspection for the Oroville Field Division was conducted during June 9-12 by representatives of the Field Division, O&M Headquarters, and the California Water Commission. The critique was held on June 13.

Figure C

OROVILLE-THERMALITO COMPLEX OPERATIONS IN 1980 INFLOW, RELEASES, & DIVERSIONS



Activities, Outages, and Limitations

Other activities, outages, and limitations affecting or influencing operations of the Oroville Field Division in 1980 were:

- January releases established a new maximum spillway flow rate at Lake Oroville. Use of the spillway had not been required since April 11, 1974. The reservoir spilled from January 12 through January 20 with a maximum rate of 70,000 cfs on January 15. Maximum encroachment was 335,700 ac-ft on January 14. Total spill in January (726,257 ac-ft) was only 3 percent less than the total inflow into Lake Oroville during the 1976-77 water year. Another 352,976 ac-ft spilled in late February. However, the February maximum spill rate, encroachment, and total releases to the Feather River were all less than those in January.

- Edward Hyatt Powerplant Units 4, 5, and 6 were out of service from September 13 through September 23 for outage of the No. 2 intake gate. Debris had jammed the gate in the unlatched position.

- Hyatt Unit 6 was out of service from March 1 through May 9 for annual maintenance and a stator rewind.

- During the year, annual maintenance was performed on Hyatt Unit 1 (September 30 through October 22), Hyatt Unit 2 (December 3 through December 15) and Hyatt Unit 3 (May 30 through June 12). Maintenance was performed on Hyatt Unit 4 during the period of November 4 through December 2 and Hyatt

Unit 5 from May 16 through May 30. Annual maintenance was also performed on Thermalito Powerplant Unit 1 (October 20 through October 30), Thermalito Unit 2 (September 15 through September 29), Thermalito Unit 3 (March 7 through March 21), and Thermalito Unit 4 (March 28 through April 11).

Delta Field Division

Water Deliveries

Comparisons of the 1980 water deliveries to the three areas the Division serves and their percent differences from 1979 deliveries are shown in the following table. Annual water deliveries to each contractor are presented on page I-2.

Delta Field Division Water Deliveries

Area	Water Deliveries (in ac-ft)	Difference from 1979 (in percent)
California Aqueduct	6,963	-4
North Bay Aqueduct	6,707	2
South Bay Aqueduct	150,491	1

Harvey O. Banks Delta Pumping Plant

Pumping at the Banks Pumping Plant for the year totaled 2,162,640 ac-ft, 17 percent less than the record amount pumped during 1979.

Of the 1980 total pumping at the Banks Pumping Plant, 250,859 ac-ft was pumped for the USBR and was conveyed through the California Aqueduct to O'Neill Forebay. Pumping for the USBR at

Banks Pumping Plant consisted of 193,590 ac-ft of D-1485 replacement water, 57,000 ac-ft of outage water for Westlands Water District, and 269 ac-ft of Cross Valley Canal water.

DWR assisted the USBR by pumping outage water and D-1485 water at Banks Pumping Plant during January to help the USBR build its active storage in San Luis Reservoir and make deliveries to federal customers in preparation for the scheduled November 10, 1979-February 7, 1980 outage of its Delta-Mendota Canal.

In complying with D-1485 limitations on Delta diversions, described on page 14, the USBR foregoes up to 193,590 ac-ft of its May-June diversion capacity at its Tracy Pumping Plant. This foregone capacity is then replaced by pumping CVP water at Banks Pumping Plant to the extent needed. In 1980, 45,513 ac-ft of this D-1485 replacement water was pumped at Banks Pumping Plant during July, the ordinary time that SWP pumping capacity is available for this purpose and 148,077 ac-ft was pumped earlier during January, February, and May when Banks Pumping Plant capacity was available in 1980.

South Bay Aqueduct

Pumping at the South Bay Pumping Plant totaled 125,420 ac-ft for the year, a 12 percent decrease from the 1979 amount.

Maximum storage in Lake Del Valle was 51,236 ac-ft, about 66 percent of absolute maximum operating storage capacity on February 21. Minimum storage was 24,508 ac-ft, during December 25-26.

A monthly reservoir operation table for Lake Del Valle is shown in Section V.

Annual Inspection

The annual inspection for the Delta Field Division was conducted during May 12-15 by representatives of the Field Division, O&M Headquarters, and the California Water Commission. The critique was held on May 16.

Activities, Outages, and Limitations

Other activities, outages, and limitations affecting or influencing operations of the Delta Field Division in 1980 were:

- On August 12, a main circuit breaker failed on the second stage of the South Bay Pumping Plant, causing a temporary reduction in water deliveries until a substitute breaker was installed. South Bay Unit 9 was out of service until August 28, when its circuit breaker was replaced.

- On October 23, the failure of a railroad levee between Upper and Lower Jones Tracts significantly affected Delta operations as follows:

  - There was an immediate closure of Clifton Court Forebay intake gates, which were later reopened the same day after the Harvey O. Banks Delta Pumping Plant had been rescheduled to meet demands only (all reservoir refilling was discontinued).

  - USBR pumping at Tracy Pumping Plant was reduced from five to two units in order to meet demands only.

  - USBR reopened the Delta Cross Channel gates that had been closed to maintain the flow at Rio Vista.

  - On October 27, both the SWP and CVP returned to the mode of operation that had been in effect prior to the levee break. The reduction in exports was to ensure a positive Delta outflow, thus preventing salt water intrusion.

- South Bay Pumping Plant Unit 3 was out of service from March 26 to July 25 for a stator rewind. South Bay Unit 6 was out of service from February 6 through May 5 for rotor inspection and repair of oil leaks.

- Banks Pumping Plant Unit 6 was out of service from March 17 through April 7 for penstock and impeller repair, and from August 6 through August 18 to clean the air cooler and install a neutral transformer containment vessel. Banks Unit 7 was out of service from March 17 through July 3 for penstock and impeller repair and annual maintenance.

- Banks discharge line 3 was out of service from March 17 through April 7 for coating renewal.

- During the year, annual maintenance was performed on South Bay Unit 2 (January 14 through March 27), Banks Unit 2 (July 1 through August 6), and Banks Unit 3 (October 6 through December 16).

San Luis Field Division

Water Deliveries

Federal water deliveries from the joint-use facilities during 1980 totaled 1,253,956 ac-ft, slightly over one percent more than the 1979 total. Of this amount, 1,253,347 ac-ft was delivered to federal water project contractors; 46 ac-ft of water was delivered to the Department of Parks and Recreation from San Luis Reservoir and

O'Neill Forebay; 357 ac-ft of mitigation water was delivered from O'Neill Forebay to the Department of Fish and Game; and 206 ac-ft of recreation water was delivered to the Mendota Waterfowl Habitat Area. An additional 744 ac-ft of State water was delivered to the Departments of Parks and Recreation and Fish and Game.

Mitigation Water

The SWP's share of mitigation water for 1980 totaled 4,454 ac-ft. This water was conveyed to the California Department of Fish and Game, Grasslands Water District, and William Affonso through the Delta-Mendota Canal, Mendota Pool, and O'Neill Forebay. In 1981, the SWP paid back a total of 1,136,600 kWh of electrical energy for pumping the SWP share of the 1980 mitigation water at the USBR's Tracy and O'Neill Pumping Plants.

San Luis Reservoir

San Luis Reservoir storage reached its maximum of the year, 1,988,196 ac-ft, on May 27. This is 98 percent of absolute maximum storage capacity. The minimum storage for the year, 1,351,986 ac-ft, was reached on August 31. A graph showing the fluctuations of San Luis Reservoir for 1980 is presented on page V-11.

The 1980 pumping at San Luis Pumping-Generating Plant totaled 1,139,496 ac-ft, nearly twice the amount pumped in 1979. Water released from San Luis Reservoir to O'Neill Forebay for generation totaled 653,927 ac-ft, or 61 percent of the 1979 total. Monthly operation tables for San Luis Reservoir and O'Neill Forebay are presented in Section V.

Annual Inspection

The annual inspection for the San Luis Field Division was conducted during September 15-18 by representatives of the Field Division, O&M Headquarters, and the California Water Commission. The critique was held on September 19.

Activities, Outages, and Limitations

Other activities, outages, and limitations affecting or influencing operations of the San Luis Field Division in 1980 were:

- San Luis Pumping-Generating Plant Unit 8 went out of service on June 10 for repairs on a failed circuit breaker. The unit was returned to service on August 1.

- Dos Amigos Pumping Plant Unit 5 was out of service from December 1 through December 23 to install test equipment and repair brakes. Unit 5 was also out of service earlier from February 13 through March 22 for annual maintenance.

- During the year, annual maintenance was also performed on San Luis Unit 3 (February 29 through April 11), Unit 4 (February 29 through April 4), and Units 5 and 6 (October 23 through December 12). Annual maintenance was performed at Dos Amigos Pumping Plant Unit 2 (October 2 through November 10), and Unit 4 (January 18 through February 14).

San Joaquin Field Division

Water Deliveries

Of the 1,163,295 ac-ft total SWP water delivered to State water service contractors in the San Joaquin Field Division during 1980, about 66 percent was entitlement water, 27 percent was surplus

water, five percent was extra surplus water, and the remaining one percent was divided among wet weather, emergency relief, repayment, make up, and carryover water. The largest delivery (964,933 ac-ft) was to the Kern County Water Agency. This represented 83 percent of the total water delivered within the Division.

Preconsolidation repayment water delivered to Belridge Oil Company in 1980 totaled 3,159 ac-ft. At the end of 1980, the preconsolidation repayment account to be delivered before 1985 was as follows:

Preconsolidation Repayment Water

(in ac-ft)

Contract Holder	Total Contract Amount	1979 Balance	1980 Deliveries	Remaining Balance
J. G. Boswell Co.	131,600	84,895	0	84,895
Belridge Oil Co.	108,000	52,882	3,159	49,723

The 1980 deliveries to SWP contractors included flood water from the Kern River Intertie. The Intertie was completed in 1976 and in operation by 1978. Over 170,000 ac-ft of water was diverted into the Governor Edmund G. Brown California Aqueduct in 1978 and a total of 138,816 was diverted between March 7 and July 17, 1980. The Intertie was shut down from June 10 through June 30, 1980. Most of the water taken into the Aqueduct was moved south in the San Joaquin Valley and some went into the East Branch in Southern California. For additional background on the operation of the Kern River Intertie, see Bulletin 132-81 and the 1978 Annual Report of Operations.

A table showing water deliveries by year and totals to date for individual agencies is presented on page I-2.

Annual Inspection

The annual inspection for the San Joaquin Field Division was conducted during October 20-22 by representatives of the Field Division, O&M Headquarters, and the California Water Commission. The critique was held on October 23.

Activities, Outages, and Limitations

Other activities, outages, and limitations affecting or influencing operations of the San Joaquin Field Division in 1980 were:

Coastal Branch. The following activities, outages, and limitations affected the Coastal Branch:

- Las Perillas Pumping Plant Unit 4 was out of service from November 25 to December 15 to repair the impeller and discharge valve. Units 5 and 6 were out of service from November 5 through late November while a valve locking pin in the discharge line was being repaired. Unit 6 was back in service on November 21 after annual maintenance had been performed. Unit 5 was back in service on November 25.

California Aqueduct. The following activities, outages, and limitations affected the California Aqueduct:

- Buena Vista Pumping Plant Unit 2 was out of service from February 6 to September 22 in order to clean the rotor and repair runner cavitation damage. Unit 8 was out of service from May 12 through July 11 for annual maintenance.

- At Wheeler Ridge Pumping Plant, Unit 5 was out of service on April 30 for annual maintenance and repair of cavitation damage. Unit 6 was out of service on November 17 to repair a discharge valve oil leak and install a new backfill valve. Both units remained out of service at the end of the year.

- At Wind Gap Pumping Plant, Unit 2 was out of service for annual maintenance and rotor cleaning from April 30 through the end of the year. Unit 3 was out of service from May 13 through June 12 for cavitation repair of the runner. Unit 3 was again out of service from October 15 through the end of the year for impeller repair. Unit 4 was out from September 10 to October 21 for annual maintenance of the transformer and other electrical repairs. Unit 7 was out from August 20, 1979 to April 24, 1980 for annual maintenance and to replace the stator winding. Between May 11 and May 27, Unit 7 was out to inspect wearing rings. Other units out for annual maintenance were Unit 5 (August 19 through October 21) and Units 8 and 9 (December 1 through December 13) for transformer electrical maintenance.

- A. D. Edmonston Pumping Plant Unit 1, taken out of service on July 10, 1978 for excessive downthrust on the unit's bearings, remained out of service through 1980. Repairs to the unit were delayed due to the size of the job and the difficulty in obtaining parts. Unit 2 was taken out of

service on December 31, 1979 due to a circuit breaker failure and was returned to service on March 19, 1980. Unit 2 was also out of service for annual maintenance from July 9 to August 8. Unit 3 was out of service from June 6 through July 18 due to a damaged thrust bearing, and from August 13 through the end of the year for impeller inspection and pump repair. Unit 6 was out of service from October 21, 1979, through July 2, 1980, for stator re-wedging, preventative maintenance, and replacement of pump seals. Unit 13 was out of service from November 22 to December 3 for breaker repair. In addition, the east discharge line was drained to repair discharge valve seals, taking Units 1, 3, 5, 7, 9, 11, and 13 out of service from August 30 to November 7.

- Other units in the San Joaquin Field Division's six pumping plants were out of service for minor repairs or maintenance during the year, with the various outage periods ranging from less than one day to a week.

Southern Field Division

Water Deliveries

Water deliveries from the SWP to State water service contractors in the Southern Field Division totaled 635,743 ac-ft, a seven percent increase over the amount delivered the previous year. Not included in this total is SWP water applied in the ground water demonstration areas (4,000 ac-ft) and recreation water (781 ac-ft).

As part of the continuation of a ground water demonstration program started in 1978 in Southern California, 4,000 ac-ft of SWP conservation water was withdrawn from the Mojave Ground Water Basin by the Mojave Water Agency in 1980, in lieu of receiving SWP water conveyed by surface facilities.

All of the 781 ac-ft of recreation water delivered in 1980 in the Southern Field Division went to the California Department of Parks and Recreation, 39 ac-ft from Silverwood Lake and 742 ac-ft from Lake Perris.

A table showing water deliveries by year with totals to date for individual agencies is presented on page I-2.

Reservoir Storage

At the start of the year, total combined reservoir storage in the Southern Field Division's five reservoirs (Pyramid Lake, Elderberry Forebay, Castaic Lake, Silverwood Lake, and Lake Perris) was 632,139 ac-ft, or 88 percent of the combined maximum operating capacity. Combined storage at the end of the year was 547,434 ac-ft, or 76 percent of the combined capacity.

A table of reservoir storages for Southern Field Division reservoirs follows, and summaries of operations for those reservoirs are in Section V.

Reservoir Storages
(in ac-ft)

Reservoir (Normal max. operating storage)	Start of 1980	End of 1980	Maximum Date	Maximum	Minimum Date	Minimum
Pyramid Lake (169,901)	164,093	142,230	3/30	169,514	8/29	127,538
Elderberry Forebay (28,230)	27,139	21,532	6/13	29,390	11/13	8,379
Castaic Lake (319,247)	283,890	214,626	3/6	320,579	12/31	214,697
Silverwood Lake (73,032)	69,369	68,753	2/26	73,707	10/6	58,166
Lake Perris (126,841)	87,648	100,212	5/5	123,556	9/8	70,572

Annual Inspection

The annual inspection for the Southern Field Division was conducted during November 17-18 by representatives of the Field Division, O&M Headquarters, and the California Water Commission. The critique was held on November 19.

Activities, Outages, and Limitations

Other activities, outages, and limitations affecting or influencing operations of the Southern Field Division in 1980 were:

West Branch.

- Oso Pumping Plant Unit 1, which was taken out of service on December 14, 1978 for replacement of pump rotating wearing rings, remained out of service during all of 1979 and was back in service by March 21, 1980. Unit 6 was taken out of service on January 14

for annual maintenance and measurement for a new stub shaft; the unit remained out of service through the end of the year. Unit 7 was out from December 2 through the end of the year for repairs to a broken wear ring. Unit 8 was available for emergency use only (since November 18, 1978) due to leakage from a discharge line coupling. The unit was taken completely out of service from February 21 to June 4 to seal the discharge line and perform annual maintenance.

- Oso Pumping Plant units out for annual maintenance during 1980 were: Unit 2 from August 15 to September 16; Unit 3 from December 22 through the end of the year; and Unit 4 from October 10 to December 9.

- The West Branch was essentially shut down between May 5 and May 16 to allow The Metropolitan Water District of Southern California to make final connections for two 4.5 MW turbine-generators at its Foothill Control Structure and to allow a tie-in to its relocated Jensen Treatment Plant inflow channel. Part of the work included taking the Castaic Lake intake tower out of service during that period.

- During construction on the William E. Warne Powerplant complex from August 3 to November 2 the following State Water Project facilities were affected:

  - Gorman Creek Channel Improvements were out of service.
  - Quail Lake was essentially at dead storage.
  - Pyramid Lake was held at 30 feet below normal operating level.

- The Gorman Creek Channel Improvements were out of service from December 15 through the end of the year when about 100 feet of canal lining failed.

East Branch.

- Pearblossom Pumping Plant Units 1 and 2 were out of service from March 24 to April 1 for discharge line repairs and from May 12 to May 24 for discharge valve installation. Unit 1 was also out for annual maintenance from December 10 to December 19. Unit 3 was out of service for discharge line repairs and annual maintenance from March 24 to September 2. Unit 4 was out of service from September 3 to October 1 for repair of a discharge valve and for annual maintenance. Unit 4 was also out of service from October 20 to November 8 for discharge line repair. Unit 5 was out of service from September 17 to October 1 for discharge valve repairs and from October 20 to November 8 for discharge line repair. Unit 6 was out of service for annual maintenance and discharge valve repairs from September 17 to November 8.

- At Devil Canyon Powerplant, Unit 1 was out of service from March 31 to May 1 for annual maintenance. Unit 2 was out of service from January 15 to February 2 for repairs and from December 1 to December 16 for annual maintenance. The entire plant was out of service for the five-day period May 7-11 while repairs were made to the hydraulic oil piping system of the San Bernardino Tunnel Intake Tower.

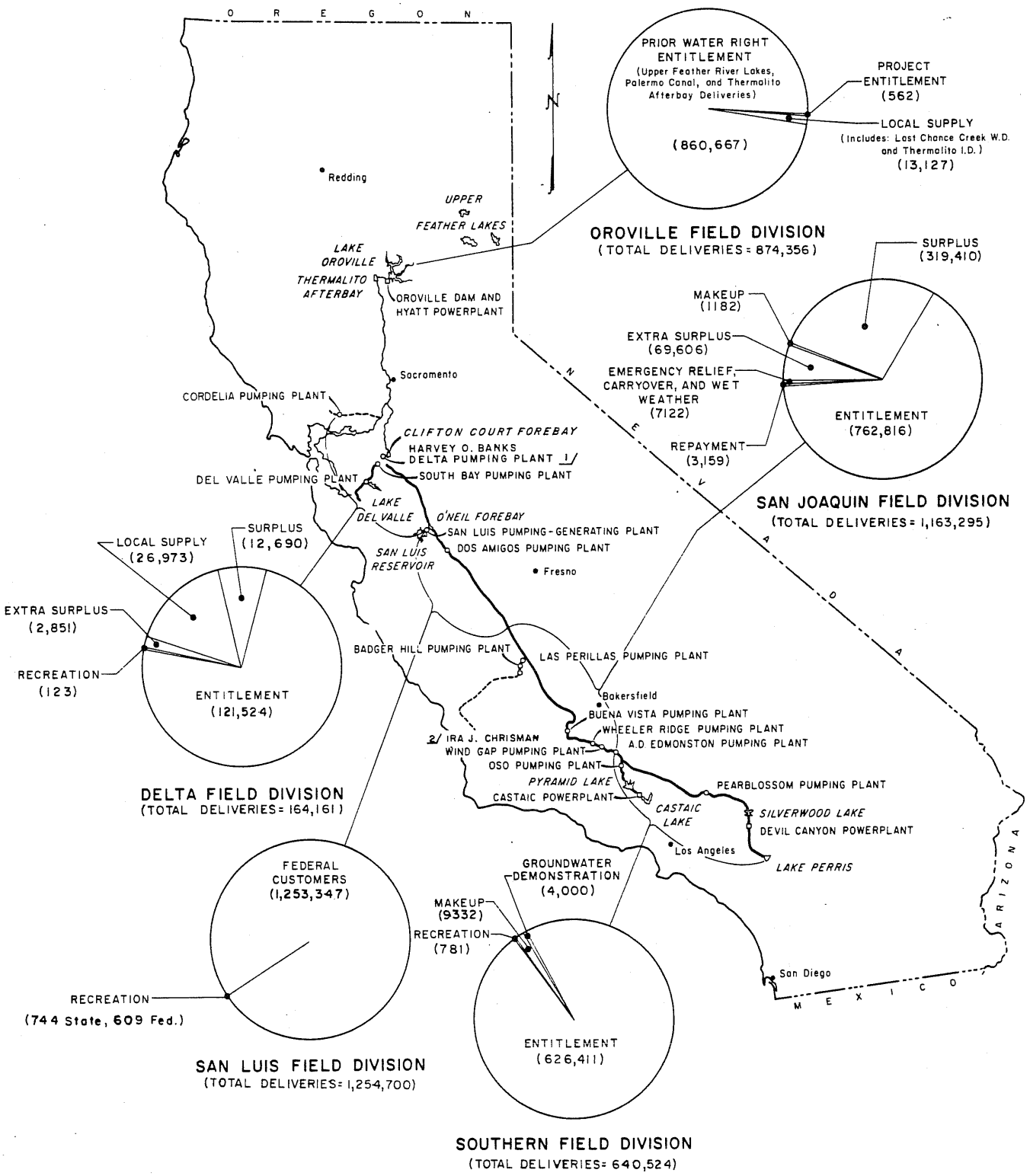
- Silverwood Lake storage was drawn down 8.2 feet between September 29 and October 10 at the request of California Department of Boating and Waterways to allow their contractor to place piles for a boat pier.

- Other units in the Southern Field Division's pumping plants and powerplants were out of service for minor repairs or maintenance during the year, with the various outage periods ranging from less than one day to a week.

PROJECT WATER DELIVERIES

Map 3
PROJECT WATER DELIVERIES
1980

(in acre-feet)



1/ This title became effective on June 3, 1981.

