

STATE OF CALIFORNIA

The Resources Agency

Department of Water Resources

DIVISION OF OPERATIONS AND MAINTENANCE

STATE WATER PROJECT
ANNUAL
REPORT OF OPERATIONS

1976

FOREWORD

This is the third 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. 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 covers Project facilities in operation during 1976; operational constraints and outages; and significant operations and maintenance events within the five field divisions. Operational data are in the form of annual summaries. Where relevant for comparison, the current and past years' data are shown in charts and tables. Corrections, and 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-IV" published by the Department of Water Resources.

^{1/} Annual publications of the Department of Water Resources on the State Water Project activities include: (1) Annual Report 1976, California State Water Project; (2) The California State Water Project in 1977, Bulletin 132-77; and The California Drought 1977, with an updated version dated February 15, 1977.

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ORGANIZATION OF
DIVISION OF OPERATIONS AND MAINTENANCE

Howard H. Eastin Division Chief
James J. Doody Deputy Division Chief

This report was prepared under the direction of

Welby R. Madsen Chief, Operations Control
Branch

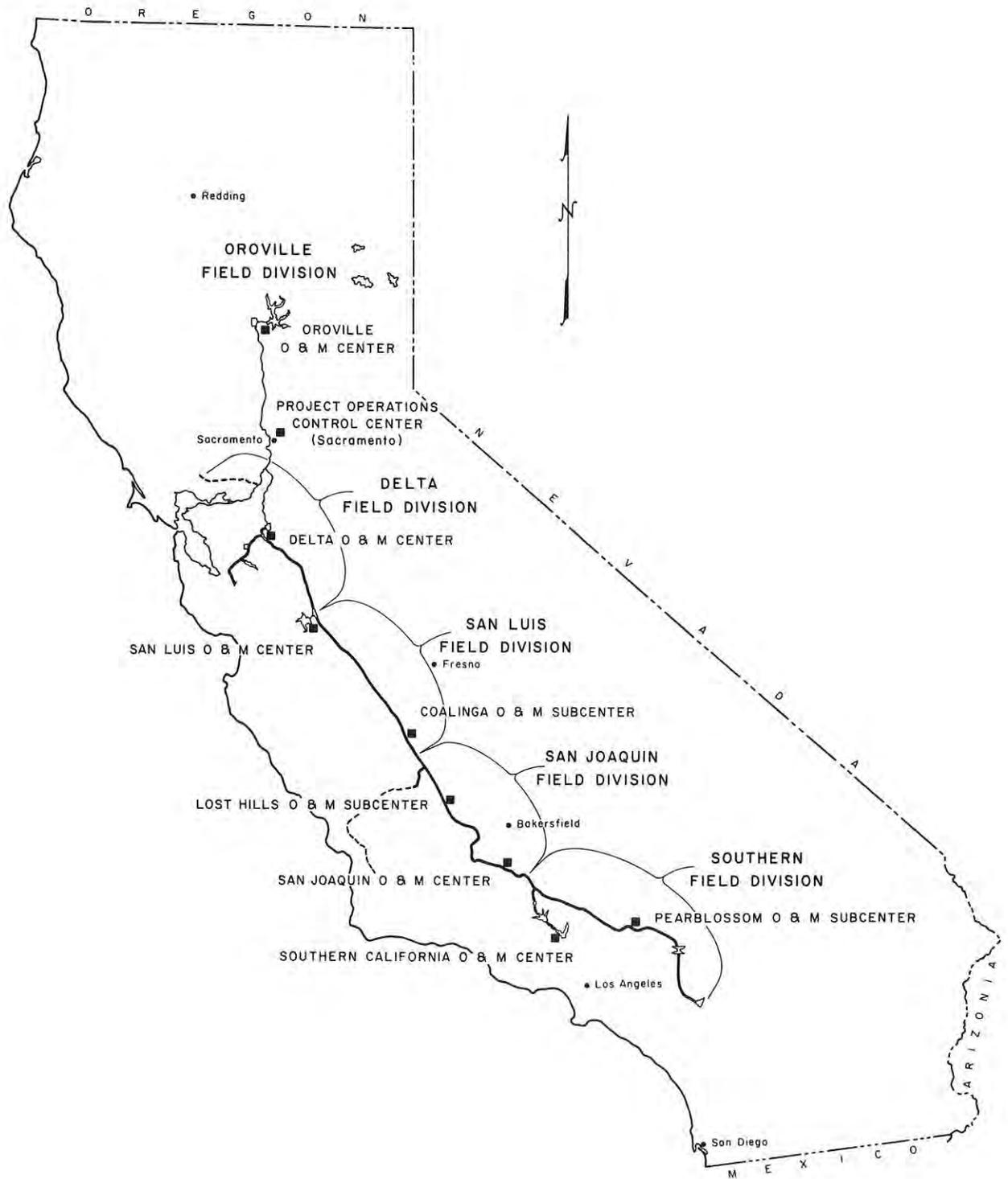
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Vanburen H. Lemons Chief, Records and Reports
Section