2/ This title became effective on Jan. 9, 1986

Table 3

WATER DELIVERIES 1962-1980

(IN ACRE-FEET)

AGENCY	1962-1975	1976	1977[6]	1978	1979	1980	TOTAL
OROVILLE FIELD DIVISION							
Last Chance Creek W.D.[1]	34,033	11,437	6,372	11,512	8,492	11,800	83,646
Plumas Co. F.C. & W.C.D.	2,371	382	303	278	329	295	3,958
Palermo Canal*	61,408	10,431	8,049	7,992	6,540	8,166	102,586
County of Butte[1]	811	527	706	579	302	267	3,192
Thermalito I.D.[1]	806	234	418	1,121	1,183	1,327	5,089
Thermalito Afterbay*	6,202,606	922,677	552,470	779,901	857,763	851,578	10,166,995
DELTA FIELD DIVISION							
Napa Co. F.C. & W.C.D.[1]	29,229	7,122	8,226	6,034	6,561	6,707	63,839
Alameda Co. W.D.[1]	192,455	26,643	20,644	14,963	18,006	26,968	492,134
Alameda Co. F.C. & W.C.D., Zone 7[1]	111,506	20,983	12,940	18,781	23,409	21,122	208,615
Pleasanton Township W.D.	674	0	0	0	0	0	674
Santa Clara Valley W.D.	77,690	112,705	76,220	95,727	107,989	102,278	1,274,609
Marin W.D.	0	0	4,594	0	0	0	4,594
San Francisco W.D.	0	0	3,372	973	0	0	4,345
Skylonda M.W.D.	0	0	10	0	0	0	10
Oak Flat W.D.[1]	45,710	7,952	3,370	3,912	6,847	6,418	74,209
Mustang W.D.	4,256	0	0	0	0	0	4,256
Tracy Golf & Country Club	11	0	0	0	330[12]	425	766
Granite Construction	0	0	0	0	0	120	120
East Bay Regional Park District (Lake Del Valle)	0	141	112	116	89	123	581
Orestimba Creek (Spec. Rec. Rel.)	0	0	0	0	100	0	100
SAN LUIS FIELD DIVISION							
Dept. of Parks & Recreation (State's share)	59	23	61	54	72	56	325
Dept. of Fish & Rame (State's share)	0	72	298	323	636	688	2,017
Federal Customers (includes fed. rec. water plus joint-use facilities)	5,755,255	1,337,137	323,638[2]	910,860	1,239,980	1,253,956	10,820,826
SAN JOAQUIN FIELD DIVISION							
Tulare Lake Basin W.S.D.	864,785	112,717	44,522	9,533	212,963	84,061	1,328,581
Empire West Side I.D.	34,562	6,457	2,355	454	1,739	894	46,461
County of Kings	10,700	1,600	1,530	2,070	2,000	2,200	20,100
Hacienda W.D.	46,219	7,620	3,836	2,520	9,500	6,200	75,895
Kern Co. W.A.	3,297,531	881,400[3]	432,837[9]	675,970	1,290,293	964,933	7,542,964
Dudley Ridge W.D.	364,778	72,343	28,918	59,333	77,089	80,079	682,540
Devil's Den W.D.	101,031	17,427	11,911	11,362	19,138	19,974	180,843
J. G. Boswell Co.[8]	39,513	6,712	0	480	0	0	46,705
Belridge Oil Co. (formerly Buena Vista W.S.D.)[8]	48,073	0	0	1,950	5,095	3,159	58,277
Green Valley W.D.	3,958	0	0	1,299	1,279	1,795	8,331
Federal USBR (U. S. Fish & Wildlife Service)	11,700	0	0	0	0	0	11,700
Federal USBR (Cross Valley Canal)	0	88,300	31,060	8,387	51,733	0	179,480
Wheeler Ridge W.S.D.	0	0	0	91	0	0	91
SOUTHERN FIELD DIVISION							
Antelope Valley-East Kern W.A.	9,400	27,782[4]	33,354	44,137	60,493[13]	72,407	247,573
The Metropolitan W.D. of So. Cal.	1,036,494	618,541[4]	189,755	550,161	507,074	531,727	3,433,752
Littlerock Creek I.D.	2,051	589	111	208[10]	133[11]	191	3,283
Mojave W.A.	69	0	80	584	4,000	4,000	8,733
Desert W.A.	30,000	12,000	0	15,300	15,000	17,000	89,300
Coachella Valley W.D.	19,200	7,600	0	10,084	10,063	10,884	57,831
Crestline-Lake Arrowhead W.A.	2,377	1,002	1,109	1,209	1,260	1,239	8,196
San Gorgonio Pass W.A.	0	0	0	0	0	0	0
San Gabriel Valley M.W.D.	6,062	6,071	8,996	7,771	290	1,085[7]	30,275
San Bernardino Valley M.W.D.	64,171	12,273	24,833[5]	4,055	18	150	105,500
Parks & Recreation (Federal, State & County)	114	613	937	674	502	781	3,621
Piru Creek Fish Enhancement	2,915	0	0	0	0	0	2,915
Castaic Lake W.A.	0	0	0	0	7	1,210	1,217

* Prior water right entitlement.

1/ Includes regulated delivery of local supply.

2/ Includes 245 acre-feet for State Department of Fish and Game and 49 acre-feet to State Department of Parks and Recreation.

3/ Of this amount, 10,500 acre-feet was acquired by exchange agreement with **The Metropolitan W.D.S.C.**

4/ Does not include amount shown in footnote 3.

5/ Includes: Reach 24, 111 acre-feet; Reach 28J, 469 acre-feet; and Reach 30, 357 acre-feet.

6/ Includes Exchange and 1976 Carryover Water.

7/ Ground water demonstration.

8/ Repayment of preconsolidation water.

9/ Includes 200 acre-feet of local supply from Kaweah River.

10/ Water borrowed during construction.

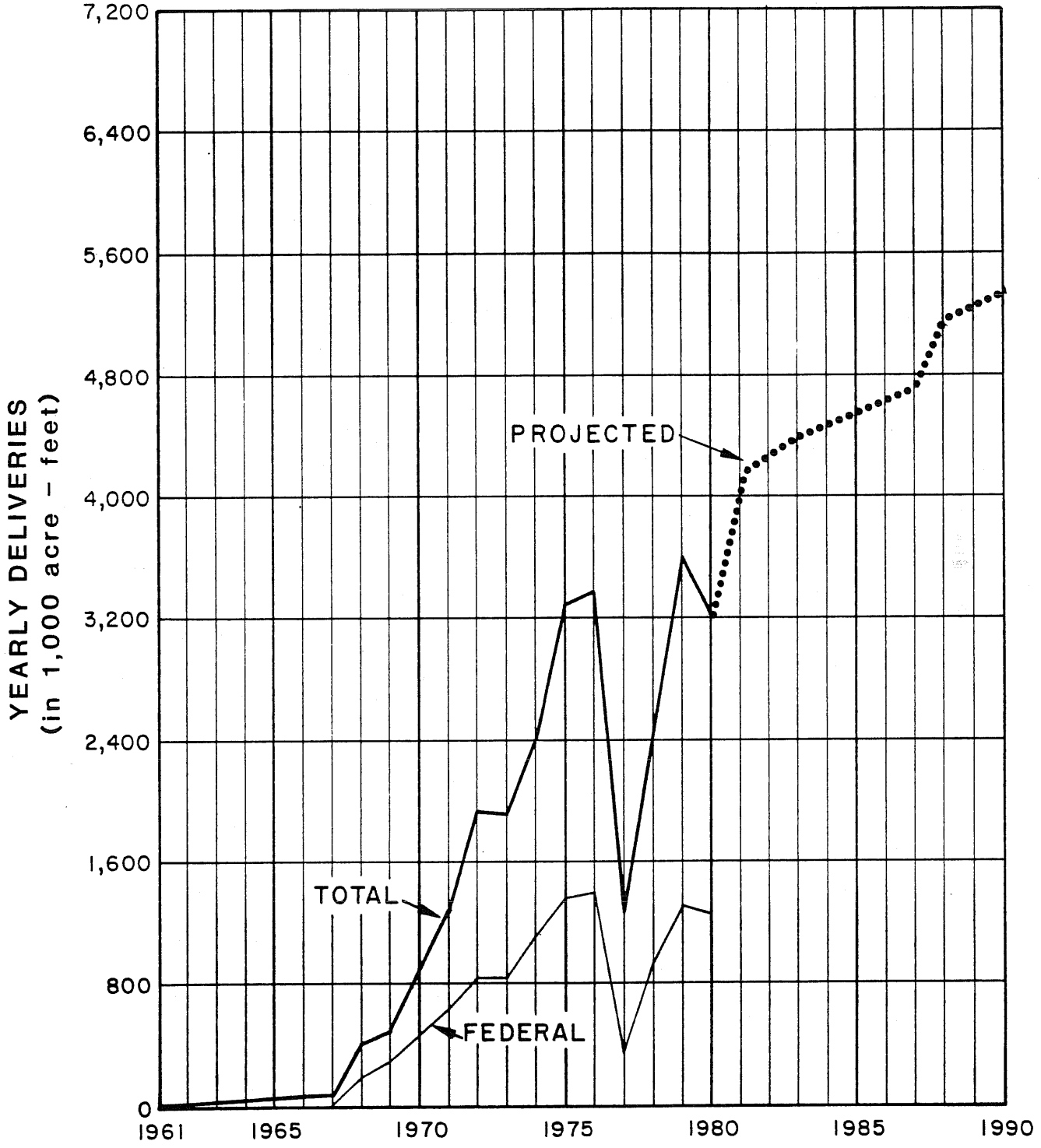
11/ Pumped from ground water basin by the agency for its use.

12/ Includes 50 acre-feet acquired in 1977 for emergency relief purposes and later sold when drought ended.

13/ Includes 30,000 acre-feet conveyed to Metropolitan for storage in local ground water basins.

FIGURE D

CALIFORNIA AQUEDUCT WATER DELIVERIES YEARLY TOTALS



Total includes federal deliveries from San Luis joint - use facilities.

SUMMARY OF CALIFORNIA AQUEDUCT OPERATION

SECTION II

Table begins on next page.

TABLE 4

SUMMARY OF CALIFORNIA AQUEDUCT OPERATION

1980

(Amounts in acre-feet)

DESCRIPTION	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE
DELTA FIELD DIVISION						
North Bay Aqueduct						
Pumped at Cordelia Pumping Plant	469	405	419	656	953	850
Storage Change	-7	2	-4	5	10	-4
Operational Losses (-), Gains (+)	0	0	0	0	0	0
Delivered to Contracting Agency	476	403	423	651	943	854
California Aqueduct						
Pumped at Delta Pumping Plant	387,017	188,292	70,724	87,083	95,309	178,246
South Bay Diversions (So. Bay P.P.)	6,774	3,940	2,595	8,995	13,308	15,757
Storage Change	36	160	-1,646	1,237	217	129
Operational Losses (-), Gains (+)	-68	399	-689	-1,840	-2,950	-1,370
Delivered to Contracting Agencies	0	0	277	1,103	1,259	836
Outflow at Check 12	380,139	184,591	68,809	73,908	77,575	160,154
South Bay Aqueduct						
Pumped at South Bay P.P.	6,774	3,940	2,595	8,995	13,308	15,757
Inflow from Lake Del Valle	1,287	3,572	3,858	1,464	434	1,301
Outflow at Del Valle P.P.	0	0	0	0	0	0
Operational Losses (-), Gains (+)	-11	-9	-10	-10	-4	-10
Delivered to Contracting Agencies:						
Project Water	6,206	5,731	4,997	8,834	13,066	14,199
Del Valle Inflow Exchanged and Released from Aqueduct	1,844	383	643	899	672	225
Del Valle Inflow Released from Aqueduct	0	1,389	803	716	0	0
Storage Change	0	0	0	0	0	0
Del Valle Stored Exchange and Released from Aqueduct	0	0	0	0	0	2,624
Lake Del Valle Operation:						
End of Month Storage	33,811	38,460	40,020	39,985	39,971	38,550
Storage Change	9,205	4,649	1,560	-35	-14	-1,421
SAN LUIS FIELD DIVISION						
O'Neill Forebay Operation						
End of Month Storage	52,172	42,508	41,171	52,333	46,862	44,819
Inflow, California Aqueduct	380,139	184,591	68,809	73,908	77,575	160,154
Inflow, O'Neill P-G Plant	0	138,042	190,874	182,436	103,867	4,550
Inflow, San Luis P-G Plant	0	0	0	0	0	229,382
Storage Change	6,779	-9,664	-1,337	11,162	-5,471	-2,043
Delivered to Federal Customers	745	670	1,158	2,717	2,383	3,474
Outflow, O'Neill P-G Plant	5,186	2,492	0	0	0	38,967
Outflow, San Luis P-G Plant	192,404	227,789	159,181	46,783	27,046	0
Operational Losses (-), Gains (+)	7,890	7,930	1,755	-9,887	-2,107	-11,574
Outflow, Dos Amigos P.P.	182,915	109,276	102,436	185,795	155,377	342,114
San Luis Reservoir Operation						
End of Month Storage	1,556,705	1,774,931	1,923,308	1,965,646	1,987,061	1,756,653
Inflow, San Luis P-G Plant	192,404	227,789	159,181	46,783	27,046	0
Storage Change	181,324	218,226	148,377	42,338	21,415	-230,408
Operational Losses (-), Gains (+)	-11,080	-9,563	-10,804	-4,445	-5,631	-1,026
Outflow, San Luis P-G Plant	0	0	0	0	0	229,382

TABLE 4

SUMMARY OF CALIFORNIA AQUEDUCT OPERATION

1980

(Amounts in acre-feet)

JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	TOTAL	DESCRIPTION
							DELTA FIELD DIVISION
							North Bay Aqueduct
677	390	479	211	654	541	6,704	Pumped at Cordelia Pumping Plant
-5	0	-2	6	4	-9	-3	Storage Change
0	0	0	0	0	0	0	Operational Losses (-), Gains (+)
682	389	481	205	650	550	6,707	Delivered to Contracting Agency
							California Aqueduct
130,320	275,598	237,756	184,034	147,117	181,144	2,162,640	Pumped at Delta Pumping Plant
16,273	16,505	9,248	8,779	12,408	10,838	125,420	South Bay Diversions (So. Bay P.P.)
-599	469	-125	-298	-146	265	-301	Storage Change
-2,592	-972	-1,680	-1,599	-469	-573	-14,403	Operational Losses (-), Gains (+)
1,262	1,032	399	334	258	202	6,962	Delivered to Contracting Agencies
110,792	256,620	226,554	173,620	134,128	169,266	2,016,156	Outflow at Check 12
							South Bay Aqueduct
16,273	16,505	9,248	8,779	12,408	10,838	125,420	Pumped at South Bay P.P.
1,458	732	4,435	5,944	577	0	25,062	Inflow from Lake Del Valle
0	0	0	0	0	0	0	Outflow at Del Valle P.P.
-10	-10	-10	-10	-10	-10	-114	Operational Losses (-), Gains (+)
							Delivered to Contracting Agencies:
15,112	15,025	12,974	13,504	10,489	9,965	130,102	Project Water
							Del Valle Inflow Exchanged and
244	13	190	192	0	66	5,371	Released from Aqueduct
							Del Valle Inflow Released from
0	0	0	0	0	0	2,908	Aqueduct
0	0	0	0	0	0	0	Storage Change
							Del Valle Stored Exchange and
2,365	2,189	509	1,017	2,486	797	11,987	Released from Aqueduct
							Lake Del Valle Operation:
36,931	35,802	31,231	25,240	24,527	24,523		End of Month Storage
-1,619	-1,129	-4,571	-5,991	-713	-4	-83	Storage Change
							SAN LUIS FIELD DIVISION
							O'Neill Forebay Operation
46,862	49,742	47,362	49,049	50,166	47,441		End of Month Storage
110,792	256,620	226,554	173,620	134,128	169,266	2,016,156	Inflow, California Aqueduct
94,899	37,927	85,282	118,082	193,976	222,003	1,371,938	Inflow, O'Neill P-G Plant
235,703	165,973	18,351	4,518	0	0	653,927	Inflow, San Luis P-G Plant
2,043	2,880	-2,380	1,687	1,117	-2,725	2,048	Storage Change
5,238	6,276	4,020	2,287	861	735	30,564	Delivered to Federal Customers
3,589	6,544	9,438	89	0	0	66,305	Outflow, O'Neill P-G Plant
2,279	0	166,491	155,236	129,739	32,548	1,139,496	Outflow, San Luis P-G Plant
-13,687	-8,995	8,533	2,151	-9,923	-16,494	-44,408	Operational Losses (-), Gains (+)
414,558	435,825	161,151	139,072	186,464	344,217	2,759,200	Outflow, Dos Amigos P.P.
							San Luis Reservoir Operation
1,522,951	1,351,986	1,483,179	1,616,591	1,738,184	1,767,418		End of Month Storage
2,279	0	166,491	155,236	129,739	32,548	1,139,496	Inflow, San Luis P-G Plant
-233,702	-170,965	131,193	133,412	121,593	29,234	392,037	Storage Change
-278	-4,992	-16,947	-17,306	-8,146	-3,314	-93,532	Operational Losses (-), Gains (+)
235,703	165,973	18,351	4,518	0	0	653,927	Outflow, San Luis P-G Plant

TABLE 4

SUMMARY OF CALIFORNIA AQUEDUCT OPERATION

1980

(Amounts in acre-feet)

DESCRIPTION	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE
SAN LUIS FIELD DIVISION (Cont.)						
California Aqueduct (Pools 14 thru 21)						
Inflow, Dos Amigos P.P. (State)	116,830	80,006	54,928	79,738	66,665	183,909
Inflow, Dos Amigos P.P. (Federal)	66,085	29,270	47,508	106,057	88,712	158,205
Inflow, Floodwater into Aqueduct	218	7,671	334	0	0	0
Inflow, Well Water Pumped into Aqueduct	0	0	0	0	9	16
Storage Change	106	-1,580	105	925	-374	1,189
Delivered to Federal Customers	68,060	34,760	47,233	109,312	88,128	161,875
Operational Losses (-), Gains (+)	4,171	4,319	-965	7,233	-1,307	8,140
Outflow, Check 21 (State)	119,138	88,086	54,467	82,791	66,325	187,206
Outflow, Check 21 (Federal)	0	0	0	0	0	0
SAN JOAQUIN FIELD DIVISION						
California Aqueduct, Check 21 to Buena Vista Pumping Plant						
Inflow, Check 21 (State)	119,138	88,086	54,467	82,791	66,325	187,206
Inflow, Check 21 (Federal)	0	0	0	0	0	0
Inflow, Kern River Intertie (State)	0	0	28,584	44,951	36,926	8,080
Delivered to State Contracting Agencies	43,352	32,849	35,838	48,473	41,381	92,994
Delivered for Repayment of Pre-consolidation Water	243	320	393	413	0	0
Delivered to Federal Customers (Cross Valley Canal)	0	0	0	0	0	0
Coastal Br. Diversion (Las Per. P.P.)	4,954	5,371	6,486	17,772	19,016	23,470
Storage Change	980	-173	-117	229	-864	921
Operational Losses (-), Gains (+)	260	-453	-754	-510	-1,530	-597
Outflow, Buena Vista P.P.	70,369	49,266	39,697	60,345	42,188	77,304
California Aqueduct, Buena Vista P.P. to Wheeler Ridge P.P.						
Inflow, Buena Vista P.P.	70,369	49,266	39,697	60,345	42,188	77,304
Delivered to Contracting Agencies	5,766	10,451	13,232	9,034	8,774	23,822
Storage Change	-82	9	335	-40	-436	276
Operational Losses (-), Gains (+)	420	-997	-329	-378	-755	201
Outflow, Wheeler Ridge P.P.	65,105	37,809	25,801	50,973	33,095	53,407
California Aqueduct, Wheeler Ridge P.P. to Wind Gap P.P.						
Inflow, Wheeler Ridge P.P.	65,105	37,809	25,801	50,973	33,095	53,407
Delivered to Contracting Agencies	411	986	1,833	3,557	2,824	6,811
Storage Change	-17	36	-59	24	-34	-9
Operational Losses (-), Gains (+)	730	1,442	457	1,028	593	-182
Outflow, Wind Gap P.P.	65,441	38,229	24,484	48,420	30,898	46,423
California Aqueduct, Wind Gap P.P. to A. D. Edmonston P. P.						
Inflow, Wind Gap P.P.	65,441	38,229	24,484	48,420	30,898	46,423
Delivered to Contracting Agencies	367	140	723	848	680	3,796
Storage Change	-32	-31	47	-90	-57	30
Operational Losses (-), Gains (+)	-158	-71	860	-207	321	-1,216
Outflow, A. D. Edmonston P.P.	64,948	38,049	24,574	47,455	30,596	41,381
Coastal Branch, California Aqueduct						
Inflow, Las Perillas P.P.	4,954	5,371	6,486	17,772	19,016	23,470
Delivered to Contracting Agencies	4,560	5,230	6,267	16,666	17,635	21,682
Storage Change	12	-32	50	0	-17	-4
Operational Losses (-), Gains (+)	-382	-173	-69	-1,106	-1,398	-1,792

TABLE 4

SUMMARY OF CALIFORNIA AQUEDUCT OPERATION

1980

(Amounts in acre-feet)

JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	TOTAL	DESCRIPTION
							SAN LUIS FIELD DIVISION (Cont.)
							California Aqueduct (Pools 14 thru 21)
221,497	257,591	122,733	108,041	116,326	157,695	1,565,959	Inflow, Dos Amigos P.P. (State)
193,061	178,234	38,418	31,031	70,138	186,522	1,193,241	Inflow, Dos Amigos P.P. (Federal)
0	0	0	0	0	0	8,223	Inflow, Floodwater into Aqueduct
16	45	0	12	9	0	107	Inflow, Well Water Pumped into Aqueduct
-702	-466	-397	4	1,698	-748	-240	Storage Change
197,747	182,681	38,276	33,164	71,467	191,331	1,224,034	Delivered to Federal Customers
10,397	9,857	-316	4,728	2,944	10,712	59,913	Operational Losses (-), Gains (+)
227,926	263,492	122,956	110,644	116,252	164,346	1,603,629	Outflow, Check 21 (State)
0	0	0	0	0	0	0	Outflow, Check 21 (Federal)
							SAN JOAQUIN FIELD DIVISION
							California Aqueduct, Check221 to Buena Vista Pumping Plant
227,926	263,492	122,956	110,644	116,252	164,346	1,603,629	Inflow, Check 21 (State)
0	0	0	0	0	0	0	Inflow, Check 21 (Federal)
20,275	0	0	0	0	0	138,816	Inflow, Kern River Intertie (State)
119,684	139,833	51,749	41,144	50,356	79,889	777,542	Delivered to State Contracting Agencies
0	0	0	505	629	656	3,159	Delivered for Repayment of Pre-consolidation Water
0	0	0	0	0	0	0	Delivered to Federal Customers (Cross Valley Canal)
27,278	25,526	8,278	5,757	4,567	8,111	156,586	Coastal Br. Diversion (Las Per. P.P.)
-905	714	53	-2,078	1,565	-728	-903	Storage Change
3,924	-408	-124	-1,914	-2,812	-1,817	-14,583	Operational Losses (-), Gains (+)
98,220	97,011	62,752	63,402	56,323	74,601	791,478	Outflow, Buena Vista P.P.
							California Aqueduct, Buena Vista P.P. to Wheeler Ridge P.P.
98,220	97,011	62,752	63,402	56,323	74,601	791,478	Inflow, Buena Vista P.P.
32,660	34,356	10,040	5,529	2,358	8,134	164,156	Delivered to Contracting Agencies
101	-178	74	-360	344	125	168	Storage Change
-30	262	719	316	-378	917	-32	Operational Losses (-), Gains (+)
65,429	63,095	53,357	58,549	53,243	67,259	627,122	Outflow, Wheeler Ridge P.P.
							California Aqueduct, Wheeler Ridge P.P. to Wind Gap P.P.
65,429	63,095	53,357	58,549	53,243	67,259	627,122	Inflow, Wheeler Ridge P.P.
8,698	7,528	3,912	2,818	3,622	4,193	47,193	Delivered to Contracting Agencies
0	11	60	-64	13	-52	-91	Storage Change
-1,189	871	1,465	1,870	1,472	612	9,169	Operational Losses (-), Gains (+)
55,542	56,427	50,850	57,665	51,080	63,730	589,189	Outflow, Wind Gap P.P.
							California Aqueduct, Wind Gap P.P. to A. D. Edmonston P.P.
55,542	56,427	50,850	57,665	51,080	63,730	589,189	Inflow, Wind Gap P.P.
6,466	7,668	2,599	573	61	187	24,108	Delivered to Contracting Agencies
-3	-53	81	-179	269	57	39	Storage Change
-217	-496	-411	-1,291	-1,116	-1,077	-5,079	Operational Losses (-), Gains (+)
48,862	48,316	47,759	55,980	49,634	62,409	559,963	Outflow, A. D. Edmonston P.P.
							Coastal Branch, California Aqueduct
27,278	25,526	8,278	5,757	4,567	8,111	156,586	Inflow, Las Perillas P.P.
25,588	24,005	7,882	5,450	4,426	7,746	147,137	Delivered to Contracting Agencies
0	-3	11	12	-13	1	17	Storage Change
-1,690	-1,524	-385	-295	-154	-364	-9,432	Operational Losses (-), Gains (+)

TABLE 4

SUMMARY OF CALIFORNIA AQUEDUCT OPERATION

1980

(Amounts in acre-feet)

DESCRIPTION	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE
SOUTHERN FIELD DIVISION						
California Aqueduct, A. D. Edmonston P.P. to Junction of West Branch						
Inflow, A. D. Edmonston P.P.	64,948	38,049	24,574	47,455	30,596	41,381
Storage Change	1	-1	3	-7	3	-2
Operational Losses (-), Gains (+)	-16	-7	-22	-14	-7	-12
Outflow, West Branch	15,490	6,261	1,249	5,353	786	312
Outflow, East Branch	49,441	31,782	23,300	42,095	29,800	41,059
California Aqueduct, Junction of West Branch to Pearblossom P.P.						
Inflow	49,441	31,782	23,300	42,095	29,800	41,059
Delivered to Contracting Agencies	433	720	991	7,210	7,548	10,647
Storage Change	-204	-15	80	53	-681	-118
Operational Losses (-), Gains (+)	-1,170	-548	-738	-1,010	-496	-891
Outflow, Pearblossom P.P.	48,042	30,529	21,491	33,822	22,437	29,639
California Aqueduct, Pearblossom P.P. to Silverwood Lake						
Inflow, Pearblossom P.P.	48, 042	30,529	21,491	33,822	22,437	29,639
Deliveries (Exchange of natural inflow)	677	506	219	471	362	798
Storage Change	79	-268	133	170	-354	25
Operational Losses (-), Gains (+)	-851	-187	317	-795	-825	-329
Outflow to Silverwood Lake	46,435	30,104	21,456	32,386	21,604	28,487
Silverwood Lake Operation						
End of Month Storage	67,900	72,782	68,307	67,291	67,319	66,978
Inflow, Project	46,435	30,104	21,456	32,386	21,604	28,487
Inflow, Natural	8,848	28,650	19,310	4,774	3,440	1,470
Storage Change	-1,469	4,882	-4,475	-1,016	-972	659
Delivered to Contracting Agencies	82	74	71	86	84	100
Outflow, Natural Inflow Released	8,027	25,773	19,184	3,275	1,748	439
Outflow, Project Water at San Bernardino Tunnel	50,588	27,832	23,003	35,172	23,728	28,806
Operational Losses (-), Gains (+)	1,945	-193	-2,983	357	-456	47
California Aqueduct, Silverwood Lake to Lake Perris						
Inflow, San Bernardino Tunnel	50,588	27,832	23,003	35,172	23,728	28,806
Storage Change	-5	4	-2	-3	3	-4
Delivered to Contracting Agencies	21,875	15,948	21,583	22,997	17,751	27,282
Outflow to Lake Perris	29,783	11,883	1,421	12,177	5,973	1,525
Operational Losses (-), Gains (+)	1,065	3	-1	-1	-1	-3
Lake Perris Operation						
End of Month Storage	112,715	122,627	120,934	121,497	119,497	108,014
Storage Change	25,067	9,912	-1,693	563	-2,000	-11,483
Inflow	29,783	11,883	1,421	12,177	5,973	1,525
Delivered to Contracting Agencies	4,528	2,427	2,416	10,448	6,736	11,566
Operational Losses (-), Gains (+)	-188	456	-698	-1,166	-1,237	-1,442
Outflow	0	0	0	0	0	0

TABLE 4

SUMMARY OF CALIFORNIA AQUEDUCT OPERATION

1980

(Amounts in acre-feet)

JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	TOTAL	DESCRIPTION
							SOUTHERN FIELD DIVISION
							California Aqueduct, A. D. Edmonston P.P. to Junction of West Branch
48,862	48,316	47,759	55,980	49,634	62,409	559,963	Inflow, A. D. Edmonston P.P.
6	-4	-2	5	6	-7	1	Storage Change
-25	-25	-9	-17	-14	-8	-176	Operational Losses (-), Gains (+)
119	84	195	142	6,044	15,285	51,320	Outflow , West Branch
48,712	48,211	47,557	55,816	43,570	47,123	508,466	Outflow, East Branch
							California Aqueduct, Junction of West Branch to Pearblossom P.P.
48,712	48,211	47,557	55,816	43,570	47,123	508,466	Inflow
13,053	12,879	10,232	5,867	2,155	863	72,598	Delivered to Contracting Agencies
486	291	-147	123	126	-211	-217	Storage Change
-1,826	-1,835	-653	-1,272	-673	-599	-11,731	Operational Losses (-), Gains (+)
33,347	33,206	36,819	48,554	40,596	45,872	424,354	Outflow, Pearblossom P.P.
							California Aqueduct, Pearblossom P.P. to Silverwood Lake
33,347	33,206	36,819	48,554	40,596	45,872	424,354	Inflow, Pearblossom P. P.
1,005	767	931	493	94	998	7,321	Deliveries (Exchange of natural inflow)
-17	-120	292	-158	18	-6	-206	Storage Change
-294	-323	-1,305	-2,345	-232	-634	-7,803	Operational Losses (-), Gains (+)
32,065	32,236	34,291	45,874	40,252	44,246	409,436	Outflow to Silverwood Lake
							Silverwood Lake Operation
67,052	64,686	58,747	67,641	70,007	68,753		End of Month Storage
32,065	32,236	34,291	45,874	40,252	44,246	409,436	Inflow, Project
533	182	229	111	166	296	68,009	Inflow, Natural
74	-2,366	-5,939	8,894	2,366	-1,254	-616	Storage Change
145	160	136	138	107	95	1,278	Delivered to Contracting Agencies
216	19	17	17	16	18	58,749	Outflow, Natural Inflow Released
32,371	34,508	40,613	37,801	38,293	46,184	418,899	Outflow, Project Water at San Bernardino Tunnel
208	-97	307	865	364	501	865	Operational Losses (-), Gains (+)
							California Aqueduct, Silverwood Lake to Lake Perris
32,371	34,508	40,613	37,801	38,293	46,184	418,899	Inflow, San Bernardino Tunnel
-1	4	1	0	0	-1	-4	Storage Change
31,206	33,009	30,955	32,602	28,171	21,214	304,593	Delivered to Contracting Agencies
1,163	1,473	8,554	5,197	10,121	24,970	114,240	Outflow to Lake Perris
-3	-22	-1,103	-2	-1	-1	-70	Operational Losses (-), Gains (+)
							Lake Perris Operation
92,368	74,329	71,902	72,980	81,221	100,212		End of Month Storage
-15,646	-18,039	-2,427	1,078	8,241	18,991	12,564	Storage Change
1,163	1,473	8,554	5,197	10,121	24,970	114,240	Inflow
15,159	18,770	11,539	3,209	1,812	3,665	92,274	Delivered to Contracting Agencies
-1,650	-742	558	-910	-68	-2,314	-9,402	Operational Losses (-), Gains (+)
0	0	0	0	0	0	0	Outflow

TABLE 4

SUMMARY OF CALIFORNIA AQUEDUCT OPERATION

1980

(Amounts in acre-feet)

DESCRIPTION	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE
SOUTHERN FIELD DIVISION (Cont.)						
West Branch California Aqueduct Tehachapi Afterbay to Oso P.P.						
Inflow	15,490	6,261	1,249	5,353	786	312
Storage Change	2	-3	3	-20	9	-6
Delivered to Contracting Agencies	0	0	0	0	0	0
Operational Losses (-), Gains (+)	-49	-23	-31	-42	-21	-38
Outflow, Oso Pumping Plant	15,439	6,241	1,215	5,331	756	280
West Branch California Aqueduct Oso P.P. to Pyramid Lake						
Inflow, Oso P.P.	15,439	6,241	1,215	5,331	756	280
Storage Change	-325	1,111	-662	274	586	-1,526
Delivered to Contracting Agencies	0	0	0	0	0	0
Operational Losses (-), Gains (+)	-52	145	-10	-95	-170	-208
Outflow to Pyramid Lake	15,712	5,275	1,867	4,962	0	1,598
Pyramid Lake Operation						
End-of-month Storage	166,553	168,421	169,115	160,324	163,980	165,384
Inflow, Project	15,712	5,275	1,867	4,962	0	1,598
Inflow, Natural (from local runoff)	3,751	25,105	13,107	3,560	2,483	1,541
Inflow, Pumpback from Elderberry Forebay	0	2,303	1,826	3,043	44,434	98,649
Storage Change	2,460	1,868	694	-8,791	3,656	1,404
Operational Losses (-), Gains (+)	-755	129	-1,782	-1,156	-2,252	-4,453
Outflow, Angeles Tunnel to Elderb. Fby.	12,343	10,283	1,202	16,223	37,933	92,254
Outflow, Natural Inflow Released to Piru Creek	3,905	20,661	13,122	2,977	3,076	3,677
Elderberry Forebay Operation						
End-of-month Storage	20,738	26,380	21,813	28,092	21,773	17,298
Inflow, Project thru Castaic P-G Plant	12,343	10,283	1,202	16,223	37,933	92,254
Inflow, Natural	2,314	14,854	4,560	1,598	949	408
Storage Change	-6,401	5,642	-4,567	6,279	-6,319	-4,475
Operational Losses (-), Gains (+)	-1,017	-5,357	156	-277	1,245	3,612
Outflow, Pumpback to Pyramid Lake	0	2,303	1,826	3,043	44,434	98,649
Outflow, Project Water Released to Castaic Lake	17,727	0	1,080	6,624	1,063	1,692
Outflow, Natural Inflow Released to Castaic Lake	2,314	11,835	7,579	1,598	949	408
Castaic Lake Operation						
End-of-month Storage	298,933	320,156	318,671	317,808	313,140	296,613
Inflow, Project	17,727	0	1,080	6,624	1,063	1,692
Inflow, Natural	1,321	17,967	8,112	3,507	2,197	780
Inflow, Natural Released from Elderberry Forebay	2,314	11,835	7,579	1,598	949	408
Storage Change	15,043	21,223	-1,485	-863	-4,668	-16,527
Delivered to Contracting Agencies	4,948	5,492	14,017	8,144	5,979	16,031
Operational Losses (-), Gains (+)	1,271	-1,252	-1,127	-455	-1,397	-168
Outflow, Castaic Afterbay	2,642	1,835	3,112	3,993	1,501	3,208
Castaic Lagoon Operation						
Inflow	2,642	1,835	3,112	3,993	1,501	3,208
Change in Storage	420	-64	179	-28	4	-2
Operational Losses (-), Gains (+)	-42	-34	-63	-75	-69	-112
Outflow, Subsurface	182	173	184	179	185	179
Outflow, Surface	1,998	1,692	2,686	3,767	1,243	2,919

TABLE 4

SUMMARY OF CALIFORNIA AQUEDUCT OPERATION

1980

(Amounts in acre-feet)

JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	TOTAL	DESCRIPTION
							SOUTHERN FIELD DIVISION (Cont.)
							West Branch California Aqueduct Tehachapi Afterbay to Oso P.P.
119	84	195	142	6,044	15,285	51,320	Inflow
95	-13	-5	14	19	-22	73	Storage Change
0	0	0	0	0	0	0	Delivered to Contracting Agencies
1	-76	-27	-53	-43	-25	-427	Operational Losses (-), Gains (+)
25	21	173	75	5,982	15,282	50,820	Outflow, Oso Pumping Plant
							West Branch California Aqueduct Oso P.P. to Pyrmaid Lake
25	21	173	75	5,982	15,282	50,820	Inflow, Oso P.P.
-2,268	-55	-39	-53	865	559	-1,533	Storage Change
0	0	0	0	0	0	0	Delivered to Contracting Agencies
-122	-76	-212	-128	-344	-47	-1,319	Operational Losses (-), Gains (+)
2,171	0	0	0	4,773	14,676	51,034	Outflow to Pyramid Lake
							Pyramid Lake Operation
129,814	130,659	129,453	131,959	137,600	142,230	---	End-of-month Storage
2,171	0	0	0	4,773	14,676	51,034	Inflow, Project
900	535	502	634	741	1,022	53,881	Inflow, Natural (from local runoff)
34,294	24,260	9,355	13,318	12,043	16,309	259,834	Inflow, Pumpback from Elderberry Forebay
-35,570	845	-1,206	2,506	5,641	4,630	-21,863	Storage Change
-4,904	-2,211	-991	-1,819	-1,678	-1,927	-23,799	Operational Losses (-), Gains (+)
66,383	20,949	9,156	8,801	9,376	24,308	309,211	
1,648	790	916	826	862	1,142	53,602	Outflow, Natural Inflow Released to to Piru Creek
							Elderberry Forebay Operation
27,955	23,622	23,705	19,882	12,061	21,532	---	End-of-month Storage
66,383	20,949	9,156	8,801	9,376	24,308	309,211	Inflow, Project thru Castaic P-G Plant
38	2	0	0	27	49	24,799	Inflow, Natural
10,657	-4,333	83	-3,823	-7,821	9,471	-5,607	Storage Change
1,783	1,081	-718	694	438	1,573	3,213	Operational Losses (-), Gains (+)
34,294	24,260	8,355	13,318	12,043	16,309	258,834	Outflow, Pumpback to Pyramid Lake
23,215	2,103	0	0	5,592	101	59,197	Outflow, Project Water Released to Castaic Lake
38	2	0	0	27	49	24,799	Outflow, Natural Inflow Released to Castaic Lake
							Castaic Lake Operation
304,940	291,712	262,995	236,135	226,111	214,626	---	End-of-month Storage
23,215	2,103	0	0	5,592	101	59,197	Inflow, Project
293	193	152	147	185	281	35,135	Inflow, Natural
38	2	0	0	27	49	24,799	Inflow, Natural Release from Elderberry Forebay
8,327	-13,228	-28,717	-26,860	-10,024	-11,485	-69,264	Storage Change
15,114	14,675	28,027	26,852	14,966	11,687	165,932	Delivered to Contracting Agencies
390	-527	-692	-155	-862	-229	-5,203	Operational Losses (-), Gains (+)
495	324	150	0	0	0	17,260	Outflow, Castaic Afterbay
							Castaic Lagoon Operation
495	324	150	0	0	0	17,260	Inflow
-221	-26	-108	-248	-200	-143	-437	Change in Storage
-125	-111	-89	-65	-74	-58	-917	Operational Losses (-), Gains (+)
184	184	149	183	126	85	1,993	Outflow, Subsurface
406	55	20	0	0	0	14,786	Outflow, Surface

PUMPING PLANTS

SECTION III

TABLE 5

PROJECT PUMPING PLANTS

1980

(Amounts in acre-feet)

PUMPING PLANTS	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	TOTAL
Hyatt	12,533	0	1,581	12,309	28,392	0	3,517	1,136	3,469	34,212	0	10,493	107,642
Thermalito	13,247	0	1,786	15,438	29,830	0	5,165	1,414	3,186	41,248	0	11,074	122,388
Cordelia	469	405	419	656	953	959	677	390	479	211	654	541	6,813
Delta:													
State	273,819	101,490	70,455	87,083	90,232	178,246	84,807	275,598	237,756	184,034	147,117	180,384	1,911,781
Federal	113,198	86,802	269	0	5,077	0	45,513	0	0	0	0	0	250,859
South Bay	6,774	3,940	2,595	8,995	13,308	15,757	16,273	16,505	9,248	8,779	12,408	10,838	125,420
Del Valle	0	0	0	0	0	0	0	0	0	0	0	0	0
1/San Luis:													
State	98,085	22,035	2,056	2,055	27	0	0	0	120,905	77,357*	8,870	9,480	340,870
Federal	94,319	205,755	157,125	44,728	27,019	0	2,279	0	45,586	77,879	120,869	23,068	798,626
2/O'Neill:													
Federal	0	138,042	190,874	182,436	103,867	4,550	94,899	37,927	85,282	118,082	193,976	222,003	1,371,938
State	0	0	0	0	0	0	0	0	0	0	0	0	0
1/Dos Amigos:													
State	116,830	80,006	54,928	79,738	66,665	183,909	221,497	257,591	122,733	108,041	116,326	157,695	1,565,959
Federal	66,085	29,270	47,508	106,057	88,712	158,205	193,061	178,234	38,418	31,031	70,138	186,275	1,193,241
Las Perillas	4,954	5,371	6,486	17,772	19,016	23,470	27,278	25,526	8,278	5,757	4,567	8,111	156,586
Badger Hill	4,955	5,383	6,429	17,749	19,218	23,688	27,138	25,402	7,835	6,009	4,683	8,167	156,656
Buena Vista	70,369	49,266	39,697	60,345	42,188	77,304	98,220	97,011	62,752	63,402	56,323	74,601	791,478
Wheeler Ridge	65,105	37,809	25,801	50,973	33,095	53,407	65,429	63,095	53,357	58,549	53,243	67,259	627,122
Wind Gap	65,441	38,229	24,484	48,420	30,898	46,423	55,542	56,427	50,850	57,665	51,080	63,730	589,189
A. D. Edmonston	64,948	38,049	24,574	47,455	30,596	41,381	48,862	48,316	47,759	55,980	49,634	62,409	559,963
Oso	15,439	6,241	1,215	5,331	756	280	25	21	173	75	5,982	15,282	50,820
Castaic	0	2,303	1,826	3,043	44,434	98,649	34,294	24,260	9,355	13,318	12,043	16,309	259,834
Pearblossom	48,042	30,529	21,491	33,822	22,437	29,639	33,347	33,206	36,819	48,554	40,596	45,872	424,354

1/ Joint State-Federal Facility

2/ O'Neill Pumping Plant is a Federal USBR facility

* Includes 4,071 AF for PGandE.

SAN LUIS
JOINT - USE FACILITIES

SECTION IV

TABLE 6

MONTHLY OPERATIONS SUMMARY
STATE-FEDERAL SAN LUIS JOINT-USE FACILITIES
19 80

Amounts in acre-feet unless noted.

		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Check 12	State	266941	97789	68540	73908	72498	160154	65279	256620	226554	173620	134128	169266	1,765,297
	Federal	113198	86802	269	0	5077	0	45513	0	0	0	0	0	250,859
	Total	380139	184591	68809	73908	77575	160154	110792	256620	226554	173620	134128	169266	2,016,156
O'Neill Pumping and Generating Plant Amount Pumped	State	0	0	0	0	0	0	0	0	0	0	0	0	0
	Federal	0	138042	190874	182436	103867	4550	94899	37927	85282	118082	193976	222003	1,371,938
	Total	0	138042	190874	182436	103867	4550	94899	37927	85282	118082	193976	222003	1,371,938
Released for Generation	Federal	5186	2492	0	0	0	38967	3589	6544	9438	89	0	0	66,305
O'Neill Forebay End-of-Month Storage	State	19014	19124	31645	18322	22969	29387	15199	30207	26118	19594	23068	15840	XXXX
	Federal	33158	23384	9526	34011	23893	15432	31663	19535	21244	29455	27098	31601	XXXX XXXX
	Total	52172	42508	41171	52333	46862	44819	46862	49742	47362	49049	50166	47441	XXXX
San Luis Reservoir End-of-Month Storage	State	1059911	1076686	1072800	1072410	1069340	1032237	882526	858854	962136	1025904	1030294	1037951	XXXX
	Federal	496794	698245	850508	893236	917721	724416	640425	493132	521043	590687	707890	729467	XXXX XXXX
	Total	1556705	1774931	1923308	1965646	1987061	1756653	1522951	1351986	1483179	1616591	1738184	1767418	XXXX
San Luis Pumping and Generating Plant Amount Pumped	State	98085	22035	2056	2055	27	0	0	0	120905	77357 1/	8870	9480	340,870
	Federal	94319	205754	157125	44728	27019	0	2279	0	45586	77879	120869	23068	798,626
	Total	192404	227789	159181	46783	27046	0	2279	0	166491	155236	129739	32548	1,139,496
Released for Generation	State	0	0	0	0	0	36539	149558	20926	8302	4071 2/	0	0	219,396
	Federal	0	0	0	0	0	192843	86145	145047	10049	447	0	0	434,531
	Total	0	0	0	0	0	229382	235703	165973	18351	4518	0	0	653,927
Dos Amigos Pumping Plant Amount Pumped	State	116830	80006	54928	79738	66665	183909	221497	257591	122733	108041	116326	157695	1,565,959
	Federal	66085	29270	47508	106057	88712	158205	193061	178234	38418	31031	70138	186522	1,193,241
	Total	182915	109276	102436	185795	155377	342114	414558	435825	161151	139072	186464	344217	2,759,200

1/ Includes 4,071 acre-feet for PGandE. 2/ For PGandE.

OPERATION OF RESERVOIRS

SECTION V

TABLE 7

UPPER FEATHER AREA LAKES
MONTHLY OPERATION
1980
(in acre-feet except as noted)

Month	Lake Storage			Outflow							Inflow
				Regulated Release							
	Water Surface Elevation (in feet) *	Storage *	Storage Change	Streamflow Maint.	Water Supply Contract	Water Right Entitlement	Total Regulated Release	Spill	Estimated Evaporation and Seepage	Total Outflow	Computed or Estimated
	1	2	3	4	5	6	7	8	9	10	11
ANTELOPE LAKE				Capacity 22,566 ac-ft							
Jan	5002.35	22890	4880	615	0	0	615	1496	64	2175	7055
Feb	5002.66	23182	292	575	0	0	575	3422	75	4072	4364
Mar	5002.56	23088	-94	615	0	0	615	4044	113	4772	4678
Apr	5003.30	23790	702	408	0	0	408	8418	190	9016	9718
May	5002.84	23352	-438	0	0	0	0	9872	304	10176	9738
June	5002.15	22704	-648	296	0	0	296	3433	404	4133	3485
July	5001.03	21674	-1030	1208	0	0	1208	70	590	1868	838
Aug	4999.23	20068	-1606	1212	0	0	1212	0	594	1806	200
Sept	4997.75	18804	-1220	1023	0	0	1023	0	401	1424	204
Oct	4996.31	17621	-1183	1275	0	0	1275	0	266	1541	358
Nov	4995.17	16716	-905	1196	0	0	1196	0	127	1323	418
Dec	4994.50	16198	-518	1230	0	0	1230	0	85	1315	797
Tot	--	--	-1768	9653	0	0	9653	30755	3213	43621	41853
FRENCHMAN LAKE				Capacity 55,477 ac-ft							
Jan	5557.33	19197	5793	128	0	0	128	0	52	180	5973
Feb	5563.01	24221	5024	128	0	0	128	0	61	189	5213
Mar	5567.29	28466	4245	141	0	0	141	0	120	261	4506
Apr	5573.05	34858	6392	124	290	0	415	0	220	635	7027
May	5576.00	38463	3605	50	1191	0	1241	0	407	1648	5253
June	5575.60E	37961	-502	0	1574	0	1574	0	543	2117	1615
July	5572.96	34752	-3209	0	2711	0	2711	0	780	3491	282
Aug	5569.27E	30569	-4183	0	3453	0	3453	0	757	4210	27
Sept	5567.36	28539	-2030	0	1638	0	1638	0	498	2136	106
Oct	5566.64	27796	-743	0	582	0	582	0	334	916	173
Nov	5566.52	27674	-122	0	232	0	232	0	164	396	274
Dec	5566.90	28063	389	43	124	0	167	0	113	280	669
Tot	--	--	14659	614	11795	0	12410	0	4049	6459	31118
LAKE DAVIS				Capacity 84,371 ac-ft							
Jan	5767.40	56744	8171	252	4	0	256	0	218	474	8645
Feb	5769.70	64473	7729	243	23	0	266	0	233	499	8228
Mar	5770.64	67793	3320	545	1	0	546	0	422	968	4288
Apr	5772.54	74782	6989	833	1	0	834	0	733	1567	8556
May	5773.33	77795	3013	682	29	179	890	0	1262	2152	5165
June	5773.04	76682	-1113	655	45	179	879	0	1656	2535	1422
July	5772.32	73954	-2728	676	74	184	934	0	2426	3360	632
Aug	5771.48	70837	-3117	615	61	246	922	0	2484	3406	289
Sept	5770.87	68620	-2217	698	41	135	874	0	1709	2583	366
Oct	5770.46	67150	-1470	861	14	0	875	0	1165	2040	570
Nov	5770.23	66334	-816	833	1	0	834	0	567	1401	585
Dec	5770.34	66724	390	861	1	0	862	0	391	1253	1643
Tot	--	--	18151	7754	295	923	8972	0	13266	22238	40389

*At end of month.
E=estimated.

Table 8
LAKE OROVILLE
MONTHLY OPERATION

Amounts in acre-feet unless noted

Capacity 3,537,577 acre-feet

MONTH	YEAR	WATER SURFACE * ELEVATION (IN FEET)	STORAGE *	STORAGE CHANGE	OUTFLOW						TOTAL INFLOW	
					POWER	PALERMO CANAL	SPILLWAY LEAKAGE	EVAPORATION	SPILL	TOTAL OUTFLOW	PUMPBACK	INFLOW**
JAN	1980	844.52	2,735,516	-78,469	620,744	71	2/	1,118	726,257	1,348,190	12,533	1,257,188
	1979	847.25	2,771,631	118,603	151,906	128	159	1,026	0	153,219	941	270,881
FEB	1980	854.40	2,867,802	132,286	517,799	82	2/	1,299	352,976	872,156	0	1,004,442
	1979	856.83	2,901,014	129,383	249,053	19	206	1,243	0	250,521	8,368	371,536
MAR	1980	856.26	2,893,199	25,397	527,457	169	284	2,870	0	530,780	1,581	554,596
	1979	868.17	3,059,593	158,579	262,422	0	278	2,415	0	265,115	2,070	421,624
APR	1980	876.14	3,174,648	281,449	169,201	460	383	4,191	0	174,235	12,309	443,375
	1979	884.22	3,294,401	234,808	138,676	13	534	3,908	0	143,131	969	376,970
MAY	1980	887.52	3,344,234	169,586	262,727	1,029	823	6,294	0	270,873	28,392	412,067
	1979	897.75	3,502,144	207,743	302,479	464	1,273	7,314	0	311,530	0	519,273
JUN	1980	872.23	3,117,827	-226,407	414,995	1,115	867	8,114	0	425,091	0	198,684
	1979	886.48	3,328,471	-173,673	304,226	1,183	1,335	10,700	37,079 1/	354,523	2,675	178,175
JUL	1980	855.67	2,885,126	-232,701	383,436	1,291	524	10,250	0	395,501	3,517	159,283
	1979	866.64	3,037,849	-290,622	428,750	1,210	480	10,871	0	441,311	300	150,389
AUG	1980	838.77	2,660,516	-224,610	328,796	1,288	218	9,336	0	339,638	1,136	113,892
	1979	847.07	2,769,240	-268,609	395,508	1,278	175	9,240	0	406,201	0	137,592
SEP	1980	834.93	2,611,211	-49,305	159,470	1,166	63	7,115	0	167,814	3,469	115,040
	1979	839.67	2,672,165	-97,075	200,345	1,146	75	8,364	0	209,930	14,012	98,843
OCT	1980	833.94	2,598,604	-12,607	168,644	839	61	5,713	0	175,257	34,212	128,438
	1979	841.88	2,700,906	28,741	134,430	730	175	4,202	0	139,537	8,553	159,725
NOV	1980	835.55	2,619,128	20,524	102,737	451	60	2,804	0	106,052	0	126,576
	1979	845.40	2,747,121	46,215	125,550	199	182	2,095	0	128,026	13,728	160,513
DEC	1980	844.28	2,732,357	113,229	114,745	205	139	1,261	0	116,350	10,493	219,086
	1979	850.42	2,813,985	66,864	178,744	170	262	1,699	0	180,875	25,390	222,349
TOTAL	1980	---	---	-81,628	3,770,751	8,166	3,422	60,365	1,079,233	4,921,937	107,642	4,732,667
	1979			160,957	2,872,089	6,540	5,134	63,077	37,079 1/	2,983,919	77,006	3,067,870

** Computed inflow excluding pumpback.

1/ Emergency procedures in effect during employee work stoppage allowed the use of spillway gates for release to meet downstream requirements. 2/ Included in spill amount.