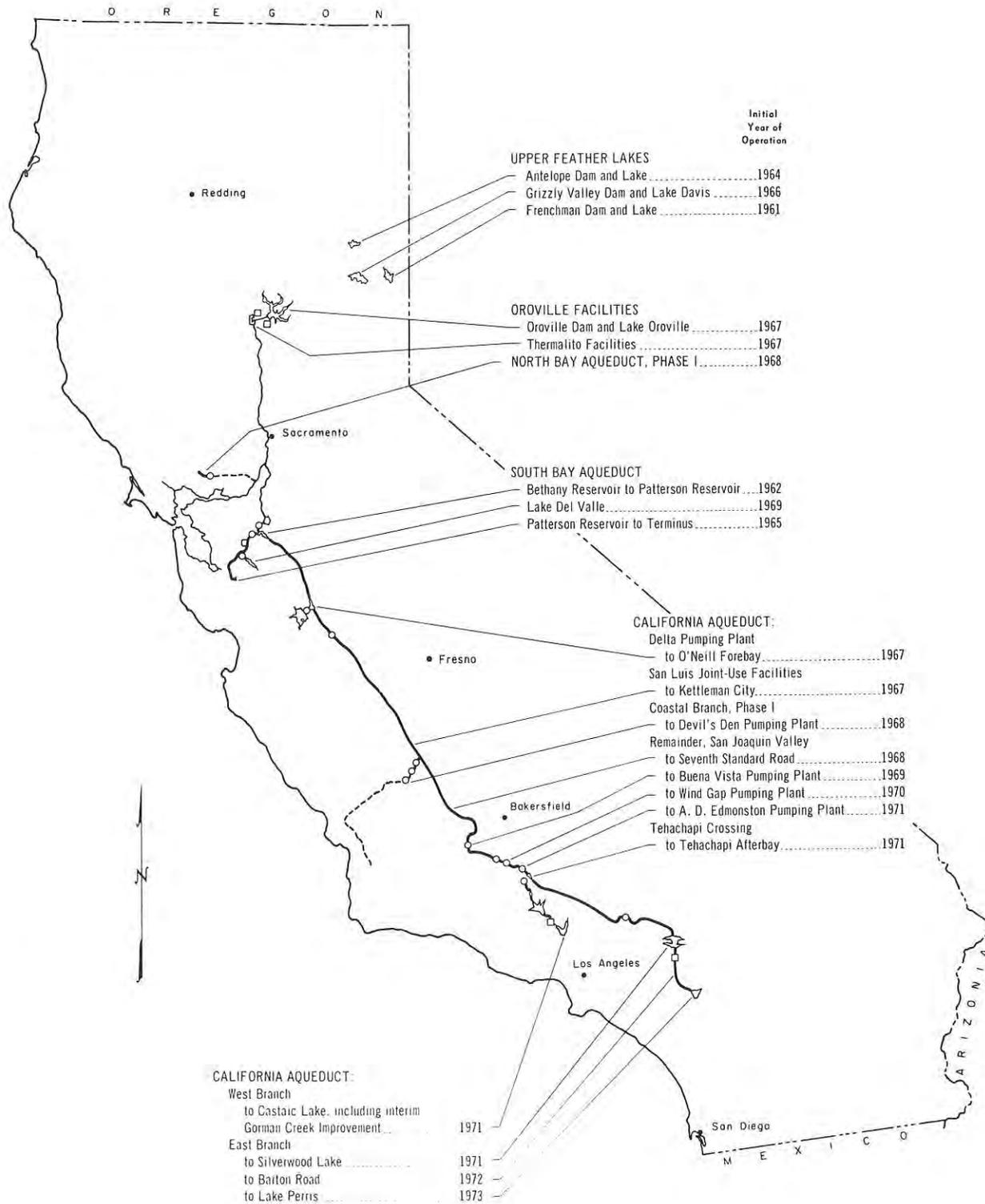
and

Richard G. Fields Records and Reports
Section

FIELD DIVISION BOUNDARIES



PROJECT FACILITIES



HIGHLIGHTS OF 1976 OPERATION

Water Deliveries

State Water Project Contractors received in excess of 2425 cubic hectometres (1,966,183 acre-feet) during 1976, up almost six percent over 1975 deliveries.

Deliveries for the U. S. Bureau of Reclamation to federal water contractors from San Luis Joint Facilities totaled 1649 cubic hectometres (1,337,209 acre-feet) during 1976, down two percent from 1975 deliveries. In addition a total of 109 cubic hectometres (88,300 acre-feet) of Bureau water was wheeled through Project facilities south of Check 21 and delivered through the Cross Valley Canal.

Water delivered from Project facilities to satisfy prior water rights amounted to 1153 cubic hectometres (935,115 acre-feet). An additional 25 cubic hectometres (20,489 acre-feet) of natural flow was released through the Project's southern reservoirs.

Project Generation

The 1.3 billion kilowatthours of electric energy generated in 1976 at the Hyatt and Thermalito Powerplants was the lowest of record, excluding 1968 when Lake Oroville was filling.

As a result of the Oroville-Thermalito pump storage operation, 63 cubic hectometres (51,099 acre-feet) was pumped back into Lake Oroville and later released.

The State's share of energy recovered from generation at San Luis Pumping-Generating Plant was 175,762,064 kWh, exceeding the previous high of 175,010,000 kWh in 1972.

Total energy recovered at the Castaic and Devil Canyon Powerplants this year was down over 10 percent from that realized in 1975. The reduction was mainly due to lack of Delta water for exporting. Still energy from Project generation at Castaic Powerplant this year was the second highest of record. Total generation at the Devil Canyon Powerplant this year reached a new high and with the addition of Unit 2 in August, most of the energy generated was during on-peak hours.

Reservoir Storage and Operation

Lake Oroville reached its maximum storage of the year, 3549 cubic hectometres (2,876,934 acre-feet) on March 28. Minimum storage, 2007 cubic hectometres (1,627,254 acre-feet), was recorded December 31. Maximum inflow to the Lake during the year was 281 m³/s (9,941 cfs) on February 29. Maximum releases down the Feather River from the Oroville-Thermalito Complex was 110 m³/s (3,900 cfs) on September 27.

State's share of San Luis Reservoir storage was a maximum on March 11, 1270 cubic hectometres (1,029,760 acre-feet). Minimum State storage in San Luis Reservoir of 582 cubic hectometres (471,836 acre-feet) was reached on December 30.

Pyramid Lake storage fluctuated between a maximum of 207 cubic hectometres (168,100 acre-feet) on November 30, and a low of 196 cubic hectometres (158,788 acre-feet) on August 26.

Maximum storage in Castaic Lake of 355 cubic hectometres (288,043 acre-feet) was reached on April 17. Minimum storage in Castaic Lake was 198 cubic hectometres (160,918 acre-feet) at the end of the year.

Drawdown of Silverwood Lake storage occurred during three periods in 1976. Beginning March 15, Silverwood Lake was drawn down for a scheduled 48-day outage to make repairs on the San Bernardino Tunnel Intake. Between May 26 and July 3, Silverwood Lake was drawn down to meet delivery demands from Devil Canyon Afterbay. The third draw-down period occurred during the outage for the construction of the Kern River Intertie.

Lake Perris received 3 cubic hectometres (2,155 acre-feet) of Project water through the year, about equal to the year's seepage and evaporation losses of 2.5 cubic hectometres (2,023 acre-feet). Year-end storage was 104 cubic hectometres (84,457 acre-feet).

Outages

Outages in chronological order were:

April 1 - Santa Ana Division, the San Bernardino Tunnel Intake Tower was out-of-service for 53 days during a scheduled outage to modify the hydraulic system that operates the butterfly valves and install the spherical valve for Devil Canyon Unit 2.

June 17 - Edward Hyatt Powerplant experienced an unscheduled 31-hour outage due to excess vibration within the plant.

July 1 - North San Joaquin Division of the California Aqueduct, was down for 14 days to repair a section of the Aqueduct embankment in Pool 10.

October 13 - South San Joaquin Division of the California Aqueduct, was down during a 45-day scheduled outage to allow construction for connecting the Kern River Intertie into Pool 29 near State Highway 119.

Limitations

Operational restraints were imposed on segments of the State Water Project resulting from construction, modifications, maintenance or revised operating capacities. These include:

Facilities between Quail Lake and Pyramid Lake the maximum flow rate was limited to $25 \text{ m}^3/\text{s}$ (900 cfs) (this was an increase, however, from the previous limit of $24 \text{ m}^3/\text{s}$ (850 cfs) which was in effect until December 22, 1974).

Pearblossom Pumping Plant was limited to a maximum pumping rate of $21 \text{ m}^3/\text{s}$ (725 cfs) throughout the year. The cross connection was removed between the discharge lines, for installation of Units 1 and 2 making Unit 3 (rated at $4 \text{ m}^3/\text{s}$ (145 cfs)) unavailable as of May 15, 1975.

Devil Canyon Powerplant was limited to a maximum rate of $17 \text{ m}^3/\text{s}$ (593 cfs) through August 6 to allow installation of Unit 2. Unit 2 installation was completed to the extent that some generation was allowed beginning on August 6.

Delta Pumping Plant pumping was at a minimum for a five-week period beginning May 22 in accordance with an interim agreement with the Department of Fish and Game. This year the Department of Fish and Game requested and received approval for the limited pumping to be shifted from April 25 through May 31 to May 22 through June 30.

From July 1 through August 14, pumping at the Delta Pumping Plant was limited to South Bay Aqueduct and North San Joaquin Division demands to repair a section of the aqueduct embankment in Pool 10 because of excessive leakage.

PROJECT STATUS IN 1976

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

The initial Project facilities to become operational were Frenchman Dam and Lake in the Upper Feather River region and the South Bay Aqueduct in the San Francisco Bay area in 1962. In 1973, construction of the "Initial Facilities" of the Project were completed. This provided for operation of the entire Project facilities from Plumas County in the north to Riverside County in the South. During 1976, water was delivered from Project facilities to: 22 State Water Contractors; one non-State water contractor; five U. S. Bureau of Reclamation customers along the San Luis Joint Facilities in addition to those served Federal water delivered via the Cross Valley Canal; eight local agencies to satisfy prior water rights; and one agency for repayment of water borrowed for preconsolidation of ground around the aqueduct prior to construction.

Facilities in operation during 1976 included: 20 reservoirs with a gross capacity of 8372 cubic hectometres (6,787,037 acre-feet); five power plants with a gross output capacity of 1,354 megawatts; 17 pumping plants housing 110 units with a total motor rating of 2,507 megawatts; and 869 Kilometers (540 miles) of aqueduct. Operational data are shown in Sections I-VII.

PROJECT OPERATION

Water Conditions

January precipitation established new lows of record at many stations in the State, varying from zero amounts throughout Southern California to a high of about 30 percent of the month's average in the extreme northern part of the State. The low January precipitation reduced the Statewide water year average to about 45 percent of normal for the period October 1975-January 1976. Precipitation during February raised the Statewide average to a high of about 60 percent, which was sustained through the year. Thus the dry regime, which began early in November 1975, continued through the 1976 calendar year. The exceptional long-dry regime was the product of a persistent high-pressure ridge which established itself over the ocean between Hawaii and California. This ridge shunted most of the winter storms to the north through Oregon, Washington, and Canada. The few storms which broke through were so weakened that little moisture was left for California. While several storms in August and September boosted the 1975-76 water year values and contributed to reservoir storage, they were too late to materially aid the State's agriculture industry. In fact, their adverse effect on the State's crops outweighed their benefits.

Snow pack in the Feather River Basin (April 1 water content) was only 30 percent of normal. Snow sensor reports indicated that maximum accumulation (which normally occurs around April 1), was reached about mid-March. Inflow into Lake Oroville for the calendar year was the lowest since operations began in 1968, 1663 cubic hectometres (1,348,393 acre-feet). By comparison,

the 1976 inflow to Lake Oroville was 10 percent less than that estimated for a 1924 water supply, the previous low of record.

A summary of California water supply conditions during 1975-76 is in DWR Bulletin No. 120-75, "Summary October 1975 - September 1976 Water Conditions in California". Data on climate and surface water flows are published in DWR Bulletin No. 130-76, "Hydrologic Data: 1976 - Volumes I-VI".

Water Deliveries

Entitlement and surplus water deliveries to State Water Contractors totaled 2409 cubic hectometres (1,953,112 acre-feet). This was a six percent increase, or about 130 cubic hectometres (105,286 acre-feet), over 1975 deliveries. Local water deliveries from Project facilities totaled 25 cubic hectometres (20,205 acre-feet) or about 45 percent of the total local water delivered in 1975.

Entitlement and surplus water delivered to State Water Contractors by major service areas during 1976 compared to 1975 deliveries were:

- a. Feather River - 0.5 cubic hectometres (382 acre-feet) down six percent
 - b. San Francisco Bay Area - 196 cubic hectometres (158,919 acre-feet), up 70 percent
 - c. San Joaquin Valley - 1366 cubic hectometres (1,107,516 acre-feet), down five percent
 - d. Southern California - 846 cubic hectometres (685,768 acre-feet), up 20 percent.
- 1,953,112*

In 1964, the State entered into two contracts for the purpose of acquiring a water supply for preconsolidation purposes.

These contracts have since been assigned to the J. G. Boswell Company and Belridge Oil Company. During 1976, no repayment water was requested by or delivered to Belridge while Boswell received 8 cubic hectometres (6,712 acre-feet) leaving 105 cubic hectometres (85,375 acre-feet) yet to be delivered by 1985.

A table showing water deliveries by year and totals to date to the individual State Water Contractors, is presented on Page 1 of Section 1.

Water deliveries to U. S. Bureau of Reclamation customers from the joint facilities totaled 1649 cubic hectometres (1,337,069 acre-feet), down about two percent from 1975 deliveries. In addition, U. S. Bureau of Reclamation water wheeled to the Cross Valley Canal in compliance with the three-party (the United States, the State, and nine water agencies) contract totaled 109 cubic hectometres (88,300 acre-feet).

Water delivered from the Oroville-Thermalito Complex to satisfy prior water rights totaled 1151 cubic hectometres (933,108 acre-feet), up ten percent from 1975 deliveries. Natural flow passed through the Project's southern reservoirs to satisfy prior water rights, amounted to some 21 cubic hectometres (16,950 acre-feet), down 39 percent from the 1975 total.

Electrical Energy Generation and Use

Electrical energy generated at the Project's five powerplants grossed in excess of two billion kilowatthours. Including Oroville-Thermalito Complex and the three power recovery plants (Devil Canyon, Castaic, and San Luis), Project's generation during

the calendar year of 1976 was almost 2.1 billion kilowatthours. Tables in Section VI give a tabulation of the electrical energy generation, supply, and uses. Compared to 1975 Project generation was down about one third, or about 1.1 billion kilowatthours. Project use of electrical energy to meet water demands and for reservoir filling totaled almost 3.6 billion kilowatthours, down 51 percent from the total used in 1975.

The year's total gross generation at the Hyatt-Thermalito Complex was the lowest since 1968, the first year of operations and filling of Lake Oroville. Gross generation by the Oroville Complex was about 1.3 billion kilowotthours, down over 75 percent from 1975. A graph showing the annual amounts of generation at the Hyatt-Thermalito Complex is presented in Section VI, page 1.

Total electrical energy generated at the Project's three recovery powerplants (San Luis, Castaic, and Devil Canyon) totaled just under 0.8 billion kilowatthours, down almost three percent from the total energy recovered at the three plants in 1975.

Special Activities

Generation at San Luis Pumping/Generating Plant was rescheduled one day in May and three days in June to provide additional energy to the PG&E system during peak loads. This was an exceptional occurrence brought about by a series of unit outages on the PG&E system, unavailability of three units at the Edward Hyatt Powerplant and above-normal temperatures. No water, above that required for Project needs, was released from San Luis Reservoir storage as a result of the rescheduled energy. All

associated energy not required for pumping Project demands, was banked and used during off-peak hours. The rescheduling was with the concurrence of the U. S. Bureau of Reclamation.

Various tests were conducted on units at the Edward Hyatt Powerplant to obtain data for the purpose of making modifications to decrease thrust bearing loads. As the level of Lake Oroville lowered more water had to be passed through the units to compensate for the lower head. Consequently in June and July there were a number of unscheduled Hyatt unit outages due to thrust bearing failures. Corrective measures from the test results materially reduced thrust bearing failures.

Between October 15 and December 30, 27 cubic hectometres (21,574 acre-feet) was diverted from the Feather River below Oroville to augment flows in Butte and Sutter Creeks. This diversion was made to counteract a potential for botulism in migratory duck population of Butte Basin and Sutter National Wildlife Refuge. The diversion, up to $4 \text{ m}^3\text{s}$ (150 cfs), was made via Pacific Gas and Electric Company's Western Canal.