*At end of month.

FIGURE E

LAKE OROVILLE OPERATION

CAPACITY 3,537,577 A .F.

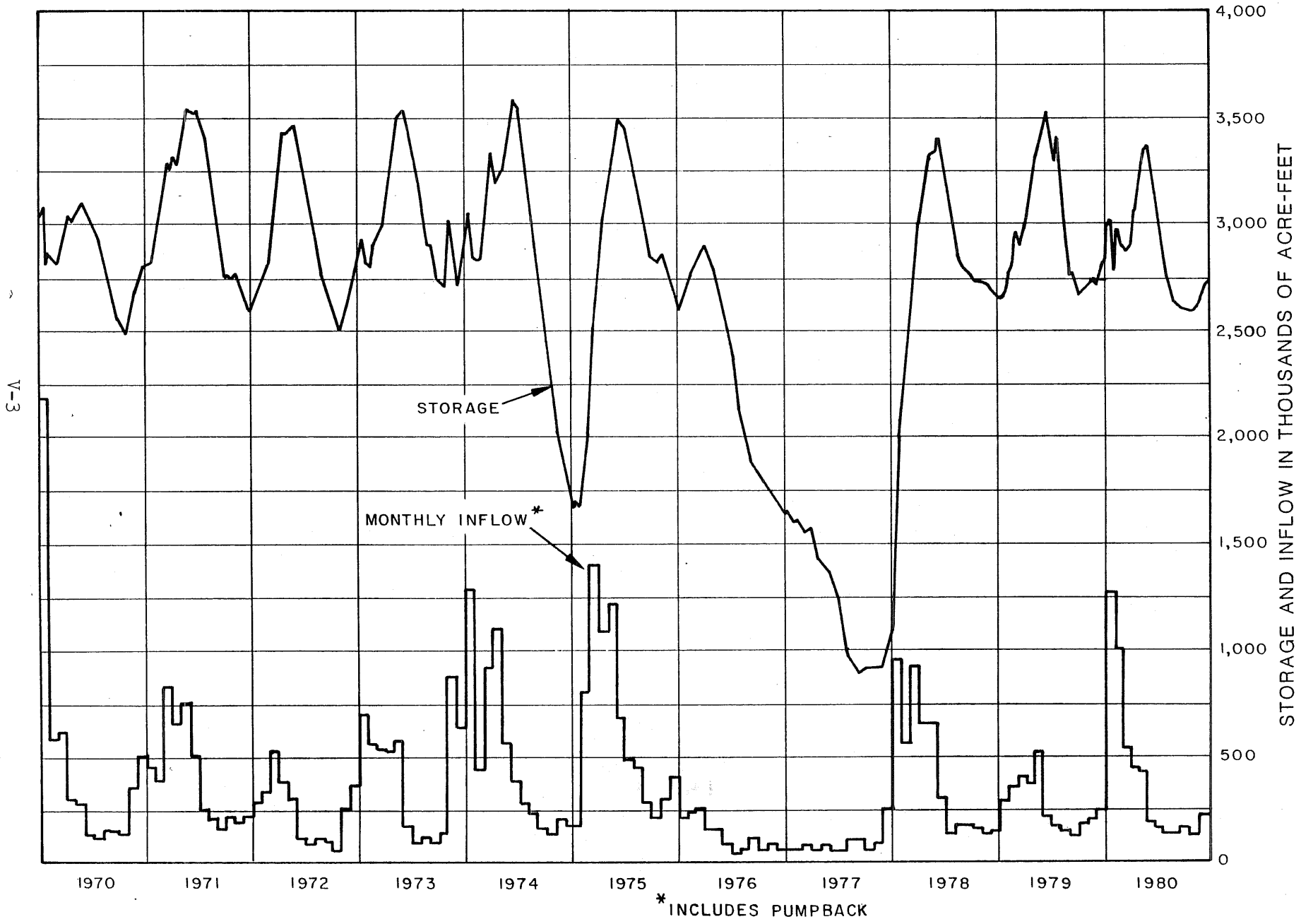


FIGURE F

OPERATION OF LAKE OROVILLE FOR FLOOD CONTROL 1979-1980

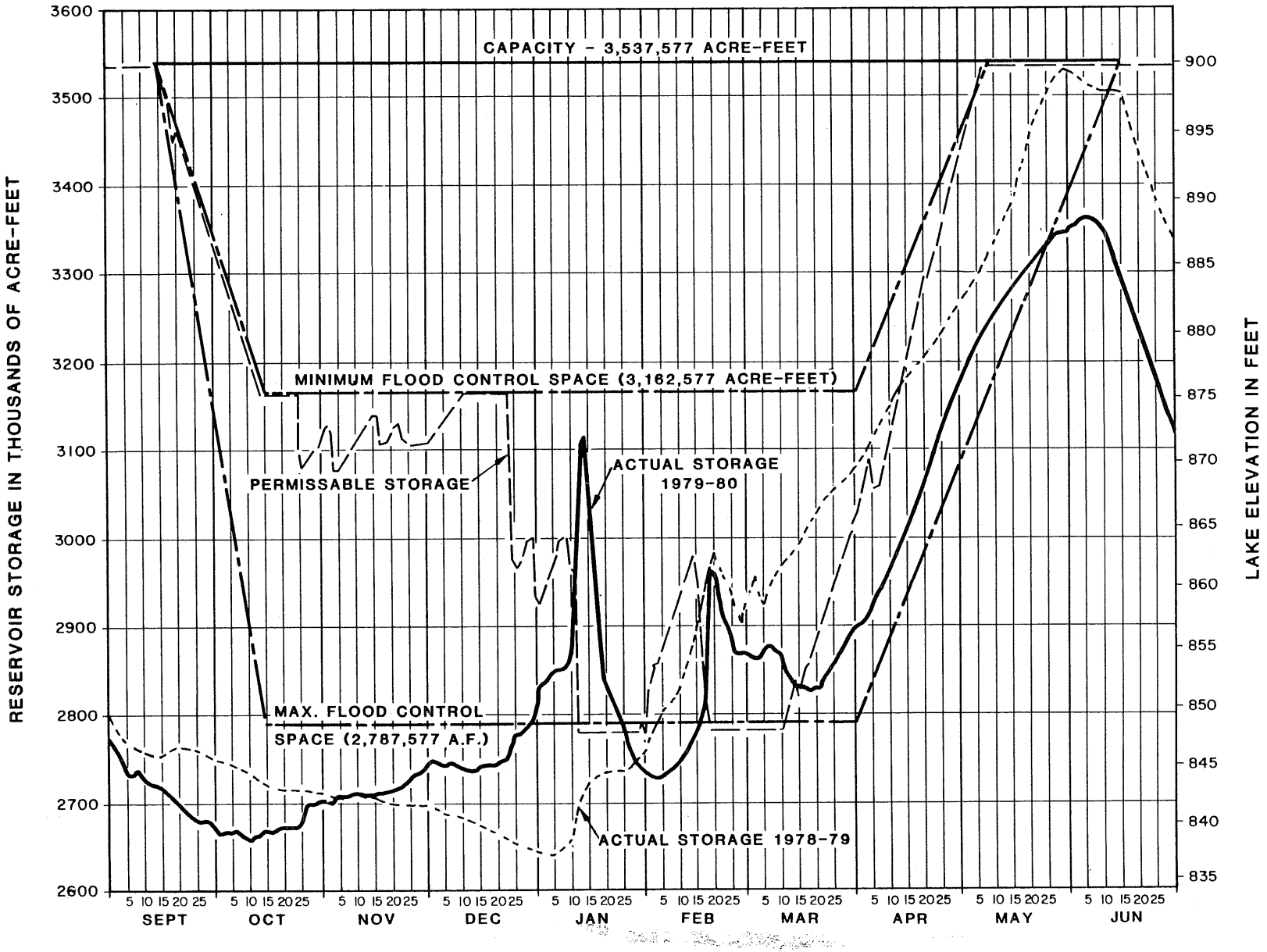


FIGURE 6

LAKE OROVILLE

ISOTHERMS - 1980

(Temperature in degrees fahrenheit)

DRAFT ELEVATION OF INTAKE STRUCTURES SHOW SHUTTER PLACEMENT AND TEMPERATURE OF WATER RELEASED AT DIFFERENT ELEVATIONS

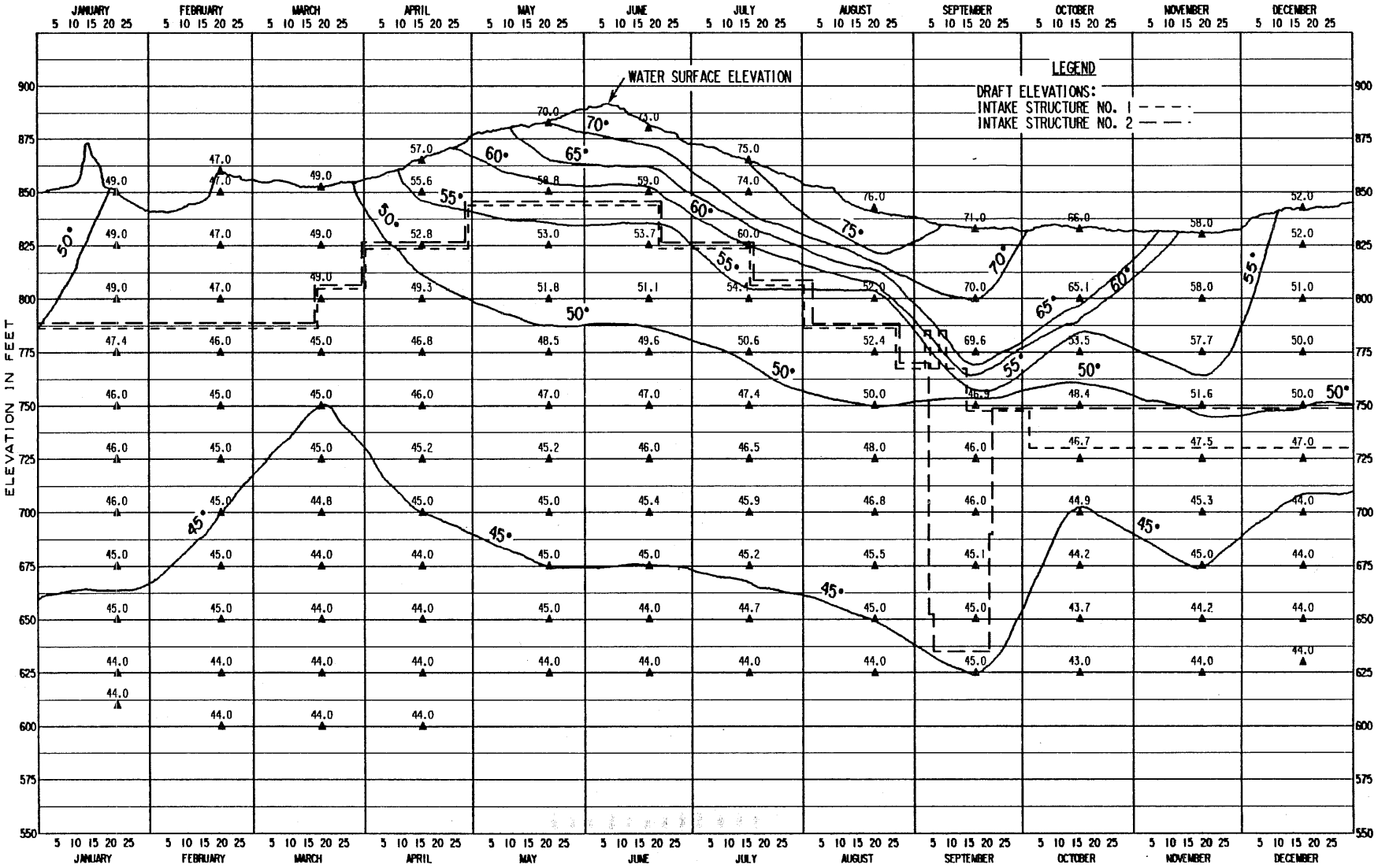


TABLE 9

OROVILLE-THERMALITO COMPLEX
MONTHLY STORAGE*

(Elevation in feet, storage in acre-feet)

MONTH	YEAR	THERMALITO DIVERSION DAM POOL		THERMALITO FOREBAY		THERMALITO AFTERBAY	
		ELEVATION	STORAGE	ELEVATION	STORAGE	ELEVATION	STORAGE
JANUARY	1980	223.11	12,749	223.12	10,607	126.33	21,060
	1979	223.51	12,875	223.60	10,752	128.12	26,191
FEBRUARY	1980	224.83	13,298	222.74	10,377	127.68	24,881
	1979	224.36	13,146	224.12	11,219	129.83	31,589
MARCH	1980	223.26	12,796	223.66	10,935	124.87	17,257
	1979	222.64	12,601	223.00	10,534	127.50	24,353
APRIL	1980	223.85	12,983	224.12	11,219	125.40	18,598
	1979	223.50	12,872	223.50	10,838	124.57	16,518
MAY	1980	223.60	12,904	223.55	10,868	126.90	22,636
	1979	224.90	13,320	224.56	11,492	127.70	24,939
JUNE	1980	224.10	13,063	223.90	11,083	125.50	18,856
	1979	223.90	12,999	223.54	10,862	125.24	18,188
JULY	1980	223.62	12,910	223.42	10,789	126.98	22,861
	1979	224.43	13,169	224.20	11,268	125.54	18,960
AUGUST	1980	223.84	12,980	223.46	10,813	125.40	18,598
	1979	223.50	12,872	223.64	10,923	127.87	25,413
SEPTEMBER	1980	223.37	12,831	223.69	10,954	127.07	23,116
	1979	224.25	13,111	224.16	11,243	125.17	18,010
OCTOBER	1980	223.15	12,761	223.12	10,607	125.34	18,443
	1979	223.99	13,028	223.90	11,083	124.76	16,984
NOVEMBER	1980	223.33	12,818	223.20	10,655	123.41	13,801
	1979	220.00	11,785	220.02	8,787	125.78	19,588
DECEMBER	1980	223.88	12,993	223.66	10,935	126.01	20,199
	1979	223.92	13,006	224.12	11,219	125.24	18,188

*At end of month.

TABLE 10

CLIFTON COURT FOREBAY

MONTHLY OPERATION

(acre-feet, except elevation in feet)

MONTH	YEAR	WATER SURFACE ELEVATION *	STORAGE *	STORAGE CHANGE	INFLOW
JANUARY	1980	1.42	21,325	1,900	387,967
	1979	2.54	23,746	1,946	82,366
FEBRUARY	1980	4.14	27,214	5,889	194,187
	1979	3.36	25,522	1,776	92,111
MARCH	1980	2.27	23,162	-4,052	65,750
	1979	2.25	23,119	-2,403	141,028
APRIL	1980	1.40	21,282	-1,880	88,757
	1979	0.23	18,758	-4,361	154,881
MAY	1980	2.14	22,881	1,599	103,792
	1979	-0.72	16,714	-2,044	190,462
JUNE	1980	-0.15	17,165	-5,716	179,224
	1979	0.55	19,448	2,734	188,406
JULY	1980	-0.37	17,467	302	138,495
	1979	-0.20	17,833	-1,615	287,451
AUGUST	1980	0.20	18,694	1,227	274,637
	1979	-1.36	15,339	-2,494	351,280
SEPTEMBER	1980	1.22	20,893	2,199	244,562
	1979	-0.21	17,811	2,472	285,283
OCTOBER	1980	0.92	20,246	-647	185,265
	1979	0.57	19,491	1,680	227,292
NOVEMBER	1980	1.25	20,958	712	148,015
	1979	-0.01	18,242	-1,249	333,357
DECEMBER	1980	0.30	18,909	-2,049	178,375
	1979	0.98	20,375	2,133	361,391
TOTAL	1980	--	--	-516	3,621,835
	1979	--	--	-1,425	2,695,308

* At end of month.

TABLE 11

LAKE DEL VALLE
MONTHLY OPERATION

1980

(Amounts in acre-feet unless noted)

MONTH	WATER* SURFACE ELEVATION (feet)	STORAGE*	STORAGE CHANGE	INFLOW		OUTFLOW				EVAPORATION (feet)	PRECIPITATION (inches)
				NATURAL	SOUTH BAY AQUEDUCT	SOUTH BAY AQUEDUCT	RECREATION 1/	ARROYO VALLE	TOTAL		
JANUARY	693.92	33,811	9,205	10,553	0	1,287	4	0	1,291	.14	3.49
FEBRUARY	700.92	38,460	4,649	26,567	0	3,572	5	18,288	21,865	.12	4.03
MARCH	703.15	40,020	1,560	5,572	0	3,716	8	142	3,866	.32	2.34
APRIL	703.10	39,985	-35	1,615	0	1,131	5	333	1,469	.40	1.56
MAY	703.08	39,971	-14	672	0	434	0	0	434	.52	.46
JUNE	701.05	38,550	-1,421	225	0	0	15	1,301	1,316	.68	0.0
JULY	698.68	36,931	-1,619	244	0	1,458	14	0	1,472	.78	.60
AUGUST	696.9	35,802	-1,129	9	0	732	17	0	749	.76	0.0
SEPTEMBER	689.75	31,231	-4,571	190	0	4,435	18	0	4,453	.60	0.0
OCTOBER	678.93	25,240	-5,991	192	0	5,944	6	0	5,950	.49	.60
NOVEMBER	677.49	24,527	-713	-5	0	577	0	0	577	.27	.29
DECEMBER	677.48	24,573	-4	66	0	0	10	0	10	.15	1.13
TOTAL	--	--	--	126,975	0	23,286	102	20,064	43,452	5.23	13.96

1/ To East Bay Regional Park District.

*At end of month.

TABLE 12
O'NEILL FOREBAY
MONTHLY OPERATION
1980
(In acre-feet unless noted)

MONTH	YEAR	RESERVOIR STORAGE			INFLOW			OUTFLOW				COMPUTED GAIN (+) LOSS (-)
		WATER SURFACE * ELEVATION (IN FEET)	STORAGE *	STORAGE CHANGE	O'NEILL P-G PLANT PUMPING	SAN LUIS P-G PLANT GENERATION	CALIFORNIA AQUEDUCT CHECK 12	O'NEILL P-G PLANT GENERATION	SAN LUIS P-G PLANT PUMPING	DOS AMIGOS PUMPING	DELIVERIES	
JANUARY	1980	223.42	52,172	6,779	0	0	380,139	5,186	192,404	182,915	745	7,890
	1979	218.79	40,053	-12,253	153,789	87	69,421	0	98,358	140,293	621	3,722
FEBRUARY	1980	219.75	42,508	-9,664	138,042	0	184,591	2,492	227,789	109,276	670	7,930
	1979	221.19	46,258	6,205	47,150	363	79,843	3,320	88	117,731	379	367
MARCH	1980	219.23	41,171	-1,337	190,874	0	68,809	0	159,181	102,436	1,158	1,755
	1979	223.29	51,823	5,565	60,077	107	131,625	4,114	20	188,053	989	6,932
APRIL	1980	223.48	52,333	11,162	182,436	0	73,908	0	46,783	185,795	2,717	-9,887
	1979	223.89	53,435	1,612	68,679	5,336	138,205	1,184	14,921	195,647	1,958	3,102
MAY	1980	221.42	46,862	-5,471	103,867	0	77,575	0	27,046	155,377	2,383	-2,107
	1979	219.26	41,248	-12,187	3,946	112,852	172,157	24,182	0	270,654	2,950	-3,356
JUNE	1980	220.64	44,819	-2,043	4,550	229,382	160,154	38,967	0	342,114	3,474	-11,574
	1979	220.14	43,516	2,268	5,164	366,725	159,682	64,965	0	445,567	4,531	-14,240
JULY	1980	221.42	46,862	2,043	94,899	235,703	110,792	3,589	2,279	414,558	5,238	-13,687
	1979	220.71	45,002	1,486	16,339	301,596	261,764	9,903	0	550,411	5,467	-12,432
AUGUST	1980	222.51	49,742	2,880	37,927	165,973	256,620	6,544	0	435,825	6,276	-8,995
	1979	222.67	50,167	5,165	31,998	18,762	331,356	3,358	10,197	500,826	6,492	-18,078
SEPTEMBER	1980	221.61	47,362	-2,380	85,282	18,351	226,554	9,438	161,151	161,151	4,020	8,533
	1979	222.07	48,573	-1,594	137,376	85	274,600	0	159,703	245,847	2,780	-5,325
OCTOBER	1980	222.25	49,049	1,687	118,082	4,518	173,620	89	155,236	139,072	2,287	2,151
	1979	220.82	45,289	-3,284	148,173	0	221,750	0	174,417	187,479	1,691	-9,620
NOVEMBER	1980	222.67	50,116	1,117	193,976	0	134,128	0	129,739	186,464	861	-9,923
	1979	219.33	41,428	-3,861	49,592	4,784	272,041	4,351	99,139	222,579	393	-3,816
DECEMBER	1980	222.64	47,441	-2,725	222,003	0	169,266	0	32,548	344,217	735	-16,494
	1979	220.86	45,393	3,965	0	94,101	348,981	22,863	17,419	385,345	663	-12,827
TOTAL	1980	---	---	2,048	1,371,938	653,927	2,016,156	66,305	1,139,496	2,759,200	30,564	-44,408
	1979	---	---	-6,913	722,283	1,066,798	2,461,425	138,230	574,226	3,450,432	28,914	-61,849

*At end of month.

TABLE 13
SAN LUIS RESERVOIR
MONTHLY OPERATION
1980
(In acre-feet unless noted)

MONTH	YEAR	RESERVOIR STORAGE			INFLOW	OUTFLOW			COMPUTED GAIN (+) LOSS (-)	EVAPORATION	PRECIPITATION IN INCHES
		WATER SURFACE * ELEVATION (IN FEET)	TOTAL * STORAGE	STORAGE CHANGE	SAN LUIS P-G PLANT PUMPING	SAN LUIS P-G PLANT GENERATION	PACHECO TUNNEL (FUTURE FACILITY)				
JANUARY	1980	504.25	1,556,705	181,324	192,404	0			-11,080	1,027	3.52
	1979	542.32	2,019,203	93,151	98,358	87			-5,120	1,081	2.55
FEBRUARY	1980	522.64	1,774,931	218,226	227,789	0			-9,563	1,702	3.16
	1979	542.52	2,021,741	2,538	88	363			2,813	1,549	2.71
MARCH	1980	534.70	1,923,308	148,377	159,181	0			-10,804	4,443	1.24
	1979	542.52	2,021,741	0	20	107			87	3,271	2.13
APRIL	1980	538.08	1,965,646	42,338	46,783	0			-4,445	6,241	.38
	1979	542.99	2,027,707	5,966	14,921	5,336			-3,619	6,469	7.94
MAY	1980	539.78	1,987,061	21,415	27,046	0			-5,631	9,549	.73
	1979	533.82	1,912,336	-115,371	0	112,852			-2,519	10,247	0.04
JUNE	1980	521.13	1,756,653	-230,408	0	229,382			-1,026	11,016	0
	1979	503.22	1,544,768	-367,568	0	366,725			-843	13,464	0
JULY	1980	501.33	1,522,951	-233,702	2,279	235,703			-278	12,355	.27
	1979	476.25	1,243,690	-301,078	0	301,596			518	11,758	0.05
AUGUST	1980	486.18	1,351,986	-170,965	0	165,973			-4,992	11,246	0
	1979	459.59	1,068,880	174,810	10,197	180,762			-4,245	10,669	0
SEPTEMBER	1980	497.86	1,483,179	131,193	166,491	18,351			-16,947	7,825	.03
	1979	473.36	1,212,743	143,863	159,703	85			-15,755	8,505	0
OCTOBER	1980	509.98	1,616,591	133,412	155,236	4,518			-17,306	5,631	.06
	1979	487.79	1,369,824	157,081	174,081	0			-17,336	5,236	0.93
NOVEMBER	1980	519.60	1,738,184	121,593	129,739	0			-8,146	2,951	.12
	1979	495.29	1,453,962	84,138	99,139	4,784			-10,217	1,855	0.87
DECEMBER	1980	522.02	1,767,418	29,234	32,548	0			-3,314	1,180	.48
	1979	488.29	1,375,381	-75,581	17,419	94,101			-1,899	1,142	1.16
TOTAL	1980	---	---	392,037	1,139,496	653,927			93,532	75,166	9.99
	1979	---	---	-201,051	574,262	1,066,798			-58,135	75,246	18.38

*At end of month.