The lower wear rings on certain units at several pumping plants began to slip from their proper positions. An inspection of other lower wear rings indicated a similar problem. The slippage resulted from fabrication methods used by the supplier. To correct the problem, eight stainless steel pins were used to fasten the lower wear rings in place. This correction was made on all units at Buena Vista, Wheeler Ridge, Wind Gap, and Pearblossom pumping plants.

The Department was a party to an agreement whereby the Metropolitan Water District of Southern California made 13 cubic hectometres (10,500 acre-feet) of their project water available to the Dudley Ridge Water District in the San Joaquin Valley. In exchange for the MWD water, Dudley Ridge paid conveyance costs plus the cost of 22 megawatt-hours to pump a similar quantity of water from the Colorado River. The energy was obtained through the Department's agreement with California Suppliers for Project energy.

Sacramento-San Joaquin Delta Operations

Calendar year 1976 was the driest year since operation of the CVP began in 1944 and the SWP in 1962. Operation of the Delta under these dry conditions tested the practicality of accepted Delta water quality standards in conjunction with operations within the CVP-SWP Coordination Agreement. The year's operation proves that Delta water quality standards must be lowered from that of a normal water supply year if the greatest beneficial use of water is to be attained. Also the CVP-SWP Coordination Agreement could provide guidelines necessary for efficient Delta operation under the driest of conditions.

The most difficult operating problem arising from the dry year was during periods when the CVP and SWP objectives governing Delta water quality criteria were different. During these periods the agency operating to the higher Delta water quality standards provided additional water for Delta outflow index above that shared with the other agency. In all cases of

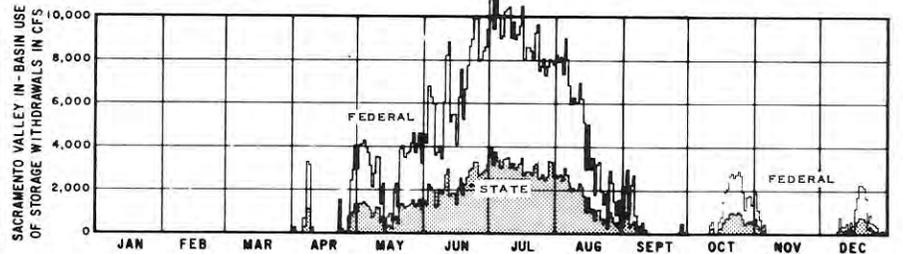
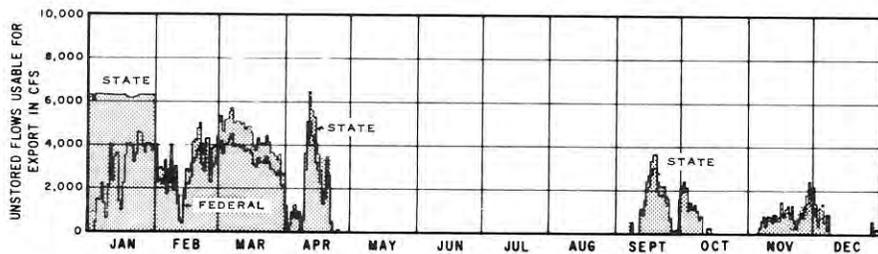
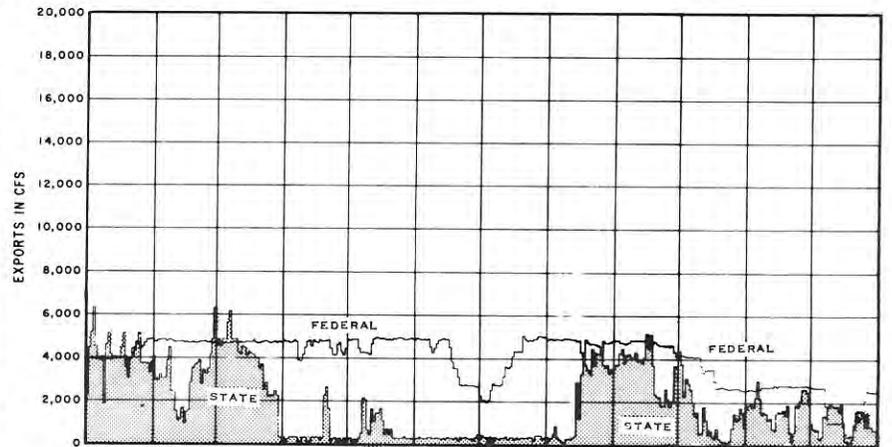
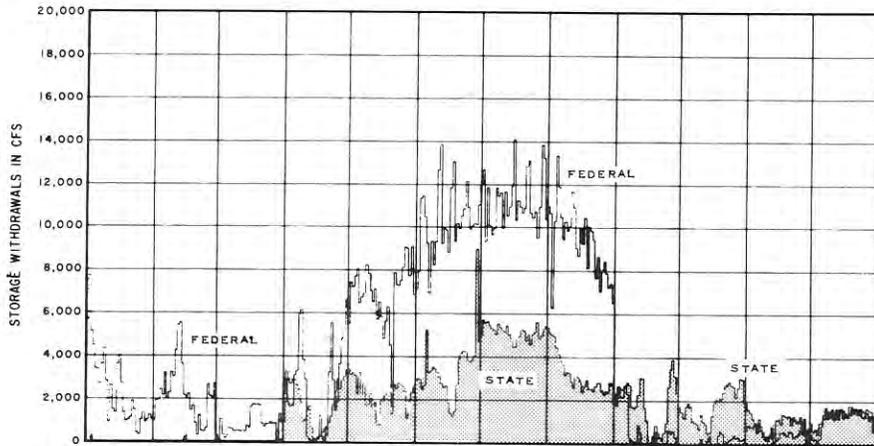
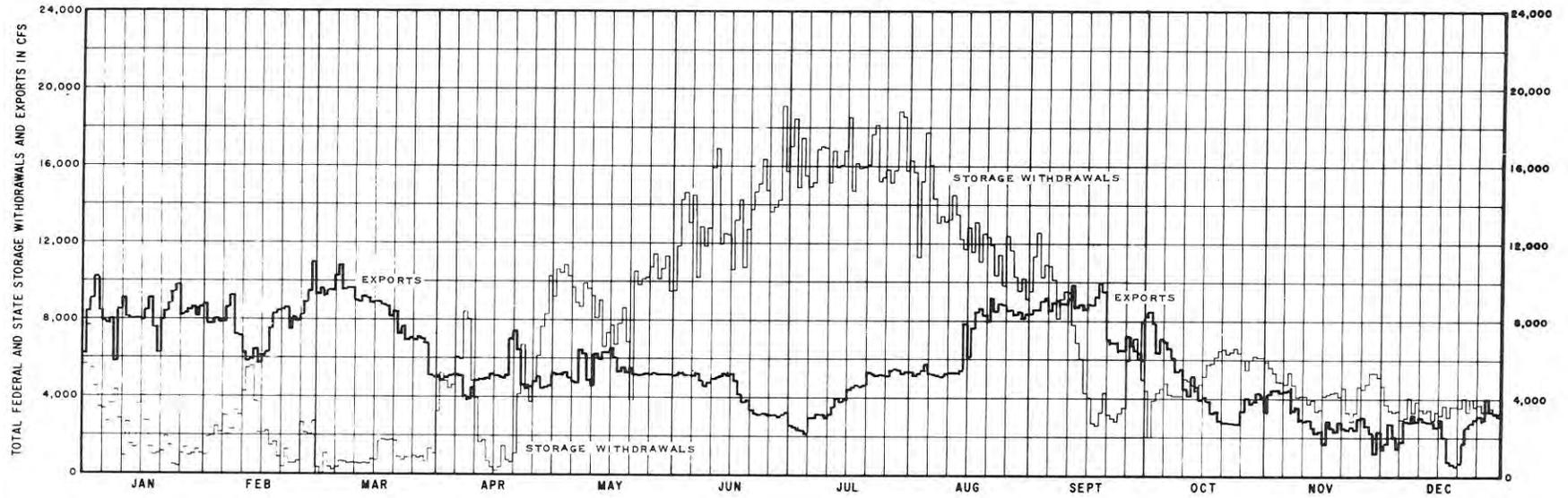
disagreement during 1976, SWP was operating to the higher Delta water quality standards. A lesser problem of operation existed in determining the Delta outflow index necessary to maintain an agreed-upon water quality standard. In the main, this was due to the great influence of local tides, winds, and increased consumptive use during the low Delta inflow periods. Previous operating experience had not encountered such low inflows. Chart A, page 13 shows the CVP-SWP Delta coordinated operation.

Table A, page 14, shows the routing of water released from CVP-SWP upstream reservoirs to the Sacramento, Feather, and American Rivers. In this routing, releases are either increased or decreased by accretions or depletions along the two rivers and further decreased by Delta consumptive use and Delta outflow index. The water flowing to the ocean, Delta outflow index, provides a hydraulic barrier of fresh water to the more saline water of Suisun Bay and maintains Delta water quality at the required level. Any water in excess of that needed for in-basin use, Delta consumptive use, and Delta outflow index is available for State and Bureau export from the Delta. Water available for export, is allocated to either CVP or SWP export by means of the Coordination Agreement. In 1976, the SWP exported 1826 cubic hectometres (1,480,000 acre-feet) and the CVP exported 3424 cubic hectometres (2,776,000 acre-feet).

The SWP Delta water quality objectives were those established in Basin Plans 2 and 5b which were adopted by the State Water Resources Control Board in April 1976. The Bureau of Reclamation's position in operating the CVP was that the Bureau was not

CHART A

CVP SWP COORDINATED OPERATION



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TABLE A

SACRAMENTO BASIN AND SACRAMENTO-SAN JOAQUIN DELTA
OPERATION FOR 1976

(thousands of acre-feet except as noted)

Month	UPSTREAM RESERVOIR RELEASE			Sacramento River In-Basin Use ^{2/} (4)	DELTA INFLOW			DELTA USES			DELTA EXPORTS		
	Keswick ^{1/} (1)	Oroville ^{1/} (2)	Nimbus ^{1/} (3)		Sacramento River at ^{3/} Sacramento (5)	San Joaquin River at ^{3/} Vernalis (6)	Total Delta Inflow (7)	Delta Consumptive Use ^{4/} (8)	Delta Outflow Index		Total Exports (11)	Exported by State-DWR (12)	Exported by Federal-USBR (13)
									Thousands of acre-feet (9)	Average cfs (10)			
Jan.	393	152	129	203	878	195	1,073	-56	620	10,089	511	252	259
Feb.	381	149	87	72	689	118	807	-38	395	6,871	449	175	274
Mar.	336	105	94	314	847	110	957	-10	450	7,314	519	228	291
Apr.	503	178	72	-13	749	76	825	63	453	7,617	299	26	273
May	753	86	78	-249	670	56	725	121	259	4,207	335	38	297
June	790	102	78	-315	653	42	695	191	249	4,186	256	18	238
July	850	182	110	-383	763	36	799	268	270	4,383	251	117	135
Aug.	782	91	124	-143	857	61	918	252	239	3,885	427	172	255
Sept.	443	135	100	99	781	64	845	174	170	2,852	492	209	283
Oct.	249	129	51	64	495	80	575	118	173	2,819	289	84	205
Nov.	235	103	49	61	448	67	515	55	208	3,493	254	94	160
Dec.	212	94	101	78	485	63	548	2	374	6,085	174	68	106
TOTAL	5,927	1,506	1,073	-212	8,315	968	9,283	1,140	3,860		4,256	1,480	2,776

^{1/} Releases to river.^{2/} Positive values show accretions; negative values show depletions.^{3/} Col. 5 and 6 are based on daily 6:00 a.m. readings. Cols. 1, 2, 3, 12, and 13 are based on measured total daily flows.^{4/} From Consumptive Use Table dated April 9, 1969.

1000 acre-feet = 1.2335 cubic hectometres

1000 cubic feet per second = 28.317 cubic metres per second

legally obligated to meet these standards and on occasions did not provide its share of Delta outflow index to meet the State's standards. The Bureau did make releases to provide its share of 113 cubic metres per second (4,000 cfs) Delta outflow index, a flow which generally met the Delta standards during most, but not all, of the year. Table B, page 16, shows the daily computed outflow index for the year. The Table A also shows that portion of the Delta outflow index not shared by the Bureau of Reclamation.

The Bureau of Reclamation's Delta water quality standards for 1976 were essentially those specified in two documents: (1) the four-agency agreement "Delta Water Quality Criteria" dated November 19, 1965 (this agreement is also included in the CVP-SWP Coordination Agreement), and the agreement the Bureau of Reclamation has with its water customers. Generally these two agreements do not require as great a Delta outflow index as the State's Basin Plans 2 and 5b.

A controlling water quality parameter effecting this year's SWP operation in the Sacramento-San Joaquin Delta was the Basin Plan criteria for protection of striped bass spawning. This criteria calls for the maintenance of electrical conductivity (EC) of less than 1,500 micromhos (approximately 1,000 mg/l TDS), 14-day average during a five-week period after water temperature in the San Joaquin River reaches 16°C (60°F) at Antioch. On March 28, that temperature had been reached, also that electrical conductivity was in excess of the standard (see Chart B, page 19). Immediately the SWP, but not the CVP, curtailed exports. The Project also upped releases from Oroville Complex to increase