FIGURE H

SAN LUIS RESERVOIR OPERATION

CAPACITY - 2,038,771 A. F.

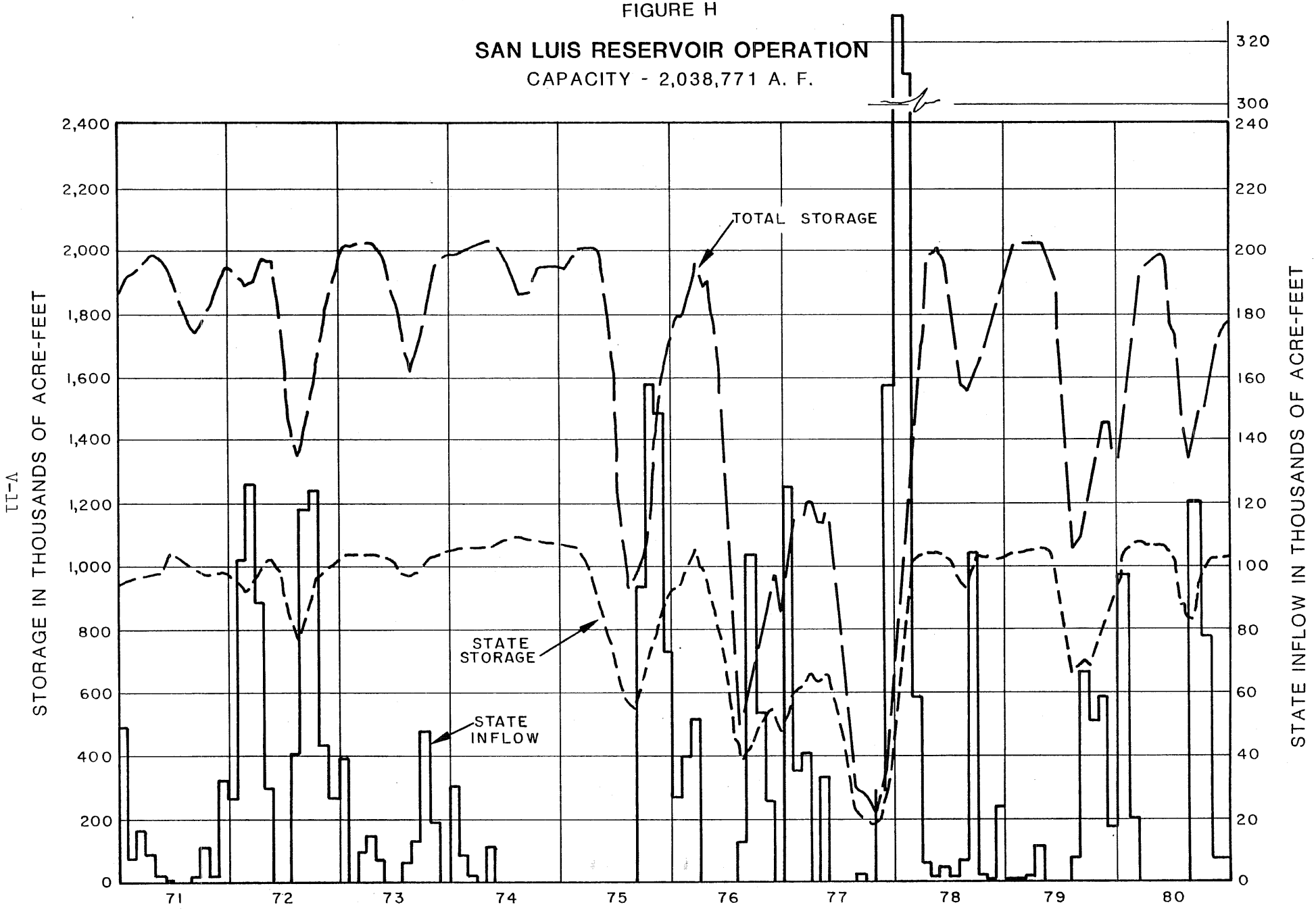


TABLE 14

PYRAMID LAKE
MONTHLY OPERATION

1980

Amounts in acre-feet unless noted

MONTH	WATER SURFACE ELEVATION (IN FEET) *	TOTAL STORAGE 1/ *	STORAGE CHANGE	INFLOW			OUTFLOW					COMPUTED LOSSES (-) GAINS (+)
				NATURAL	PROJECT		ANGELES TUNNEL	TO PIRU CREEK				
					GORMAN CREEK	PUMPBACK 2/		NATURAL INFLOW RELEASE 3/	PROJECT WATER FOR FISH ENHANCEMENT			
JAN	2575.39	(818) 166,553	2,460	3,751	15,712	0	12,343	3,905				-755
FEB	2576.85	(5,262) 168,421	1,868	25,105	5,275	2,303	10,283	20,661				129
MAR	2577.39	(5,247) 169,115	694	13,107	1,867	1,826	1,202	13,122				-1,782
APR	2570.44	(5,830) 160,324	-8,791	3,560	4,962	3,043	16,223	2,977				-1,156
MAY	2573.36	(5,237) 163,980	3,656	2,483	80	44,434	37,933	3,076				-2,332
JUN	2547.47	(1,101) 165,384	1,404	1,541	1,598	98,649	92,254	3,677				-4,453
JUL	2544.29	(2,353) 129,814	-35,570	900	2,171	34,294	66,383	1,648				-4,904
AUG	2545.06	(2,098) 130,659	845	535	0	24,260	20,949	790				-2,211
SEP	2543.96	(1,684) 129,453	-1,206	502	0	8,355	9,156	916				9
OCT	2546.24	(1,492) 131,959	2,506	634	0	13,318	8,801	826				-1,819
NOV	2551.28	(1,371) 137,600	5,641	741	4,773	12,043	9,376	862				-1,678
DEC	2555.33	(1,251) 142,230	4,630	1,022	14,676	16,309	24,308	1,142				-1,927
TOTAL			-21,863	53,881	51,034	258,834	309,211	53,602				-22,799

* At end of month.

1/ Natural inflow storage shares shown in brackets.

2/ Pumpback by Los Angeles Department of Water and Power (LADWP) from Elderberry Forebay thru Castaic Powerplant.

3/ Portion of these amounts used to satisfy fishery enhancement agreement.

FIGURE I

PYRAMID LAKE OPERATION

CAPACITY 171,196 A.F.

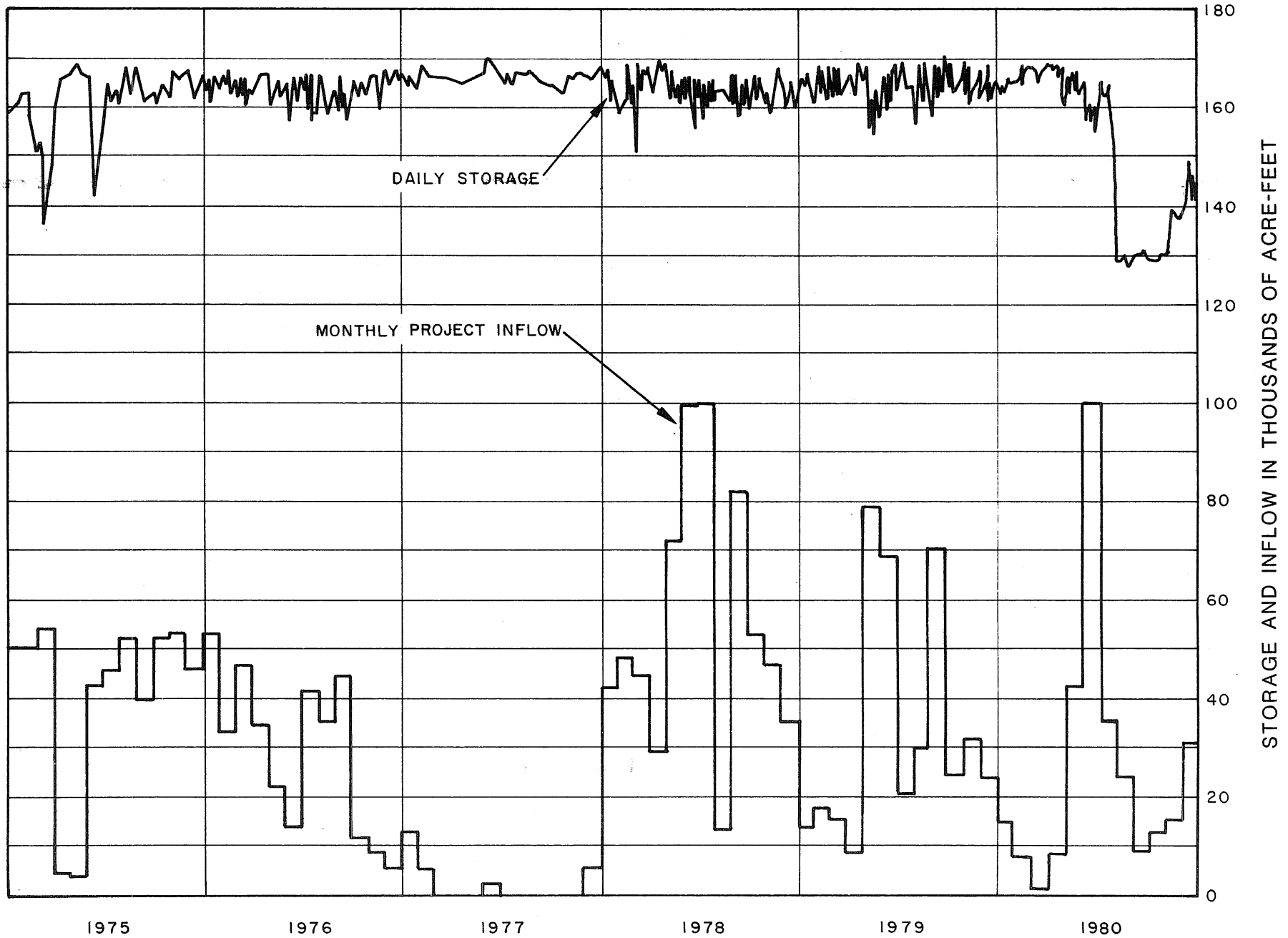


TABLE 15

ELDERBERRY FOREBAY
MONTHLY OPERATION

1980

Amounts in acre-feet unless noted

MONTH	WATER SURFACE * ELEVATION (in feet)	TOTAL STORAGE * 2/	STORAGE CHANGE	INFLOW		OUTFLOW			COMPUTED LOSSES (-) GAINS (+)
				CASTAIC P.P. GENERATION	NATURAL	TO CASTAIC LAKE		PUMP-BACK TO PYRAMID LAKE. 1/	
						NATURAL	PROJECT		
JAN	1512.4	20,738 (3,019)	-6,401	12,343	2,314	2,314	17,727	0	-1017
FEB	1525.9	26,380 (0)	5,642	10,283	14,854	11,835	0	2,303	-5357
MAR	1515.1	21,813	-4,567	1,202	4,560	7,579	1,080	1,826	156
APR	1529.7	28,092	6,279	16,223	1,598	1,598	6,624	3,043	-277
MAY	1515.0	21,773 (0)	-6,319	37,933	949	949	1,063	44,434	1,245
JUN	1503.3	17,298	-4,475	92,254	408	408	1,692	98,649	3,612
JUL	1529.4	27,955	10,657	66,383	38	38	23,215	34,294	1,783
AUG	1519.5	23,622	-4,333	20,949	2	2	2,103	24,260	1,081
SEP	1519.7	23,705	83	9,156	0	0	0	9,355	282
OCT	1510.2	19,882	-3,823	8,801	0	0	0	13,318	694
NOV	1487.7	12,061	-7,821	9,376	27	27	5,592	12,043	438
DEC	1514.4	21,532	9,471	24,308	49	49	101	16,309	1,573
TOTAL			-5,607	309,211	24,799	24,799	59,197	259,834	4,213

1/ Pumpback by Los Angeles Department of Water and Power (LADWP) thru Castaic Power Plant. * At end of month.
2/ Natural inflow storage share shown in brackets.

TABLE 16

CASTAIC LAKE
MONTHLY OPERATION

1980

Amount in acre-feet unless noted

MONTH	WATER SURFACE * ELEVATION (in feet)	TOTAL STORAGE * 1/	STORAGE CHANGE	INFLOW			OUTFLOW		DISPOSITION OF NATURAL INFLOW		COMPUTED LOSSES (-) GAINS (+)
				NATURAL	FROM ELDERBERRY FOREBAY		DELIVERIES	RELEASED TO CASTAIC AFTERBAY	RELEASED FROM CASTAIC AFTERBAY		
					NATURAL	PROJECT			SURFACE	SUB-SURFACE	
JAN	1503.66	(1,666) 298,933	15,043	1,321	2,314	17,727	4,948	2,642	1,998	182	1,271
FEB	1513.41	(29,603) 320,156	21,223	17,967	11,835	0	5,492	1,835	1,692	173	-1,252
MAR	1512.74	(42,424) 318,671	-1,485	8,112	7,579	1,080	14,017	3,112	2,686	184	-1,127
APR	1512.35	(43,583) 317,808	-863	3,507	1,598	6,624	8,144	3,993	3,767	179	-455
MAY 2/	1510.23	(1,718) 313,140	-4,668	2,197	949	1,063	5,979	1,501	1,243	185	-1,397
JUN	1502.57	(-192) 296,613	-16,527	780	408	1,692	16,031	3,208	2,919	179	-168
JUL	1506.46	(-451) 304,940	8,327	293	38	23,215	15,114	495	406	184	390
AUG	1500.25	(-495) 291,712	-13,228	193	2	2,103	14,675	324	55	184	-527
SEP	1486.18	(-512) 262,995	-28,717	152	0	0	28,027	150	20	149	-692
OCT	1472.24	(-548) 236,135	-26,860	147	0	0	26,852	0	0	183	-155
NOV	1466.82	(-462) 226,111	-10,024	185	27	5,592	14,966	0	0	126	-862
DEC	1460.46	(-217) 214,626	-11,485	281	49	101	11,687	0	0	85	-229
TOTAL			-69,264	35,135	24,799	59,197	165,932	17,260	14,776	1,993	-5,203

1/ Natural inflow storage shares shown in brackets.

2/ On May 1, 43,583 acre-feet transferred to State ownership in accordance with agreement executed October 24, 1978.

* At end of month.

FIGURE J

CASTAIC LAKE OPERATION

CAPACITY 323,702 A.F.

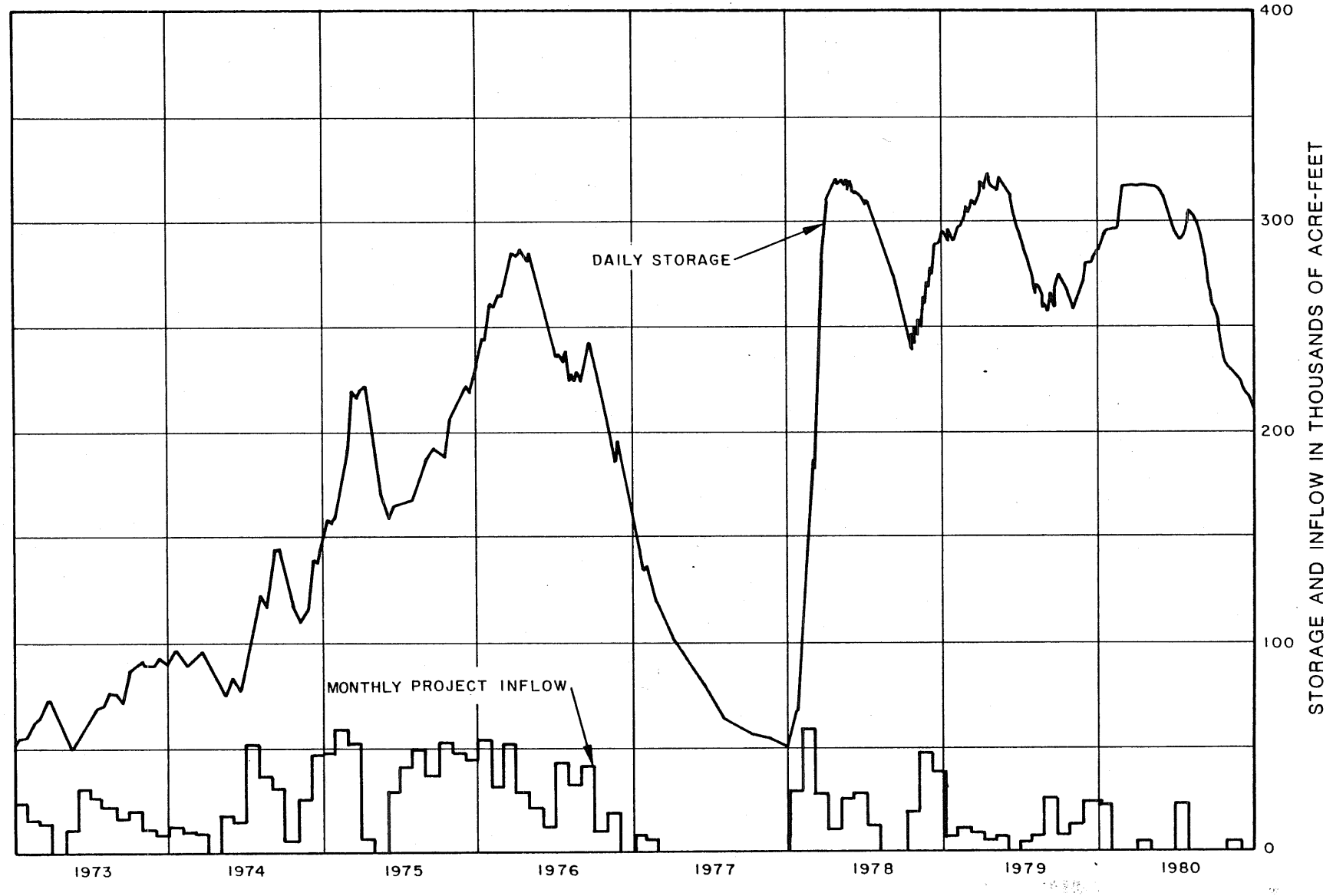


TABLE 17

SILVERWOOD LAKE
MONTHLY OPERATION
1980

Amounts in acre-feet unless noted

MONTH	WATER SURFACE * ELEVATION (IN FEET)	STORAGE * 1/	STORAGE CHANGE	INFLOW		OUTFLOW			COMPUTED LOSSES (-) GAINS (+)	EXCHANGE OF NATURAL INFLOW 2/
				NATURAL	PROJECT	SAN BERNARDINO TUNNEL	AT TURNOUT (CLAWA)	NATURAL INFLOW TO MOJAVE RIVER		
JAN	3347.56	(170) 67,900	-1,469	8,848	46,435	50,588	82	8,027	1,945	8,704
FEB	3352.74	(2,541) 72,782	4,882	28,650	30,104	27,832	73	25,773	-194	26,279
MAR	3348.00	(2,448) 68,307	-4,475	19,310	21,456	23,003	71	19,184	-2,983	19,403
APR	3346.90	(3,476) 67,291	-1,016	4,774	32,386	35,172	86	3,275	357	3,746
MAY	3345.84	(4,806) 67,319	-972	3,440	21,604	23,728	84	1,748	-456	2,110
JUN	3346.56	(5,039) 66,978	659	1,470	28,487	28,806	100	439	47	1,237
JUL	3346.64	(4,351) 67,052	74	533	32,065	32,371	145	216	208	1,221
AUG	3344.04	(3,747) 64,686	-2,366	182	32,236	34,508	160	19	-97	786
SEP	3337.28	(3,028) 58,747	-5,939	229	34,291	40,613	136	17	307	948
OCT	3347.28	(2,629) 67,641	8,894	111	45,874	37,801	138	17	865	510
NOV	3349.82	(2,685) 70,007	2,366	166	40,252	38,293	106	16	363	110
DEC	3348.48	(1,965) 68,753	-1,254	296	44,246	46,184	95	18	501	1,016
TOTAL			-616	68,009	409,436	418,899	1,276	58,749	863	66,070

*At end of month.

1/ Natural inflow storage shares are shown in brackets.

2/ Releases made from Mojave Siphon to Los Flores Ranch Co. and to Mojave River from outlet to Mojave W.A. in exchange for natural inflow stored in lake.

FIGURE K

SILVERWOOD LAKE OPERATION

CAPACITY 74,940 A.F.

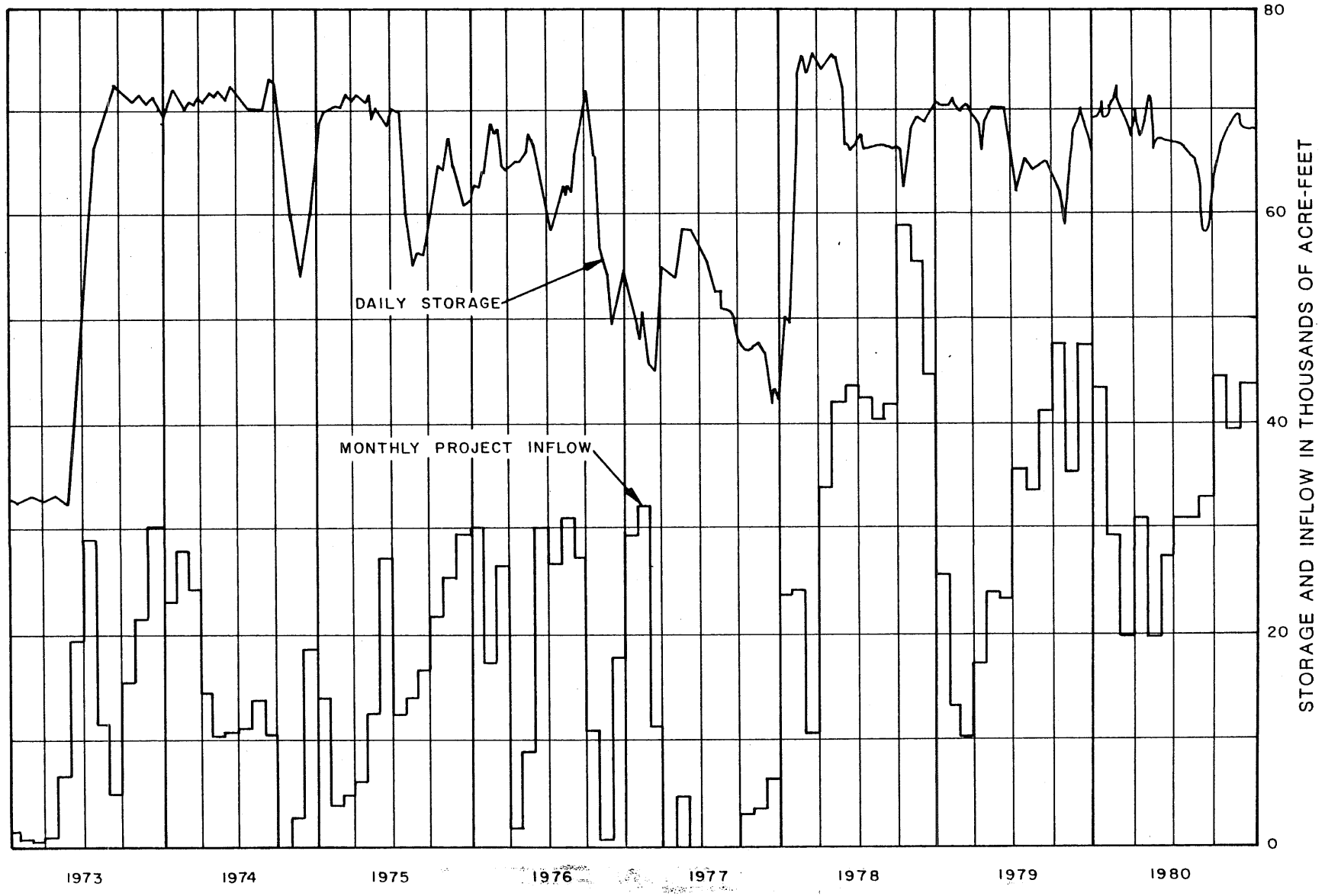


TABLE 18

LAKE PERRIS
MONTHLY OPERATION

1980

Amounts in acre-feet unless noted

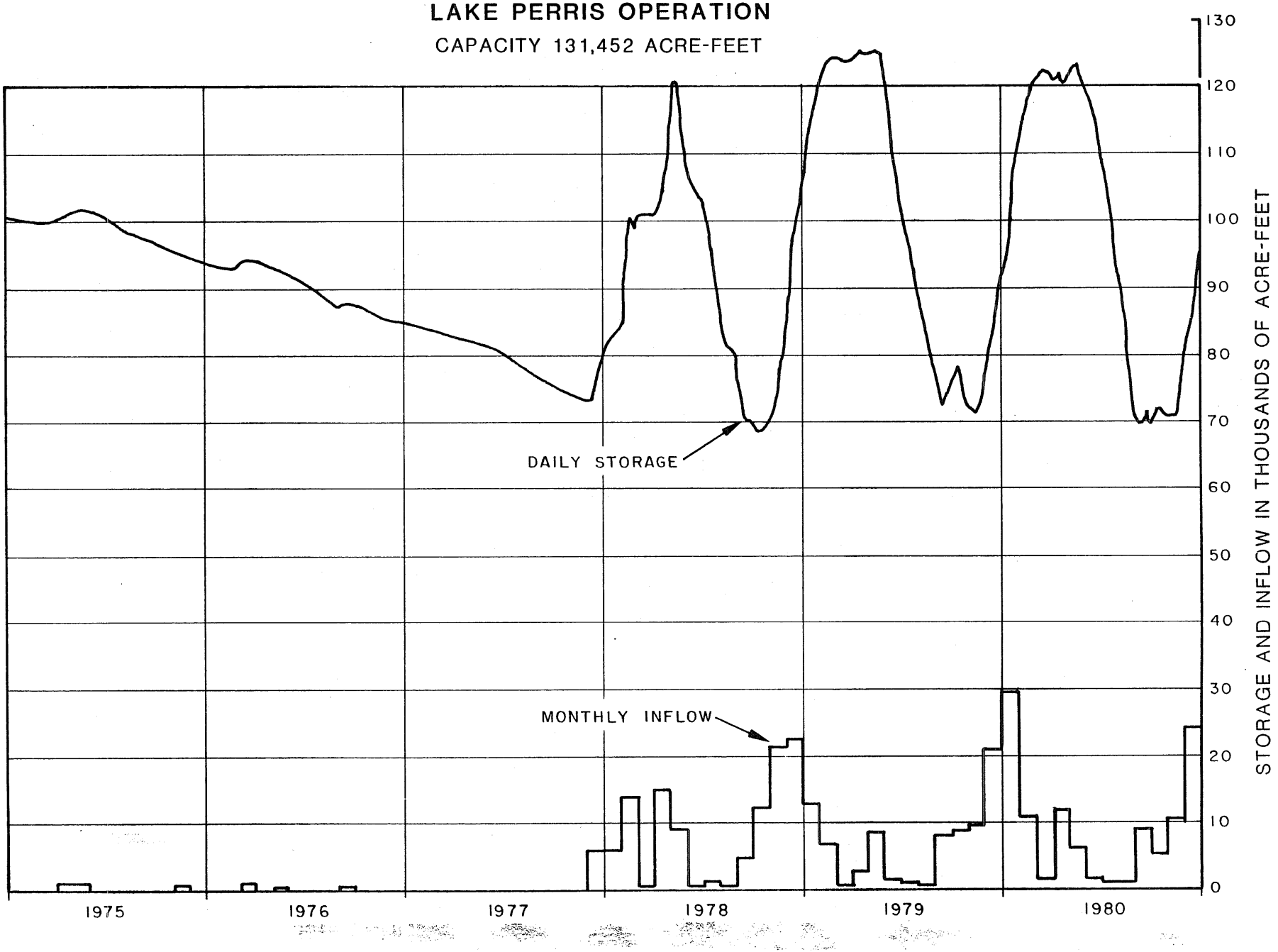
MONTH	WATER SURFACE ELEVATION * (in feet)	STORAGE	STORAGE CHANGE	INFLOW	OUTFLOW	COMPUTED LOSSES (-) GAINS (+)
JAN	1581.70	112,715	25,067	29,783	4,528	-188
FEB	1586.15	122,627	9,912	11,883	2,427	456
MAR	1585.40	120,934	-1,693	1,421	2,416	-698
APR	1585.65	121,497	563	12,177	10,448	-1,166
MAY	1584.76	119,497	-2,000	5,973	6,736	-1,237
JUN	1579.54	108,014	-11,483	1,525	11,482	-1,526
JUL	1572.10	92,368	-15,646	1,163	15,159	-1,650
AUG	1562.92	74,329	-18,039	1,473	18,770	-742
SEP	1561.62	71,902	-2,427	8,554	11,836	855
OCT	1562.20	72,980	1,078	5,197	3,209	-910
NOV	1566.52	81,221	8,241	10,121	1,812	-68
DEC	1575.88	100,212	18,991	24,970	3,665	-2,314
TOTAL			12,564	114,240	92,488	-9,188

*At end of month.

FIGURE L

LAKE PERRIS OPERATION

CAPACITY 131,452 ACRE-FEET



POWER SUPPLY & USE

SECTION VI

FIGURE M

PROJECT GROSS POWER GENERATION
1980

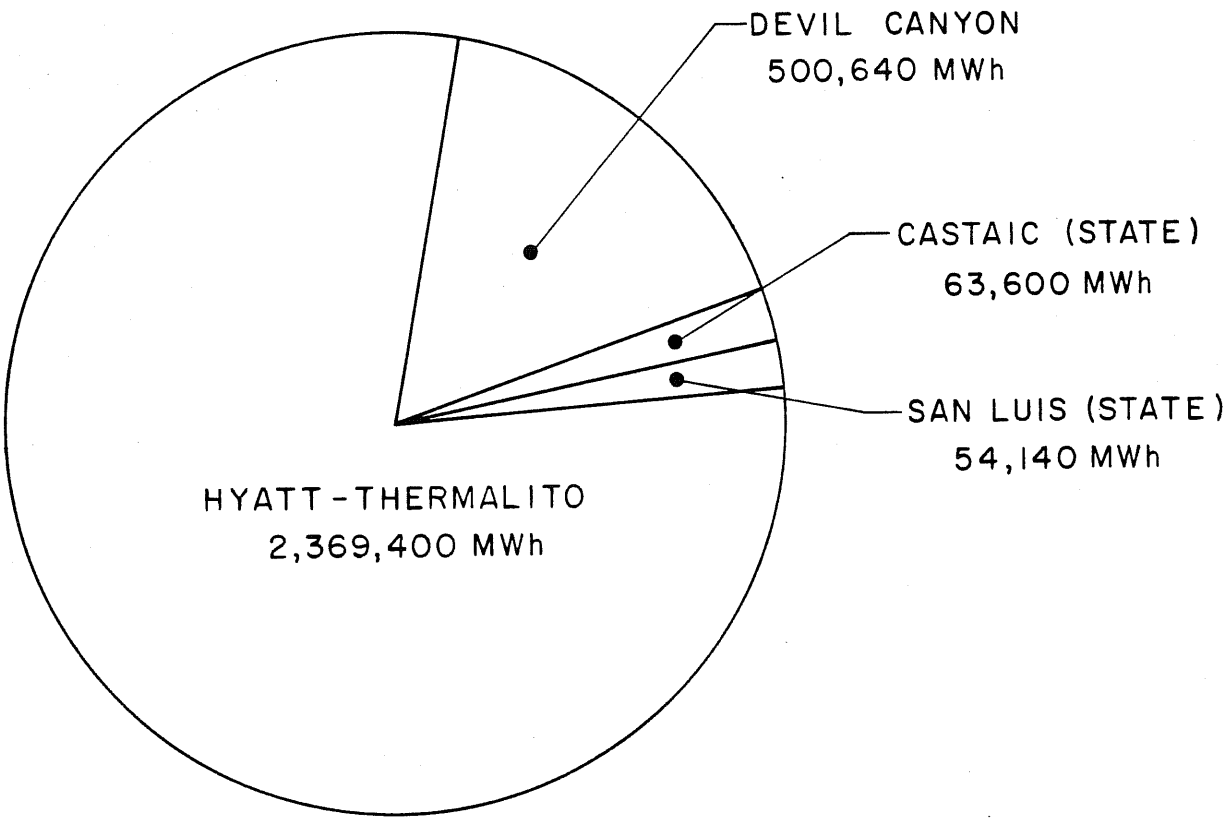
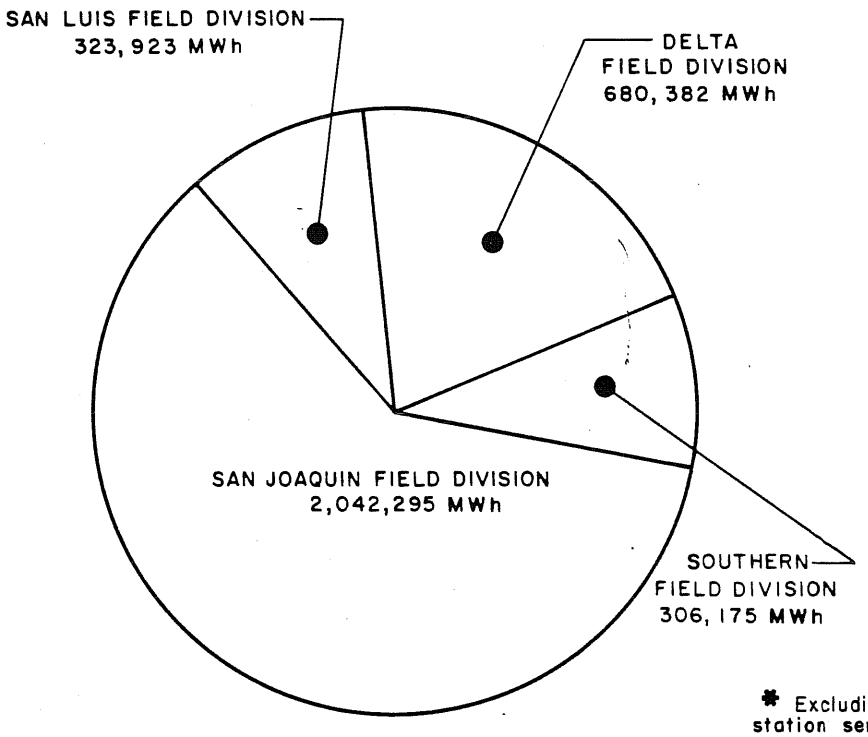


FIGURE N

PROJECT POWER OPERATIONS 1/

(STATE ONLY)
1980



POWER USED *

PUMPING PLANTS

DELTA FIELD DIVISION
1. CORDELIA
2. DELTA
3. SOUTH BAY
4. DEL VALLE

SAN LUIS FIELD DIVISION
1. SAN LUIS
2. DOS AMIGOS

SAN JOAQUIN FIELD DIVISION
1. LAS PERILLAS
2. BADGER HILL
3. BUENA VISTA
4. WHEELER RIDGE
5. IRA J. CHRISMAN WIND GAP
6. A. D. EDMONSTON

SOUTHERN FIELD DIVISION
1. OSO
2. PEARBLOSSOM

* Excluding Devil Canyon Powerplant station service and State's share of power to pump waterfowl mitigation water at Tracy Pumping Plant

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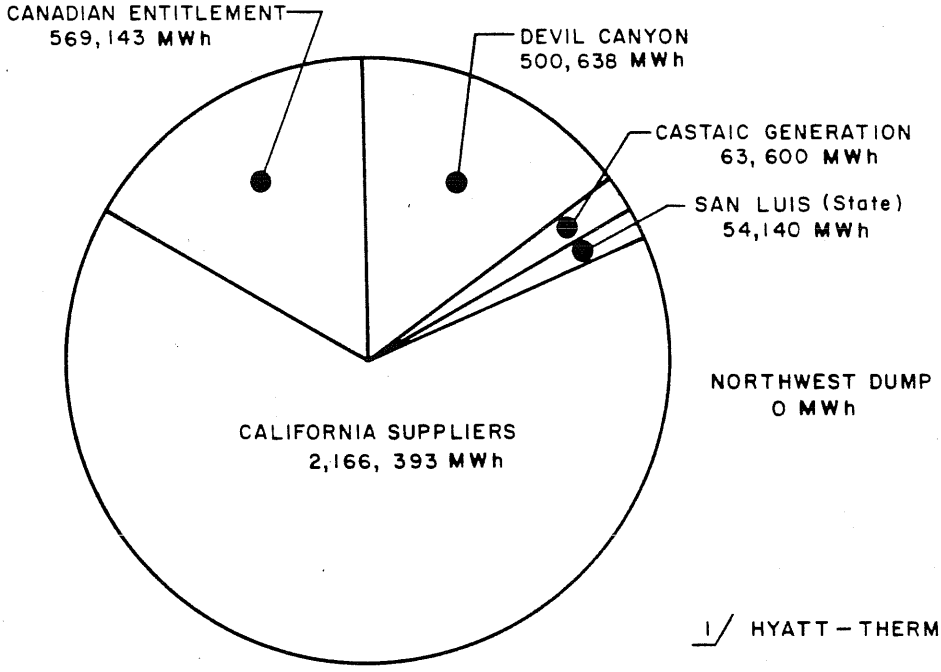


POWER SUPPLIED

1/ HYATT – THERMALITO NOT INCLUDED.

FIGURE O

GROSS GENERATION AT EDWARD HYATT AND THERMALITO POWERPLANTS

1980

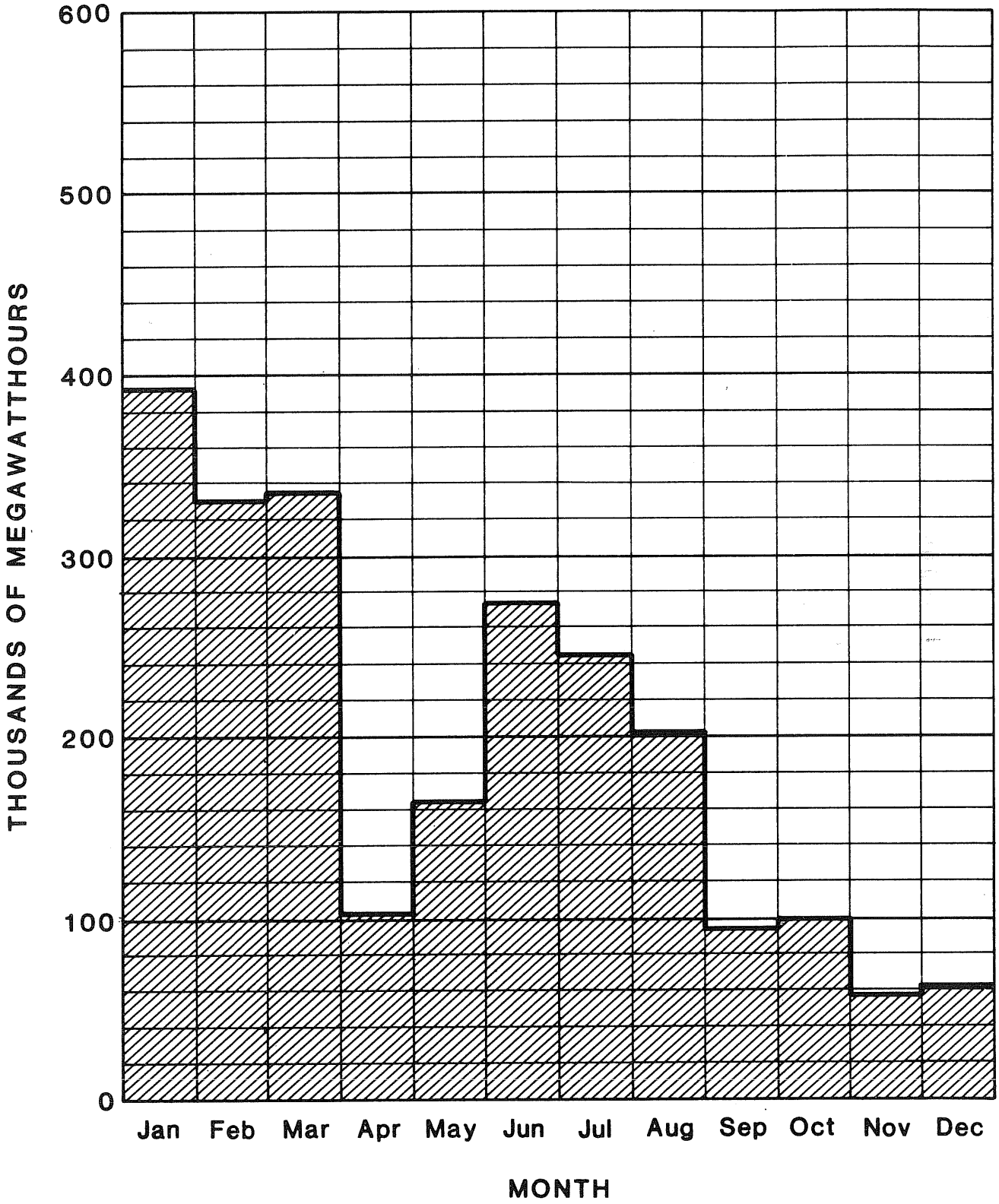


FIGURE P

OPERATION OF EDWARD HYATT AND THERMALITO POWERPLANTS

1980

ENERGY IN THOUSANDS OF MWh

OPERATIONS	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	TOTAL
ENERGY GENERATED BY EDWARD HYATT AND THERMALITO POWER PLANTS													
GROSS GENERATION	394.20	328.11	336.13	102.39	166.77	272.26	245.10	203.61	94.79	100.57	58.90	66.57	2,369.40
POWERPLANT USE AND PUMPBACK REQUIREMENTS	13.20	2.54	3.34	13.39	29.31	.92	5.67	4.29	6.63	34.14	5.95	12.35	131.73
DELIVERED TO CALIFORNIA POWER POOL COMPANIES	381.00	325.57	332.79	89.00	137.46	271.34	239.43	199.32	88.16	66.43	52.95	54.22	2,237.67

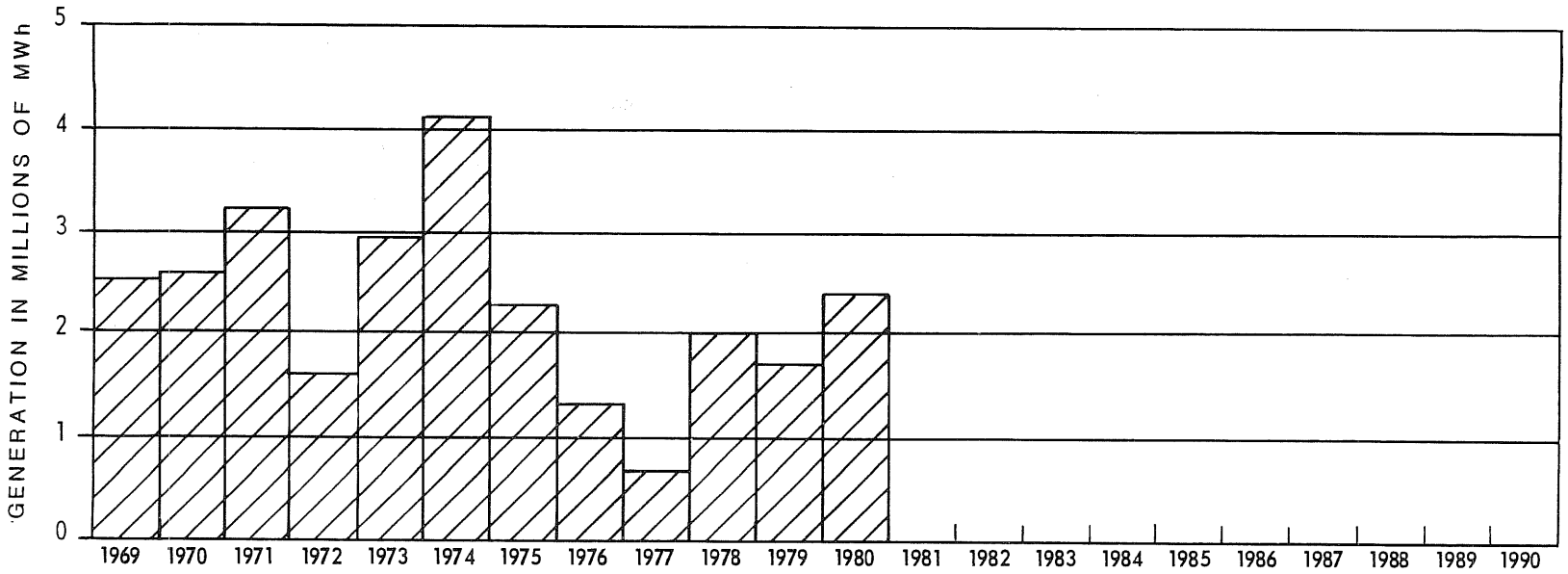


TABLE 19

PROJECT POWER SUPPLY

1980

(In Megawatthours)

SOURCE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	TOTAL
San Luis Generation:													
State	0	0	0	0	0	9,786	37,815	4,990	1,549	0	0	0	54,140
Federal	0	0	0	0	0	52,014	21,278	34,215	2,431	103	0	0	110,041
Total	0	0	0	0	0	61,800	59,093	39,205	3,980	103	0	0	164,181
Castaic:													
State	16,656	6,912	1,920	4,800	0	1,680	28,920	0	0	0	2,184	528	63,600
Devil Canyon	59,372	32,585	27,740	42,261	28,609	34,857	39,249	41,767	48,917	45,372	46,179	53,730	500,638
Bonneville Power Administration	0	0	0	0	0	0	0	0	0	0	0	0	0
Canadian Entitlement	50,053	46,681	49,815	45,735	47,531	46,132	47,800	48,109	46,243	47,495	45,999	47,550	569,143
Suppliers	269,717	122,009	58,206	146,918	103,233	183,200	136,012	253,023	232,574	234,984	183,539	242,978	2,166,393
PGandE, SDG&E and SCE	0	0	0	0	0	0	0	0	0	0	0	0	0
PGandE: San Luis Generation	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE 20