TABLE B
CVP - SWP COORDINATED OPERATION
DELTA OUTFLOW INDEX 1976

DAY	JANUARY		FEBRUARY		MARCH		APRIL		MAY ^{2/}		JUNE ^{2/}		JULY ^{2/}		AUGUST		SEPTEMBER		OCTOBER ^{2/}		NOVEMBER ^{2/}		DECEMBER ^{2/}	
	Actual	Excess	Actual	Excess	Actual	Excess	Actual	Excess	Actual	Excess	Actual	Excess	Actual	Excess	Actual	Excess	Actual	Excess	Actual	Excess	Actual	Excess	Actual	Excess
1	15,982		5,290		8,941		6,302		3,759	0	4,206	206	3,931	-69	4,033		3,118		2,222	0	3,017	1,017	4,376	1,876
2	15,770		5,304		13,786		6,523		4,346	0	4,111	111	4,417	417	4,000		3,016		2,657	0	2,657	0	5,021	2,521
3	12,533		5,544		18,063		6,432		5,083	0	4,235	235	4,141	141	4,678		3,019		2,178	0	2,534	0	5,047	0
4	11,795		6,361		18,684		7,009		4,982	0	4,052	52	4,392	392	4,612		3,081		2,250	0	2,512	0	5,017	0
5	12,688		7,286		15,616		7,732		4,014	0	3,964	-36	4,080	80	3,843		3,060		2,233	0	2,497	0	4,994	0
6	12,647		6,326		12,362		8,289		3,929	0	3,901	-99	5,202	1,202	3,619		3,356		2,181	0	2,495	0	5,002	0
7	13,011		7,145		9,418		8,526		3,930	0	4,110	110	5,180	1,180	3,904		2,951		2,196	0	2,650	0	5,015	0
8	12,540		7,222		7,817		9,992		3,984	0	4,364	364	5,246	1,246	4,095		2,915		2,301	101	2,418	0	4,986	0
9	12,851		7,361		6,188		11,451		4,032	0	4,436	436	5,191	1,191	4,603		3,030		2,536	336	2,496	0	6,036	0
10	12,498		8,273		5,382		12,839		4,027	0	4,565	565	5,215	1,215	4,196		3,002		2,475	275	2,996	496	6,037	0
11	10,951		7,937		5,364		14,265		4,145	0	4,512	512	5,298	1,298	4,331		2,466		2,251	51	3,107	607	6,005	0
12	11,139		7,636		5,614		14,359		3,997	0	4,190	190	5,232	1,232	4,078		2,595		2,245	0	3,658	1,158	5,994	0
13	10,763		7,498		4,729		12,957		3,958	0	4,240	240	4,762	762	3,657		2,508		2,079	0	3,607	1,107	6,014	0
14	11,338		7,746		4,982		11,298		4,001	7,746	4,157	157	4,526	526	3,760		3,603		2,001	0	3,734	1,234	6,030	0
15	10,728		8,334		5,556		10,022		4,047	0	4,271	271	4,402	402	3,907		4,046		2,005	0	3,474	974	5,996	0
16	10,445		7,858		4,908		8,988		3,990	0	4,170	170	4,119	119	3,837		2,987		2,507	507	3,740	1,240	5,977	0
17	9,960		8,606		4,249		7,888		4,113	0	4,106	106	4,068	68	3,715		3,004		1,995	0	3,457	957	7,840	0
18	8,992		8,279		4,222		6,970		4,018	0	4,147	147	4,059	59	3,585		2,502		2,503	503	3,612	1,112	8,012	0
19	9,649		7,981		5,301		6,759		4,000	0	3,786	-214	4,257	257	3,610		2,512		3,568	1,568	4,055	1,555	8,300	0
20	10,845		7,998		5,325		5,902		3,931	0	3,631	-369	4,334	334	3,726		2,443		3,584	1,584	4,049	1,549	8,060	0
21	10,012		7,927		5,118		4,285		4,335	0	4,287	287	3,879	0	3,610		2,640		3,498	1,498	4,053	1,553	7,965	0
22	10,119		6,831		5,334		4,622		4,318	0	4,272	272	3,953	0	3,835		3,065		3,701	1,701	4,731	2,231	7,011	0
23	9,062		6,361		5,543		4,428		4,616	0	4,317	317	3,982	0	4,847		3,081		3,778	1,778	5,511	3,011	5,996	0
24	6,707		6,093		5,750		4,350		4,920	0	4,326	326	3,919	0	3,813		2,501		3,745	1,745	4,008	1,508	6,070	0
25	6,843		6,182		4,852		4,397		4,456	0	4,312	312	4,099	0	3,526		2,426		3,664	1,664	4,047	1,547	6,049	0
26	5,721		5,548		4,977		3,823		4,485	485	4,216	216	3,977	0	3,663		2,505		3,567	1,567	4,066	1,566	6,024	0
27	6,334		5,055		4,942		4,470		4,448	448	4,166	166	4,000	0	3,487		2,527		3,575	1,575	4,061	1,561	5,955	0
28	5,527		4,666		4,767		4,961		4,680	680	4,170	170	3,984	0	3,492		2,475		3,595	1,595	4,037	1,537	5,638	0
29	5,067		4,617		5,216		4,742		3,985	-15	4,221	221	4,045	0	3,660		2,806		3,547	1,547	3,500	1,000	6,012	0
30	5,101				7,097		3,931		3,769	-231	4,148	148	3,992	0	3,570		2,326		3,522	1,522	4,000	1,500	5,984	0
31	5,155				6,625				3,837	-163			4,006	0	3,145				3,661	1,661			6,170	
TOTAL	312,773		199,265		226,728		228,512		130,135	1,204	125,589	5,589	135,888	12,052	120,437		85,566		87,387	22,778	104,779	30,020	188,633	4,397
AVERAGE	10,089		6,871		7,314		7,617		4,198	39	4,186	186	4,383	389	3,885		2,852		2,819	735	3,493	1,001	6,085	142
MAXIMUM	15,982		8,606		18,684		14,359		5,083	680	4,565	565	5,298	1,298	4,847		4,046		3,778	1,778	5,511	3,011	8,300	2,521
MINIMUM	5,067		4,617		4,222		3,823		3,759	-231	3,631	-369	3,931	0	3,145		2,426		1,995	0	2,418	0	4,376	0
TOTAL IN ACRE-FEET	620,385		395,242		449,715		453,254		258,103	2,388	249,106	11,086	269,534	23,905	238,887		169,720		173,332	45,180	207,829	59,545	374,154	8,721

Values in cfs - days except where noted.

^{1/} Excess outflow is that part of the Outflow Index provided by SWP not shared with CVP

^{2/} SWP assumed excess outflow (+ or -)

	TOTAL	SHARED	EXCESS ^{1/}
Total Delta Outflow Index	1,945,692 cfs-days 3,859,261 acre-feet	1,869,652 cfs-days 3,708,436 acre-feet	76,040 cfs-days 150,825 acre-feet
Delta Outflow Index	Average 5,316 cfs-days Maximum 18,684 cfs-days Minimum 1,995 cfs-days	5,108 cfs-days 18,684 cfs-days 1,995 cfs-days	208 cfs-days 3,011 cfs-days 0 cfs-days

1,000 cfs = 28.317 m³/s

1,000 acre-feet = 1.2335 cubic hectometres

Delta outflow and achieve the criterion. However, only a small portion of the increased inflow in the Sacramento River reached the San Joaquin River system through the Delta Cross Channel and Georgiana Slough. As a result, the increased releases proved very ineffective in flushing the river and an EC lower than 1,500 was not achieved until April 12 resulting in the 14-day running average exceeding the standards until April 21.

By an interim agreement with the State Department of Fish and Game (DFG), the Project curtails exports from the Delta during a five-week period each spring for the protection of striped bass. In 1976, the DFG requested that this period be in June rather than in April as in the past. To comply, beginning May 22, 1976, exports were reduced to those necessary to meet South Bay and North San Joaquin Aqueduct demands. Repair of a leak in the North San Joaquin Aqueduct extended the period of reduced exports from the Delta Pumping Plant until August 15, 1976, but in the interim, Project water was pumped at the U. S. Bureau of Reclamation's Tracy Pumping Plant and conveyed to O'Neill Forebay beginning July 8, 1976. Water delivery commitments south of Kettleman City during the period of curtailment were met by releases from San Luis Reservoir and from State water conveyed to O'Neill Forebay by the Bureau.