PROJECT POWER USE

1980
(In Megawatthours) 1/

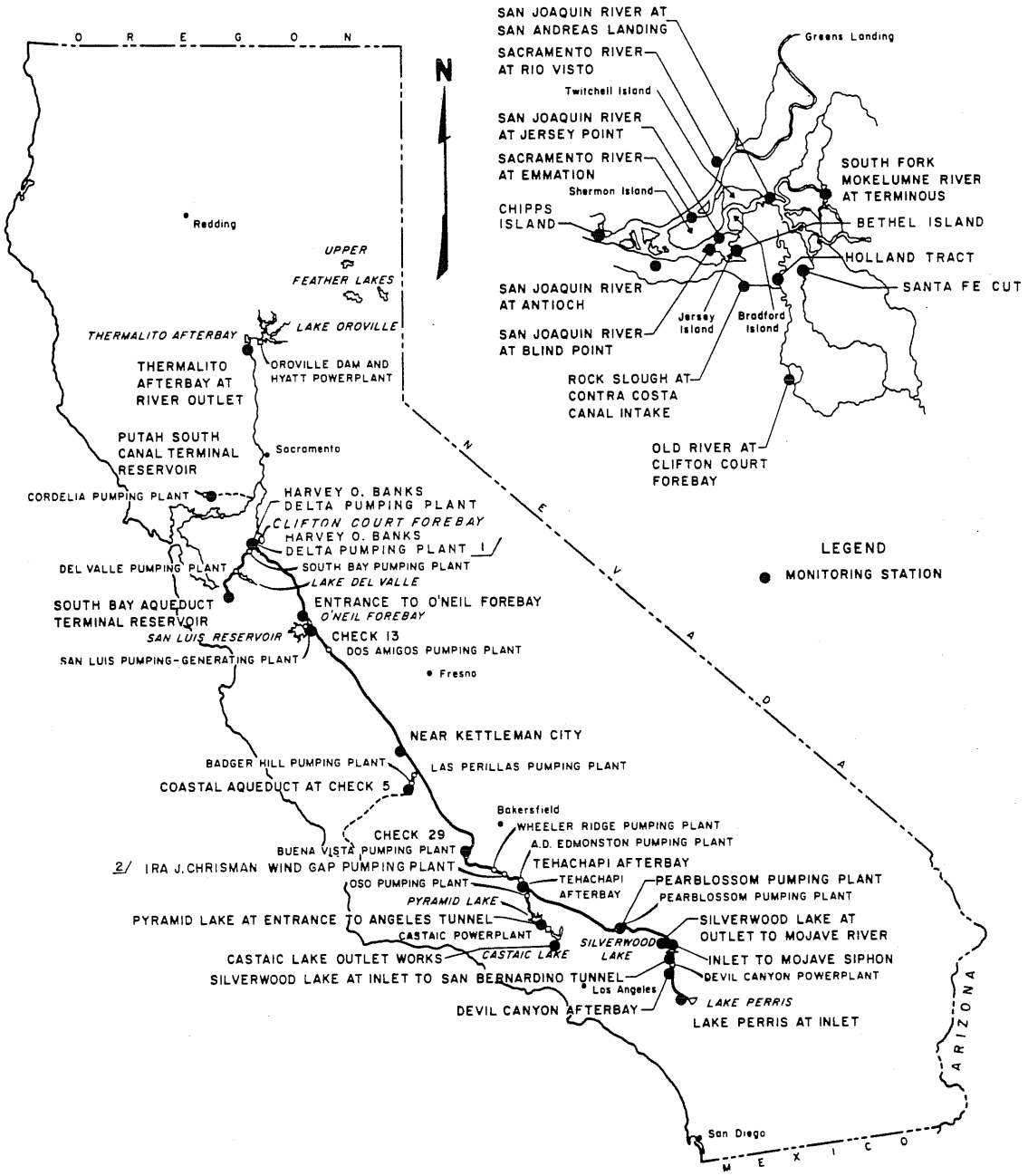
PUMPING PLANTS	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	TOTAL
Cordelia	252	222	232	363	528	474	362	193	232	106	309	252	3,525
Tracy: State	0	0	1,015	0	0	0	0	0	0	0	0	0	1,015 2/
Delta: State	80,979	29,114	21,101	25,962	26,760	52,613	24,653	81,717	70,648	54,706	43,864	54,033	566,150
Federal	34,033	26,909	80,700	0	1,574	0	14,109	0	0	0	0	0	157,309
South Bay	5,726	3,329	2,146	7,438	11,817	14,293	14,924	15,089	7,931	7,580	10,960	9,328	110,561
Del Valle	17	13	14	10	10	11	11	10	13	12	12	13	146
San Luis: State	30,452	7,426	1,049	1,127	71	147	173	173	36,310	23,367	3,226	4,013	107,534
Federal	29,621	69,086	67,411	23,775	14,680	134	917	157	14,270	24,877	42,854	8,897	296,679
Dos Amigos: State	16,960	10,961	8,736	9,532	10,118	24,880	30,969	34,906	17,131	14,575	15,910	21,711	216,389
Federal	8,256	4,447	5,258	16,193	10,822	22,920	26,777	24,836	4,091	4,664	9,621	26,127	164,012
Las Perillas	369	397	482	1,299	1,384	1,741	2,054	1,941	651	433	363	609	11,687
Badger Hill	897	982	1,235	3,596	3,839	4,766	5,518	5,204	1,528	1,122	964	1,607	31,258
Buena Vista	17,378	12,262	9,948	14,788	10,465	18,845	23,952	23,746	15,501	15,483	13,782	18,325	194,475
Wheeler Ridge	18,725	11,142	7,801	14,759	9,774	14,972	18,298	18,102	15,364	16,807	15,338	19,119	180,201
Wind Gap	41,540	24,045	16,253	30,361	20,086	29,381	36,123	36,500	32,385	35,853	32,175	40,231	374,983
A. D. Edmonston	145,344	83,188	54,613	105,622	68,354	92,922	108,958	108,145	106,526	124,953	111,084	140,032	1,249,741
Oso	4,279	1,774	431	1,665	410	300	249	253	306	223	1,902	4,409	16,201
Pearblossom	32,880	20,964	14,949	23,190	15,687	20,308	22,767	22,695	24,792	32,631	28,007	31,104	289,974
Devil Canyon (Station Service)	0	0	45	2	71	0	0	0	0	0	3	0	121

1/ Values rounded to the nearest megawatthours.
2/ Payback for mitigation water.

WATER QUALITY

SECTION VII

MAP 4
WATER QUALITY MONITORING STATIONS

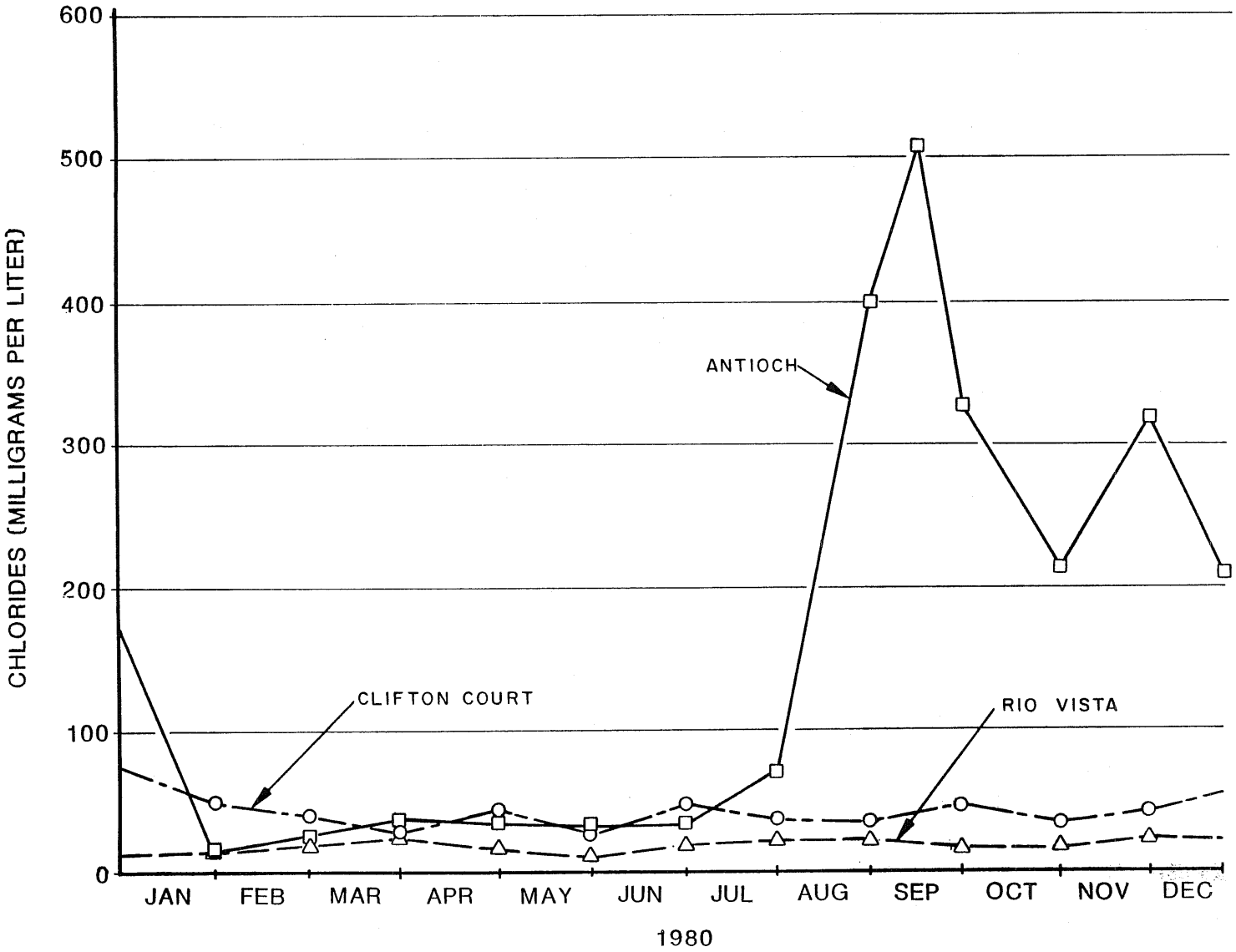


1/ This title became effective on June 3, 1981.

2/ This title became effective on Jan. 9, 1986.

FIGURE Q

MONTHLY 28-DAY MEAN CHLORIDE LEVELS[1/] AT DELTA STATIONS



1/ CALCULATED FROM CORRELATIONS USING THE 28-DAY MEAN VALUE OF ELECTRICAL CONDUCTIVITY FOR THE LAST DAY OF EACH MONTH

FIGURE R

MONTHLY ELECTRICAL CONDUCTIVITY AT SWP LOCATIONS

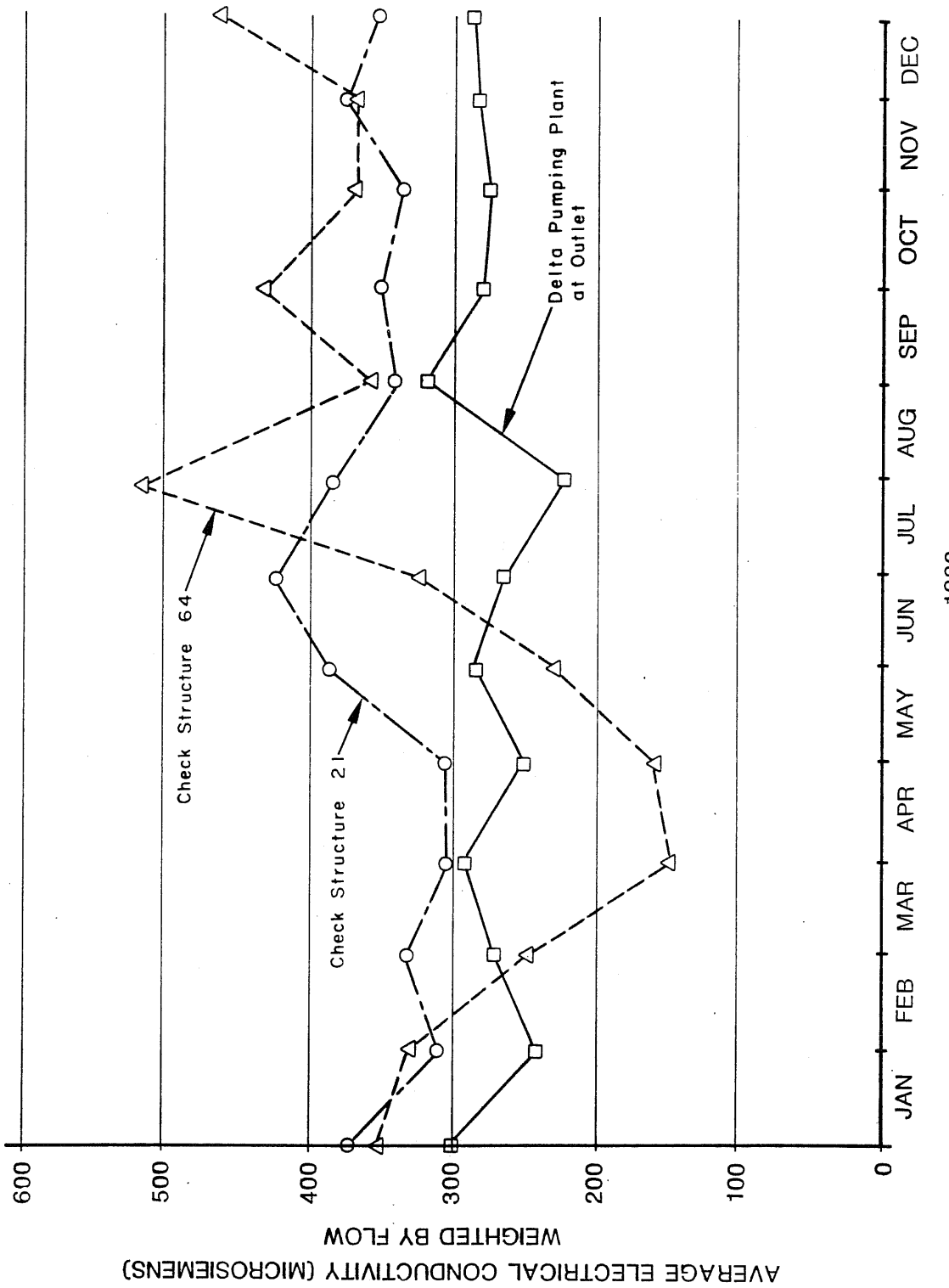


Table 21
WATER QUALITY 1/
Thermalito Afterbay at Feather River

1980

Constituents	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
Total Dissolved Solids	56	52	63	51	49	52	46	64	63	60	51	50	55
Total Hardness	36	32	30	30	30	30	30	32	32	32	32	32	32
Chlorides	2	1	1	1	1	0	1	1	1	1	2	2	1
Sulfates	2	0	2	3	1	0	1	1	2	2	2	2	2
Sodium	3	3	3	3	3	3	3	3	3	3	3	4	3
% Sodium	15	17	18	18	18	17	17	16	16	16	16	20	17
Electrical Conductivity	88	81	74	72	72	73	74	78	76	83	84	83	78
pH		7.2	7.2	7.4	7.3	7.4	7.4	7.6	7.2	7.2	7.1	7.6	7.4
Boron	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0
Fluoride													0.0
Lead													0.00
Selenium													0.00
Hexavalent Chromium													0.00
Arsenic													0.00
Iron													0.00
Manganese													0.00
Magnesium	4	3	3	3	3	3	3	3	3	3	3	3	3
Copper													0.00
Calcium	8	8	7	7	7	7	7	8	8	8	8	8	8
Zinc													0.00
Phenol													0.000
Color													0
Sampling Date	01/16	02/20	03/19	04/16	05/21	06/18	07/16	08/20	09/17	10/16	11/19	12/17	

1/ Electrical Conductivity is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1,000). All other constituents are in milligrams per liter except for pH, % sodium, and as otherwise noted. Each value is obtained from a once-monthly sample.

Table 22
WATER QUALITY 1/
Putah South Canal Terminal Facility

1980

Constituents	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
Total Dissolved Solids	169		414	244	188	182	164	194	189	177	178	168	203
Total Hardness	111		237	172	155	148	139	152	148	150	152	141	154
Chlorides	16		24	11	7	6	5	6	6	6	6	7	9
Sulfates	24		111	40	20	19	20	19	20	19	20	21	30
Sodium	14		52	20	11	10	9	9	9	9	10	10	14
% Sodium	22		32	20	13	13	12	11	12	11	13	13	15
Electrical Conductivity	286		663	414	327	316	303	314	316	317	321	331	353
pH	8.6		8.6	7.5	8.6	8.3	8.4	8.0	8.4	8.5	7.9	7.7	8.3
Boron	0.2		0.7	0.3	0.2	0.2	0.2	0.2	0.5	0.2	0.1	0.2	0.3
Fluoride													0.0
Lead													0.00
Selenium													0.00
Hexavalent Chromium													0.00
Arsenic													0.00
Iron													0.00
Manganese													0.00
Magnesium	16		28	26	26	25	24	26	25	26	26	24	25
Copper													0.00
Calcium	18		49	26	19	18	16	18	18	17	18	17	21
Zinc													0.00
Phenol													0.000
Color													0
Sampling Date	01/15		03/18	04/15	05/20	06/17	07/15	08/19	09/16	10/14	11/18	12/16	

1/ Electrical Conductivity is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1,000). All other constituents are in milligrams per liter except for pH, % sodium, and as otherwise noted. Each value is obtained from a once-monthly sample.

Table 23
WATER QUALITY 1/
California Aqueduct at
Delta Pumping Plant

1980

Constituents	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
Total Dissolved Solids 2/	176	145	161	173	148	170	158	133	185	164	164	168	162
Total Hardness 2/	72	61	68	72	64	71	67	59	75	69	69	70	68
Chlorides 2/	34	26	30	33	26	32	29	22	37	31	31	32	30
Sulfates 2/	28	20	25	27	23	26	24	21	28	25	25	26	25
Sodium 2/	29	23	26	28	23	27	25	20	31	26	26	27	26
% Sodium 2/	47	45	45	46	44	46	45	42	47	45	45	46	45
Electrical Conductivity 3/	296	244	271	291	249	286	265	221	312	276	275	283	272
Electrical Conductivity	320	313	254	308	223	277	259	209	342	267	284	292	279
pH	7.9	9.7	8.0	7.3	8.5	7.9	7.5	8.0	8.1	7.8	7.7	7.2	8.7
Boron	0.2	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.2
Fluoride	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.1
Lead	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00
Selenium	0.01	0.00	0.00	0.02	0.00	0.02	0.00	0.01	0.02	0.00	0.02	0.02	0.01
Hexavalent Chromium		0.01							0.00				0.01
Arsenic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iron	0.07	0.02	0.03	0.00	0.00	0.02	0.00	0.01	0.00	0.00	0.01	0.02	0.02
Manganese	0.04	0.02	0.08	0.03	0.03	0.03	0.01	0.01	0.03	0.03	0.02	0.04	0.03
Magnesium	8	8	6	7	6	8	7	7	10	8	8	9	8
Copper	0.03	0.00	0.02	0.01	0.01	0.02	0.01	0.00	0.02	0.01	0.01	0.03	0.01
Calcium	16	16	13	15	12	15	14	12	16	14	15	16	15
Zinc	0.04	0.00	0.04	0.01	0.01	0.02	0.01	0.00	0.01	0.01	0.01	0.03	0.02
Phenol		0.000							0.000				0.000
Color	40	18	18	10	12	15	18	10	10	15	5	20	16
Sampling Date	01/16	02/20	03/19	04/16	05/21	06/18	07/16	08/20	09/17	10/15	11/19	12/17	

1/ Electrical Conductivity is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1,000). All other constituents are in milligrams per liter except for pH, % sodium, and as otherwise noted. The second Electrical Conductivity shown is from a once-monthly sample, as are all constitutents following.

2/ Values correlated from continuous EC.

3/ Continuous EC value.

Table 24
WATER QUALITY 1/
South Bay Aqueduct Terminal Reservoir

1980

Constituents	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
Total Dissolved Solids 2/	240	230	181	175	161	174	162	143	200	186	170	175	183
Total Hardness 2/	89	86	78	76	70	75	70	62	86	80	73	76	77
Chlorides 2/	39	37	35	33	29	33	29	24	40	36	32	33	33
Sulfates 2/	36	34	28	27	25	27	25	22	31	29	26	27	28
Sodium 2/	32	31	29	28	25	27	25	21	32	29	26	27	28
% Sodium 2/	44	44	44	44	44	44	44	43	45	44	44	44	44
Electrical Conductivity 3/	349	333	308	297	271	294	272	237	343	316	286	297	300
Electrical Conductivity	367	422	328	307	231	295	251	206	354	311	292	296	305
pH	8.6	8.4	8.0	7.2	8.0	7.7	7.6	7.7	8.3	8.9	7.6	7.4	8.2
Boron	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1
Fluoride	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Lead	0.01	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.01
Selenium	0.02	0.00	0.00	0.01	0.01	0.03	0.00	0.00	0.02	0.00	0.02	0.01	0.01
Hexavalent Chromium		0.00							0.00				0.00
Arsenic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iron	0.03	0.02	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.03	0.01
Manganese	0.00	0.01	0.01	0.02	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01
Magnesium	10	19	15	9	5	8	7	7	13	12	8	9	10
Copper	0.03	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.02	0.01
Calcium	20	33	27	18	11	16	14	12	24	22	16	17	19
Zinc	0.05	0.02	0.01	0.02	0.02	0.00	0.01	0.01	0.02	0.00	0.01	0.02	0.02
Phenol		0.000							0.000				0.000
Color	20	10	18	12	12	15	20	10	10	15	10	25	15
Sampling Date	01/15	02/19	03/18	04/15	05/20	06/17	07/15	08/19	09/16	10/14	11/18	12/16	

1/ Electrical Conductivity is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1,000). All other constituents are in milligrams per liter except for pH, % sodium, and as otherwise noted. The second Electrical Conductivity shown is from a once-monthly sample, as are all constitutents following.

2/ Values correlated from continuous EC.

3/ Continuous EC value.

Table 25
WATER QUALITY 1/
California Aqueduct Entrance
to O'Neill Forebay

1980

Constituents	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
Total Dissolved Solids 2/	175	132	172	160	152	161	156	132	188	164	156	169	160
Total Hardness 2/	73	59	72	69	67	69	68	61	77	70	68	71	69
Chlorides 2/	34	24	34	30	28	31	29	23	39	31	29	33	30
Sulfates 2/	29	18	26	24	23	24	23	20	28	25	23	25	24
Sodium 2/	29	21	28	25	24	25	24	20	31	26	25	27	25
% Sodium 2/	46	43	46	44	44	45	44	42	47	45	44	45	44
Electrical Conductivity 3/	301	227	295	275	260	275	266	226	323	281	267	290	274
Electrical Conductivity	366	299	352	265	290	306	263	206	339	242	284	303	293
pH	8.3	8.9	8.1	7.3	8.5	7.6	7.8	7.8	8.6	8.3	7.5	7.6	8.3
Boron	0.2	0.2	0.3	0.2	0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.2
Fluoride	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Lead	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01
Selenium	0.00	0.00	0.00	0.04	0.00	0.02	0.00	0.01	0.01	0.00	0.02	0.01	0.01
Hexavalent Chromium		0.00							0.00				0.00
Arsenic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iron	0.02	0.09	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.03	0.01	0.03	0.02
Manganese	0.01	0.01	0.05	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.02	0.01
Magnesium	10	7	8	6	7	8	8	7	10	8	8	9	8
Copper	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.03	0.02	0.02
Calcium	19	15	17	14	15	16	15	12	16	12	15	17	15
Zinc	0.04	0.02	0.03	0.01	0.02	0.04	0.01	0.02	0.02	0.01	0.06	0.03	0.03
Phenol		0.000							0.000				0.000
Color	20	15	15	12	15	15	18	10	10	15	5	20	14
Sampling Date	01/16	02/20	03/19	04/16	05/21	06/18	07/16	08/20	09/17	10/15	11/19	12/17	

1/ Electrical Conductivity is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1,000). All other constituents are in milligrams per liter except for pH, % sodium, and as otherwise noted. The second Electrical Conductivity shown is from a once-monthly sample, as are all constitutents following.

2/ Values correlated from continuous EC.

3/ Continuous EC value.

Table 26
WATER QUALITY 1/
California Aqueduct at Check 13

1980

Constituents	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
Total Dissolved Solids 2/	197	152	159	167	163	229	235	199	201	185	200	205	191
Total Hardness 2/	81	66	70	72	71	91	92	82	83	78	82	84	79
Chlorides 2/	42	26	31	33	32	53	55	43	44	38	43	45	40
Sulfates 2/	33	22	30	31	31	39	39	35	35	33	35	36	33
Sodium 2/	35	26	27	29	28	42	43	35	36	32	35	36	34
% Sodium 2/	49	46	46	46	46	50	50	48	48	47	48	49	48
Electrical Conductivity 3/	341	261	276	290	282	397	407	345	348	320	346	355	331
Electrical Conductivity	376	301	270	308	274	469	351	322	347	285	354	376	336
pH	7.3	7.4	7.4	7.3	7.5	8.4	7.6	7.6	7.6	7.3	7.4	7.4	7.7
Boron	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.2	0.2
Fluoride	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.1	0.2	0.0	0.1
Lead	0.00	0.05	0.04	0.01	0.00	0.02	0.04	0.02	0.03	0.04	0.07	0.03	0.03
Selenium	0.00	0.00	0.00	0.01	0.01	0.02	0.00	0.00	0.02	0.01	0.02	0.01	0.01
Hexavalent Chromium		0.00							0.00				0.00
Arsenic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iron	0.01	0.01	0.01	0.03	0.01	0.01	0.01	0.01	0.00	0.07	0.02	0.04	0.02
Manganese	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.04	0.01
Magnesium	10	7	6	8	7	12	9	9	10	9	10	10	9
Copper	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.02	0.01	0.01
Calcium	20	15	14	16	15	21	18	17	17	15	18	20	17
Zinc	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.02	0.02	0.02	0.01
Phenol		0.000							0.002				0.001
Color	18	12	20	12	15	12	12	10	10	20	10	20	14
Sampling Date	01/16	02/20	03/19	04/16	05/21	06/18	07/16	08/20	09/17	10/15	11/19	12/17	

1/ Electrical Conductivity is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1,000). All other constituents are in milligrams per liter except for pH, % sodium, and as otherwise noted. The second Electrical Conductivity shown is from a once-monthly sample, as are all constitutents following.

2/ Values correlated from continuous EC.

3/ Continuous EC value.