State Water Resources Control Board's Water Rights Decision D 1275 (as amended by D 1291) criteria restricts the Project from storing water in its upstream reservoirs or exporting the natural inflow to the Delta during the months of April through June whenever maximum surface zone salinity at Blind Point on the

San Joaquin River exceeds 250 mg/l chloride. This criterion was exceeded from April 1 through April 12, on April 15, and from April 28 through June 30. Project exports, during the periods this criterion was exceeded, were limited to Project upstream storage withdrawals.

The original criteria for the Basin 2 Plan called for a daily limit of 4,000 mg/l chloride at the western end of Chipps Island measurements at the O&A Ferry Slip indicated that this criterion was exceeded only on May 16. On several days in June the daily chlorides increased to near the maximum daily due to a sudden decrease in barometric pressure and with subsequent westerly winds through the Carquinez Strait (see Chart B, page 19).

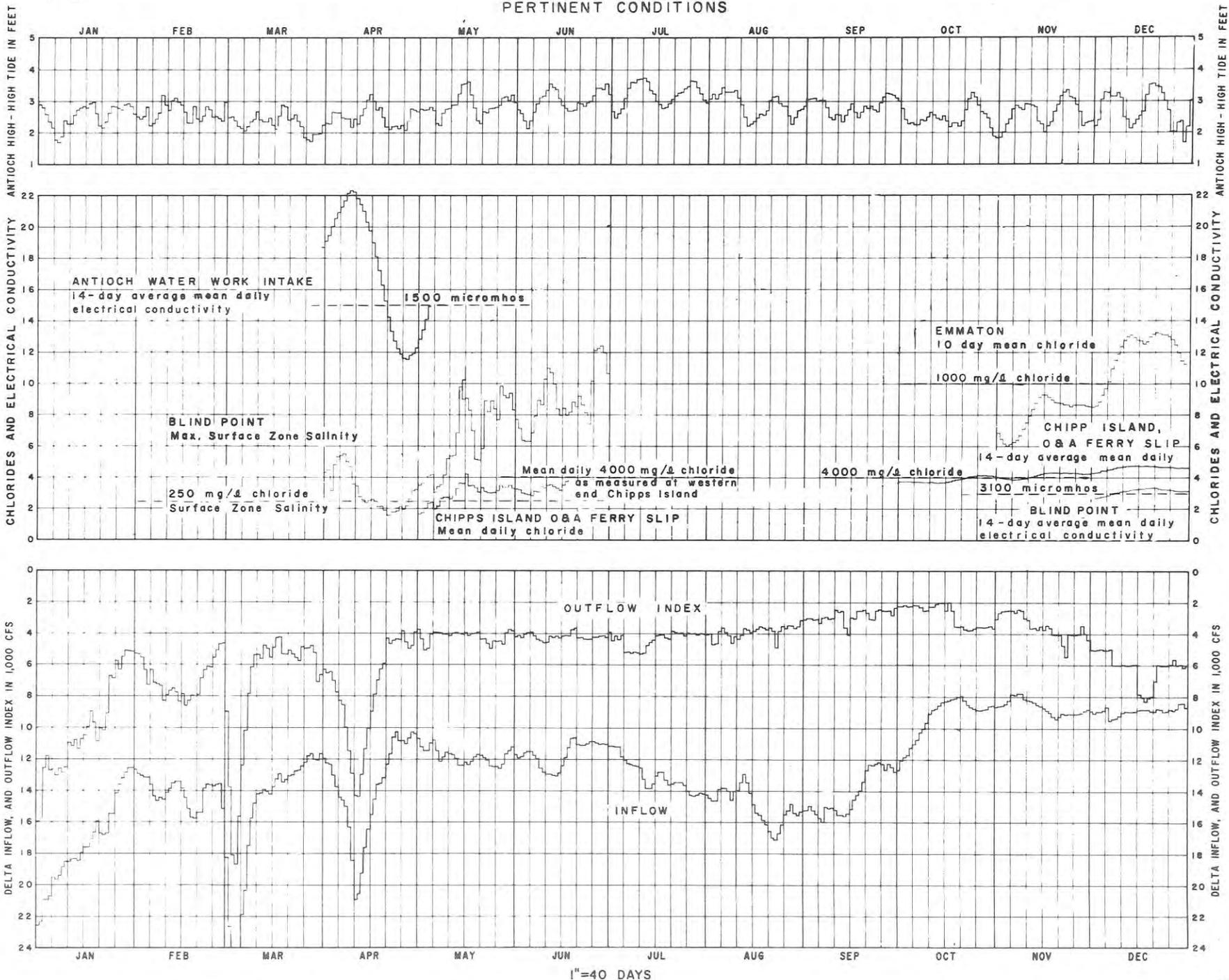
In June, the Chipps Island chloride standards was modified to provide for the quality to be maintained on a 14-day running average rather than a 10-day average, measured at the O&M Ferry Slip on Chipps Island. This new criterion was exceeded between October 23 and November 1, and again from November 10 through December 31. Water quality conditions in the Delta following the irrigation season were generally very close to the Basin Plan limits. Near the end of the year and despite increased outflows, some limits were exceeded as previously stated.

The 14-day mean electrical conductivity (EC) at Blind Point on the San Joaquin River exceeded the Basin Plan limit of 3,100 micromhos EC (based on a "noncritical" year) from December 11, 1976 through December 31, 1976 (the end of the period for which the limit applies).

On the Sacramento River at Emmaton, the 10-day mean salinity standard of 1,000 mg/l chlorides (based on a "noncritical" year) in the Basin Plan was exceeded from December 6, 1976 through

CHART B
 WATER QUALITY OBJECTIVES
 AND
 PERTINENT CONDITIONS

1976



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December 31, 1976. Periods during the year where water quality conditions exceeded criteria are shown on Chart B, page 19, "Water Quality Objectives and Pertinent Conditions".

The discrepancy between projected and actual Sacramento Valley in-basin use caused concern during late spring and early summer this year. Sacramento Valley in-basin use is the net effect of the stream flow and water use in the Sacramento Valley between the release points of Keswick, Oroville, and Nimbus Dams and the point of inflow to the Delta at Sacramento. Projections anticipated near normal timing of the buildup of in-basin use, therefore, the significant difference between the projected and actual use during May required increased releases from storage. August and September storms helped toward an early turn around, providing some compensation for the early buildup in Sacramento Valley in-basin use.

In an effort to conserve water in the Delta, and with the agreement of Delta water agencies, a rock barrier was installed on Sutter Slough, near Clarksburg. The barrier, completed on August 31, 1976, and removed by December 10, 1976, served to divert additional water into the central part of the Delta to improve its water quality and decrease the drain on Project reservoirs. It is estimated that this action conserved between 60-120 cubic hectometres (50,000 and 100,000 acre-feet) of water.

Delta and SWP operations during the fall and early winter continued under dry conditions. As a result of lack of runoff, outflows to the Delta were far below normal for that time of year and both the DWR and USBR committed an extremely large

volume of outflow from their reservoirs to control saline intrusion. For a short time, however, in mid-October, the Delta outflow index was reduced to a low of 57 m³/s (2,000 cfs). The index was increased again, in stages, to a maximum of 235 m³/s (8,300 cfs) by December 18, 1976. During December 1976, the index averaged 172 m³/s (6,085 cfs), almost the average released from CVP and SWP upstream reservoirs.