Table 27
WATER QUALITY 1/
California Aqueduct Near
Kettleman City

1980

Constituents	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
Total Dissolved Solids 2/	219	177	191	170	170	226	250	224	196	201	190	215	203
Total Hardness 2/	86	68	78	71	71	89	97	88	79	81	78	86	81
Chlorides 2/	45	35	40	35	35	50	57	49	42	43	40	47	43
Sulfates 2/	39	16	20	11	11	35	45	34	22	24	20	30	26
Sodium 2/	37	31	33	30	30	39	43	39	34	35	33	37	35
% Sodium 2/	49	50	48	48	48	49	49	49	48	49	48	49	49
Electrical Conductivity 3/	371	308	333	303	302	385	420	382	341	349	333	369	350
Electrical Conductivity	388	599	349	280	290	399	373	314	347	347	317	352	363
pH	7.7	8.4	8.2	8.0	8.3	8.3	8.2	8.3	8.3	8.2	7.7	7.6	8.2
Boron	0.2	0.4	0.3	0.2	0.2	0.1	0.2	0.1	0.2	0.2	0.1	0.1	0.2
Fluoride	0.1	0.2	0.0	0.0	0.1	0.0	0.1	0.2	0.1	0.1	0.2	0.0	0.1
Lead	0.08	0.02	0.06	0.01	0.01	0.04	0.00	0.06	0.02	0.04	0.04	0.01	0.03
Selenium	0.01	0.00	0.00	0.02	0.00	0.02	0.00	0.01	0.02	0.00	0.02	0.01	0.01
Hexavalent Chromium		0.00							0.00				0.00
Arsenic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iron	0.04	0.01	0.04	0.03	0.03	0.01	0.07	0.02	0.00	0.01	0.04	0.05	0.03
Manganese	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
Magnesium	11	18	9	7	7	10	10	9	10	10	8	10	10
Copper	0.01	0.01	0.01	0.02	0.02	0.01	0.02	0.01	0.01	0.01	0.00	0.01	0.01
Calcium	21	32	18	15	15	19	19	16	18	18	17	19	19
Zinc	0.03	0.02	0.01	0.02	0.01	0.00	0.02	0.01	0.01	0.01	0.00	0.01	0.01
Phenol		0.001							0.002				0.002
Color	20	20	25	10	12	12	15	10	8	15	10	18	15
Sampling Date	01/16	02/20	03/19	04/16	05/21	06/18	07/16	08/20	09/17	10/15	11/19	12/17	

1/ Electrical Conductivity is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1,000). All other constituents are in milligrams per liter except for pH, % sodium, and as otherwise noted. The second Electrical Conductivity shown is from a once-monthly sample, as are all constitutents following.

2/ Values correlated from continuous EC.

3/ Continuous EC value.

Table 28
WATER QUALITY 1/
Coastal Branch at Check 5

1980

Constituents	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
Total Dissolved Solids 2/	232	189	198	182	186	218	248	232	202	204	202	221	209
Total Hardness 2/	86	73	78	73	73	84	92	88	79	79	79	85	81
Chlorides 2/	51	32	38	31	37	48	62	54	41	41	41	49	44
Sulfates 2/	37	27	37	35	34	38	41	39	37	37	37	39	37
Sodium 2/	39	30	33	29	31	38	45	41	34	34	34	38	36
% Sodium 2/	50	47	48	47	48	49	51	50	48	48	48	50	49
Electrical Conductivity 3/	380	298	323	292	304	362	418	387	331	334	332	367	344
Electrical Conductivity	379	208	353	278	302	442	364	340	334	397	348	359	342
pH	7.1	7.5	7.0	7.6	7.6	7.5	7.4	7.4	7.9	7.9	7.0	7.7	7.6
Boron	0.3	0.1	0.3	0.2	0.2	0.1	0.2	0.1	0.1	0.2	0.1	0.2	0.2
Fluoride	0.1	0.0	0.2	0.1		0.1	0.1	0.1	0.1	0.1	0.3	0.1	0.1
Lead	0.02	0.00	0.18	0.02	0.05	0.01	0.08	0.04	0.03	0.19	0.04	0.06	0.06
Selenium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hexavalent Chromium									0.00		0.00		0.00
Arsenic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iron	0.05	0.01	0.05	0.00	0.01	0.01	0.03	0.01	0.01	0.02	0.03	0.04	0.02
Manganese	0.03	0.02	0.03	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.01
Magnesium	10	4	9	7	8	11	10	9	9	11	9	10	9
Copper	0.01	0.04	0.02	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.02	0.01
Calcium	20	14	19	15	15	21	19	20	18	18	18	19	18
Zinc	0.02	0.00	0.02	0.01	0.02	0.00	0.01	0.01	0.01	0.03	0.01	0.03	0.01
Phenol		0.000							0.000		0.000		0.000
Color													0
Sampling Date	01/15	02/19	03/18	04/15	05/20	06/17	07/15	08/19	09/16	10/14	11/18	12/16	

1/ Electrical Conductivity is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1,000). All other constituents are in milligrams per liter except for pH, % sodium, and as otherwise noted. The second Electrical Conductivity shown is from a once-monthly sample, as are all constitutents following.

2/ Values correlated from continuous EC.

3/ Continuous EC value.

Table 29
WATER QUALITY 1/
California Aqueduct at Check 29

1980

Constituents	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
Total Dissolved Solids 2/	230	186	160	124	104	210	218	245	199	216	199	226	193
Total Hardness 2/	88	73	65	52	44	81	84	92	78	84	78	87	75
Chlorides 2/	53	37	29	16	9	46	48	58	42	48	42	51	40
Sulfates 2/	37	26	20	12	9	32	34	41	29	34	29	36	28
Sodium 2/	38	29	24	17	13	34	35	41	32	35	32	37	30
% Sodium 2/	48	46	44	41	39	47	48	49	47	48	47	48	46
Electrical Conductivity 3/	374	294	248	183	147	337	352	401	318	350	319	367	308
Electrical Conductivity	380	215	141	245	118	343	374	326	347	403	332	366	299
pH	7.2	7.6	7.0	7.0	7.7	7.6	7.6	8.4	8.2	7.9	7.6	7.4	7.8
Boron	0.2	0.1	0.1	0.3	0.1	0.1	0.2	0.1	0.2	0.2	0.1	0.1	0.2
Fluoride	0.1	0.1	0.2	0.1	0.2	0.0	0.1	0.1	0.1	0.1	0.3	0.1	0.1
Lead	0.01	0.02	0.05	0.00	0.07	0.01	0.13	0.02	0.06	0.14	0.00	0.05	0.05
Selenium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hexavalent Chromium									0.00		0.00		0.00
Arsenic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iron	0.06	0.09	0.09	0.01	0.02	0.02	0.02	0.02	0.10	0.02	0.01	0.03	0.04
Manganese	0.01	0.01	0.02	0.01	0.01	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.01
Magnesium	10	5	2	5	1	8	10	9	9	11	8	9	7
Copper	0.01	0.02	0.02	0.00	0.01	0.01	0.00	0.01	0.03	0.02	0.01	0.01	0.01
Calcium	21	13	13	16	11	18	19	21	19	19	18	20	17
Zinc	0.01	0.01	0.02	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01
Phenol		0.000							0.000		0.000		0.000
Color	23	15	18	18	18	13	18	15	15	13	6	18	16
Sampling Date	01/15	02/19	03/18	04/15	05/20	06/17	07/15	08/19	09/16	10/14	11/18	12/16	

1/ Electrical Conductivity is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1,000). All other constituents are in milligrams per liter except for pH, % sodium, and as otherwise noted. The second Electrical Conductivity shown is from a once-monthly sample, as are all constitutents following.

2/ Values correlated from continuous EC.

3/ Continuous EC value.

Table 30
WATER QUALITY 1/
California Aqueduct at
Tehachapi Afterbay

1980

Constituents	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
Total Dissolved Solids 2/	205	186	143	100	90	163	192	222	176	198	175	200	171
Total Hardness 2/	87	81	67	52	49	73	82	90	77	84	77	84	75
Chlorides 2/	43	37	22	6	2	30	41	53	35	44	35	44	33
Sulfates 2/	39	36	26	18	17	29	34	39	31	35	31	35	31
Sodium 2/	37	32	23	14	13	27	34	41	30	35	30	36	29
% Sodium 2/	48	47	43	38	36	45	47	49	46	48	46	48	45
Electrical Conductivity 3/	362	329	252	176	160	289	339	393	312	351	310	354	302
Electrical Conductivity	343	238	390	144	117	244	374	365	326	356	318	366	300
pH	8.7	7.5	8.1	8.2	8.8	9.9	8.7	8.2					9.1
Boron	0.2	0.2	0.3	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.2	0.2
Fluoride	0.1	0.2	0.3	0.2	0.2	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Lead	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Selenium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hexavalent Chromium													0.00
Arsenic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iron	0.03	0.06	0.06	0.05	0.02	0.07	0.04	0.04	0.03	0.01	0.03	0.04	0.04
Manganese	0.00	0.00	0.01	0.00	0.02	0.00	0.01	0.00	0.01	0.00	0.02	0.00	0.01
Magnesium	10	6	9	2	2	6	9	10	10	10	9	10	8
Copper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.04	0.01	0.01
Calcium	19	14	26	13	11	14	19	18	17	18	16	19	17
Zinc	0.01	0.01	0.00	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.08	0.00	0.01
Phenol													0.000
Color	13	22	6	18	8	18	8	13	8	4	8	18	12
Sampling Date	01/16	02/20	03/19	04/16	05/21	06/18	07/16	08/20	09/17	10/15	11/19	12/17	

1/ Electrical Conductivity is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1,000). All other constituents are in milligrams per liter except for pH, % sodium, and as otherwise noted. The second Electrical Conductivity shown is from a once-monthly sample, as are all constitutents following.

2/ Values correlated from continuous EC.

3/ Continuous EC value.

Table 31
WATER QUALITY 1/
Pyramid Lake at Entrance
to Angeles Tunnel

1980

Constituents	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
Total Dissolved Solids	345	377	282	292	308	298	340	328	343	365	410	324	334
Total Hardness	142	149	152	154	156	164	174	174	176	182	182	179	165
Chlorides	55	52	46	44	41	39	40	39	39	42	40	39	43
Sulfates	84	88	92	95	106	110	120	119	122	123	123	116	108
Sodium	51	46	43	43	43	42	44	44	46	45	45	44	45
% Sodium	43	40	38	37	37	35	35	35	36	35	35	34	37
Electrical Conductivity	520	522	512	508	514	520	543	547	565	575	584	558	539
pH	7.8	7.5	8.2	8.8	8.7	8.8	9.2	8.0	8.7	7.8	7.3	7.6	8.6
Boron	0.4	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Fluoride	0.3	0.4	0.4	0.4	0.3	0.4	0.3	0.4	0.4	0.5	0.5	0.5	0.4
Lead	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Selenium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hexavalent Chromium													0.00
Arsenic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iron	0.01	0.02	0.00	0.01	0.00	0.00	0.00	0.02	0.01	0.00	0.00	0.01	0.01
Manganese	0.01	0.01	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Magnesium	15	15	15	15	16	16	18	18	18	18	18	18	17
Copper	0.00	0.04	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.01	0.01
Calcium	32	35	36	37	36	39	40	40	41	43	43	42	39
Zinc	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
Phenol													0.000
Color	8	4	8	8	8	8	8	8	8	2	5	8	7
Sampling Date	01/16	02/21	03/18	04/15	05/20	06/17	07/17	08/20	09/16	10/17	11/17	12/19	

1/ Electrical Conductivity is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1,000). All other constituents are in milligrams per liter except for pH, % sodium, and as otherwise noted. Each value is obtained from a once-monthly sample.

Table 32
WATER QUALITY 1/
Castaic Lake at Outlet Works

1980

Constituents	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
Total Dissolved Solids	364	400	323	385	346	369	460	381	396	401	401	387	384
Total Hardness	196	196	196	199	193	202	203	208	212	213	213	214	204
Chlorides	49	49	46	46	45	46	46	48	48	46	46	44	47
Sulfates	126	120	120	122	125	129	134	137	139	140	139	136	131
Sodium	51	46	45	45	46	47	48	49	52	50	51	47	48
% Sodium	36	33	33	33	34	33	33	33	34	33	34	32	33
Electrical Conductivity	605	603	586	598	586	602	616	638	652	656	653	629	619
pH	8.2	8.2	8.6	8.6	8.8	8.8	8.4	8.9		8.2	7.8	8.4	8.5
Boron	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Fluoride	0.5	0.4	0.5	0.4	0.4	0.4	0.4	0.5	0.5	0.4	0.5	0.5	0.5
Lead	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Selenium	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hexavalent Chromium													0.00
Arsenic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iron	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00
Manganese	0.00	0.02	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Magnesium	18	18	18	18	19	20	19	19	20	19	19	20	19
Copper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00
Calcium	49	49	49	50	46	48	50	52	52	54	54	53	51
Zinc	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00
Phenol													0.000
Color	10	2	8	8	8	8	8	8	8	5	5	8	7
Sampling Date	01/15	02/20	03/17	04/14	05/19	06/16	07/16	08/18	09/15	10/16	11/17	12/16	

1/ Electrical Conductivity is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1,000). All other constituents are in milligrams per liter except for pH, % sodium, and as otherwise noted. Each value is obtained from a once-monthly sample.

Table 33
WATER QUALITY 1/
California Aqueduct at
Pearblossom Pumping Plant
1980

Constituents	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
Total Dissolved Solids	195	212	324	77	72	127	117	219	200	249	186	214	183
Total Hardness	84	66	132	40	38	60	46	84	80	86	77	86	73
Chlorides	41	28	22	4	4	28	22	48	39	44	34	44	30
Sulfates	38	32	137	9	7	23	17	33	29	29	28	30	34
Sodium	37	25	56	12	11	24	20	37	34	37	32	37	30
% Sodium	48	44	47	38	38	46	47	48	47	48	47	47	45
Electrical Conductivity	336	258	520	138	130	254	195	362	332	357	318	364	297
pH	8.8	8.0	8.1	8.5	8.7	7.8	8.4	8.8					8.5
Boron	0.2	0.2	0.3	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Fluoride	0.1	0.2	0.4	0.3	0.2	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.2
Lead	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Selenium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
Hexavalent Chromium													0.00
Arsenic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iron	0.03	0.04	0.02	0.03	0.07	0.05	0.07	0.04	0.04	0.02	0.02	0.04	0.04
Manganese	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
Magnesium	9	7	14	2	2	6	4	9	9	10	9	8	7
Copper	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.02	0.01	0.00
Calcium	19	15	30	13	12	14	12	19	17	18	16	21	17
Zinc	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.00
Phenol													0.000
Color	13	25	4	13	8	8	8	15	8	7	8	8	10
Sampling Date	01/16	02/22	03/19	04/16	05/22	06/19	07/16	08/21	09/18	10/15	11/19	12/17	

1/ Electrical Conductivity is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1,000). All other constituents are in milligrams per liter except for pH, % sodium, and as otherwise noted. Each value is obtained from a once-monthly sample.

Table 34
WATER QUALITY 1/
California Aqueduct at Inlet
to Mojave Siphon

1980

Constituents	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
Total Dissolved Solids 2/	195	180	135	79	86	124	178	293	198	241	204	280	183
Total Hardness 2/	85	81	65	46	48	62	79	110	85	96	86	107	79
Chlorides 2/	43	38	22	1	3	18	38	82	46	62	48	77	40
Sulfates 2/	34	32	23	13	14	21	30	49	33	40	34	47	31
Sodium 2/	34	32	22	11	13	20	32	59	36	46	37	56	33
% Sodium 2/	47	46	43	35	36	41	47	54	48	51	49	53	46
Electrical Conductivity 3/	350	325	246	146	159	226	321	521	356	431	366	499	329
Electrical Conductivity	327	259	226	136	126	219	211	412	321	365	316	364	274
pH	8.7	8.6	8.2	8.0	8.6	8.9	8.1	8.6					8.6
Boron	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.1
Fluoride	0.1	0.2	0.1	0.3	0.2	0.1	0.2	0.1	0.0	0.2	0.2	0.1	0.2
Lead	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Selenium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hexavalent Chromium													0.00
Arsenic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iron	0.03	0.06	0.10	0.03	0.06	0.04	0.07	0.04	0.02	0.01	0.04	0.03	0.04
Manganese	0.00	0.00	0.01	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00
Magnesium	9	7	5	2	2	5	5	10	9	10	9	9	7
Copper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.02	0.01	0.01
Calcium	19	16	14	12	11	13	12	20	16	18	16	20	16
Zinc	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.02	0.03	0.01
Phenol													0.000
Color	13	23	12	18	8	8	8	10	8	4	8	8	11
Sampling Date	01/16	02/22	03/19	04/17	05/22	06/19	07/16	08/21	09/18	10/16	11/19	12/18	

1/ Electrical Conductivity is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1,000). All other constituents are in milligrams per liter except for pH, % sodium, and as otherwise noted. The second Electrical Conductivity shown is from a once-monthly sample, as are all constitutents following.

2/ Values correlated from continuous EC.

3/ Continuous EC value.

Table 35
WATER QUALITY 1/
Silverwood Lake at Outlet
to Mojave River

1980

Constituents	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
Total Dissolved Solids	234	205	145	133	115	108	164	209	207	200	190	192	175
Total Hardness	97	69	64	58	56	52	64	76	77	76	77	77	70
Chlorides	63	32	29	19	17	15	32	47	45	42	39	39	35
Sulfates	37	27	25	23	22	17	28	32	32	28	28	31	28
Sodium	47	27	25	21	20	18	29	37	36	35	34	36	30
% Sodium	50	45	45	43	43	42	48	51	50	49	48	50	47
Electrical Conductivity	427	274	263	223	209	196	272	349	340	335	330	333	296
pH	8.6	7.5	6.8	8.5	8.8	8.5	8.5	8.3	8.8		8.5	8.6	8.5
Boron	0.2	0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.2
Fluoride	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1
Lead	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Selenium	0.00				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hexavalent Chromium													0.00
Arsenic	0.00				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iron	0.01	0.02	0.05	0.03	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02
Manganese	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Magnesium	12	7	6	5	5	4	7	8	9	10	9	9	8
Copper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00
Calcium	19	16	16	15	14	14	14	17	16	14	16	16	16
Zinc	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.07	0.00	0.00	0.00	0.01	0.01
Phenol													0.000
Color	8	12	18	18	13	8	8	8	8	8	8	8	10
Sampling Date	01/17	02/26	03/18	04/14	05/22	06/16	07/15	08/18	09/15	10/15	11/19	12/16	

1/ Electrical Conductivity is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1,000). All other constituents are in milligrams per liter except for pH, % sodium, and as otherwise noted. Each value is obtained from a once-monthly sample.

Table 36
WATER QUALITY 1/
Silverwood Lake at Inlet to
San Bernardino Tunnel

1980

Constituents	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
Total Dissolved Solids	235	133	146	126	114	107	164	199	200	208	197	190	169
Total Hardness	97	49	67	62	58	52	64	73	77	76	77	77	70
Chlorides	63	16	28	20	17	15	32	44	45	42	40	38	33
Sulfates	36	16	24	23	22	17	27	31	33	28	29	30	27
Sodium	46	15	24	21	19	18	29	35	36	35	35	35	30
% Sodium	50	39	43	41	41	42	48	50	50	49	49	49	47
Electrical Conductivity	428	174	260	227	206	195	272	332	341	336	335	333	292
pH	8.4	7.8	7.0	8.3	8.8			8.0	8.4		7.6	8.1	8.3
Boron	0.2	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.2	0.1	0.1
Fluoride	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2
Lead	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Selenium	0.00				0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00
Hexavalent Chromium													0.00
Arsenic	0.00				0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iron	0.01	0.02	0.05	0.02	0.00	0.01	0.02	0.01	0.00	0.01	0.01	0.01	0.01
Manganese	0.00	0.00	0.00	0.01	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Magnesium	12	4	6	6	5	4	7	8	9	10	9	9	8
Copper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00
Calcium	19	13	17	15	15	14	14	16	16	14	16	16	15
Zinc	0.01	0.00	0.00	0.00	0.01	0.00	0.04	0.01	0.00	0.00	0.00	0.00	0.01
Phenol													0.000
Color	8	18	18	18	13	8	8	8	8	8	8	8	10
Sampling Date	01/17	02/26	03/18	04/14	05/22	06/16	07/15	08/18	09/15	10/15	11/19	12/16	

1/ Electrical Conductivity is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1,000). All other constituents are in milligrams per liter except for pH, % sodium, and as otherwise noted. Each value is obtained from a once-monthly sample.

Table 37
WATER QUALITY 1/
Devil Canyon Afterbay

1980

Constituents	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
Total Dissolved Solids 2/	266	183	145	138	134	130	155	183	217	231	232	280	191
Total Hardness 2/	101	77	64	62	60	59	67	76	86	90	90	103	78
Chlorides 2/	72	37	20	17	15	13	24	36	51	58	58	79	40
Sulfates 2/	42	29	25	24	23	23	26	30	34	36	36	42	31
Sodium 2/	52	31	22	20	19	18	24	32	41	44	45	57	34
% Sodium 2/	53	47	42	41	41	40	44	48	51	52	52	55	47
Electrical Conductivity 3/	476	314	239	226	218	211	258	312	377	404	406	499	328
Electrical Conductivity	397	177	247	233	213	194	270	343	338	335	341	337	285
pH	7.3	8.4	8.3	7.8	8.9	9.5	7.9	8.6					8.8
Boron	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1
Fluoride	0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.1	0.0	0.1	0.2	0.1	0.1
Lead	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Selenium	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hexavalent Chromium													0.00
Arsenic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iron	0.02	0.03	0.04	0.01	0.00	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.02
Manganese	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.01	0.00	0.00
Magnesium	11	4	6	6	4	4	7	8	9	9	9	8	7
Copper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.02	0.01	0.00
Calcium	20	12	16	15	15	14	14	16	15	16	16	18	16
Zinc	0.02	0.00	0.00	0.00	0.00	0.00	0.03	0.01	0.01	0.01	0.04	0.01	0.01
Phenol													0.000
Color	8	20	6	8	8	8	8	8	8	3	8	2	8
Sampling Date	01/16	02/21	03/20	04/17	05/22	06/19	07/16	08/21	09/18	10/16	11/20	12/18	

1/ Electrical Conductivity is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1,000). All other constituents are in milligrams per liter except for pH, % sodium, and as otherwise noted. The second Electrical Conductivity shown is from a once-monthly sample, as are all constitutents following.

2/ Values correlated from continuous EC.

3/ Continuous EC value.

Table 38
WATER QUALITY 1/
Lake Perris at Inlet

1980

Constituents	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC	ANNUAL Average
Total Dissolved Solids	244	267	237	242	253	237	253	248	244	220	240	225	243
Total Hardness	90	92	90	87	85	85	84	80	75	78	78	78	84
Chlorides	74	71	69	69	65	65	63	65	64	60	60	56	65
Sulfates	42	39	37	36	36	35	37	36	38	34	36	38	37
Sodium	56	51	51	51	48	47	48	48	48	45	45	44	49
% Sodium	57	54	54	55	54	53	54	56	57	55	55	54	55
Electrical Conductivity	443	439	431	431	421	410	422	414	407	400	401	390	417
pH	8.6	7.4	9.0	9.0	8.9	8.7	9.0	9.1	8.2		8.2	7.8	8.8
Boron	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Fluoride	0.1	0.2	0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.2	0.1
Lead	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Selenium	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00
Hexavalent Chromium													0.00
Arsenic	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00
Iron	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
Manganese	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Magnesium	12	12	12	12	11	11	12	12	11	11	11	11	12
Copper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
Calcium	16	17	16	15	16	16	14	12	12	13	13	13	14
Zinc	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00
Phenol													0.000
Color		3	8	8	8	8	8	8	5	5	8	8	7
Sampling Date	01/15	02/25	03/17	04/15	05/21	06/17	07/14	08/19	09/16	10/14	11/18	12/15	

1/ Electrical Conductivity is in microsiemens/cm (microsiemens are equivalent to micromhos; to obtain millisiemens, divide by 1,000). All other constituents are in milligrams per liter except for pH, % sodium, and as otherwise noted. Each value is obtained from a once-monthly sample.

TABLE 39

WATER QUALITY

PESTICIDES IN CALIFORNIA AQUEDUCT

(In parts per billion)

STATION	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
DELTA PUMPING PLANT												
Chlorinated Hydrocarbons		0.00			0.00			0.00			0.00	
Organic Phosphorous					0.00			0.00				
Herbicides		0.12			0.00			0.00			0.00	
Combinations of C,P, and N types												
DISCHARGE FROM O'NEILL P.P.												
Chlorinated Hydrocarbons					0.00						0.00	
Organic Phosphorous					0.01							
Herbicides		0.03			0.00						0.00	
Combinations of C,P, and N types		0.26			0.06							
NEAR KETTLEMAN CITY (Check 21)												
Chlorinated Hydrocarbons					0.00			0.00			0.00	
Organic Phosphorous		0.30			0.01			0.00				
Herbicides					0.00			0.00			0.00	
Combinations of C,P, and N types		0.10			0.01							
TEHACHAPI AFTERBAY												
Chlorinated Hydrocarbons					0.00						0.00	
Organic Phosphorous					0.00							
Herbicides		0.00			0.29						0.48	
Combinations of C,P, and N types		0.05										

C – Chlorinated Hydrocarbons

P – Organic Phosphorous

N – Organic Nitrogen