The additional water necessary to raise the index was initially furnished by the SWP. However, when the CVP's Mendota Pool quality criteria were affected, the Bureau agreed to modify CVP operation to share in an outflow of 142 m³/s (5,000 cfs) on December 3, 1976, and the higher subsequent outflows required during the remainder of the month.

In summary, changes in Delta outflow index were accomplished by: (1) modifying releases from SWP and CVP upstream reservoirs; (2) modifying inflow into Clifton Court Forebay; (3) modifying CVP and SWP export pumping from the Delta; or (4) a combination of the three. From October 15, 1976 to January 1, 1977, the SWP had withdrawn 380 cubic hectometres (308,000 acre-feet) from its storage facilities at Oroville, DWR's southern reservoirs, and the Project's share of San Luis Reservoir storage. This occurred during what is ordinarily considered to be a filling period for those facilities.

The dry year conditions also affected salmon in their adult stage during the 1976 fall spawning. Because of the low storage in the State's reservoirs, water releases were at temperatures well above maximum levels for successful salmon spawning and

for incubation of eggs in the gravel. Planned fall reductions in water releases would have compounded the problem by dewatering spawning gravel during spawning periods.

To improve the water temperature and flow situation, the Bureau of Reclamation and the Department cooperated in altering operations at Shasta, Trinity, Folsom, and Oroville reservoirs to provide the best available water temperatures and to stabilize flow releases during the spawning period. Water temperatures were reduced on the Sacramento River by utilizing cooler Trinity-Whiskeytown water with a corresponding decrease in releases from warmer Shasta Reservoir. This operation commenced on October 1 and by October 14, 1976 temperatures of 14°C (58°F) were achieved at Red Bluff. American River temperatures were lowered by using the Folsom Dam low level outlet near river elevation. This operation was at the expense of some power production.

Flow was stabilized on the Sacramento River through a mutual water exchange between the USBR and DWR. A stabilized spawning flow of 110 m³/s (3,900 cfs) was maintained from October 1 through December 1, 1976, when it was reduced to 92 m³/s (3,250 cfs). Even though a flow of 110 m³/s (3,900 cfs) is the lowest spawning flow since Shasta Dam began operating, and thus less spawning gravel was available, these flow conditions are expected to affect salmon reproduction less than a fluctuating high to low flow condition.

Oroville Field Division

As in 1975, of the three Upper Feather River reservoirs, only Antelope Lake spilled during the spring runoff period. The maximum storage attained in Frenchman Lake occurred April 20, and was the lowest maximum storage recorded since operations began in 1968, about 50 percent of capacity. Lake Davis' maximum storage occurred March 24, about 86 percent of capacity, and was the second lowest maximum storage recorded. (In 1968, year of initial operation, maximum storage recorded was only 77 percent of capacity.) Antelope Lake was drained in October to eradicate rough fish, in an operation similar to that carried out in 1971. Graphs showing this year's storage fluctuations of the three reservoirs are on page 46. Monthly operation data is presented in Section V, page 1.

The maximum storage for 1976 in Lake Oroville was reached on March 28, 3549 cubic hectometres (2,876,934 acre-feet). Minimum storage in Lake Oroville, 2007 cubic hectometres (1,627,254 acre-feet) was recorded on December 31. Both maximum and minimum storages established new low records since the initial filling of Lake Oroville in 1969. The previous low maximum storage in Lake Oroville occurred May 31, 1970, 3817 cubic hectometres (3,094,644 acre-feet) while the previous record minimum occurred on January 2, 1975, 2046 cubic hectometres (1,658,970 acre-feet).

Gross generation at the Hyatt-Thermalito (Oroville) Complex during 1976 was 1,338,570 megawatthours. Energy consumed for power plant use and pump back requirements amounted to 53,350 megawatthours.

The surface water in Lake Oroville warmed to a high of 26°C (78°F) on July 22, 1976. Minimum temperature was 9°C (48°F) on February 9.

Releases to satisfy prior water rights to Sutter Butte Canal, Pacific Gas and Electric Company Lateral, Western Canal, Richvale Canal, and Palermo Canal totaled 1124 cubic hectometres (911,534 acre-feet) and reached a peak of 103.4 m³/s (3,650 cfs) on May 4. Releases to the Feather River totaled 1841 hectometres (1,492,310 acre-feet) and reached a peak of 104 m³/s (3,680 cfs) on April 8.

In addition, between October 15 and December 30, up to 4 m³/s (150 cfs) of water scheduled for release to the Feather River below Oroville was diverted via Pacific Gas and Electric Company's Western Canal to augment flows in Butte Creek and Sutter Bypass. This diversion, of 27 cubic hectometres (21,574 acre-feet), was to provide control of potential botulism in the migratory duck population in the Butte Basin and Sutter National Wildlife Refuge.

The Edward Hyatt Powerplant and the Oroville Area Control Center were evacuated on June 17 when vibrations commenced in Number 1 penstock and initial corrective actions did not suppress the vibrations. The Hyatt Powerplant was down between 8:30 a.m., June 17 and 3:30 a.m. June 18 for inspection and testing. No structural damage was observed during the inspection. This incident was presumed to be caused by resonant vibrations induced in the penstock caused by low operating pressure on a turbine shutoff valve seat. The "Summary Report, June 17, 1976, Incident at the

Edward Hyatt Powerplant" provides a sequence of events along with probable cause and preventive recurrence.

Six one-ton explosions were set off by the U. S. Geological Survey in the Oroville area during the week of July 20-30, to provide seismic velocity data. Two of the shots were in arms of Lake Oroville. This data was used to develop velocity profiles, both North-South and East-West, around Lake Oroville to be used in evaluating possible future seismic action in the area.

During June and July there were a number of unscheduled Hyatt unit outages due to thrust bearing failures.

Outages of Hyatt Powerplant penstocks occurred alternately during the latter part of November to allow the contractor to replace bolts on the trashrack.

The annual inspection critique for the Oroville Field Division was held May 14. Mr. James J. Doody, Acting Division Chief, Division of Operations and Maintenance, conducted the critique with Mr. Philip J. Johns, Chief of Oroville Field Division, representing the field division. Messrs Samuel B. Nelson, Mal Combs, and Ray W. Ferguson represented the California Water Commission's Committee at this inspection.

Delta Field Division

For the first time since operation began in the Delta Field Division in 1969, Lake Del Valle spring storage did not reach 49 cubic hectometres (40,000 acre-feet). Local inflow amounted to only 1/4 cubic hectometre (216 acre-feet), the lowest recorded inflow. With the limited amount of water available in

the Delta for SWP export, the spring refilling of Lake Del Valle, normally to 49 cubic hectometres (40,000 acre-feet), was limited to 42 cubic hectometres (34,078 acre-feet) which was attained on April 5. Pumping from the South Bay Aqueduct for the refilling operation began February 17 and continued through April 6. The annual drawdown of Lake Del Valle, normally beginning after Labor Day, was delayed until October 12 to reduce South Bay Aqueduct's power consumption during the Kern River Intertie outage and while the availability of SWP recovery power was low. During the drawdown, 8 cubic hectometres (6,493 acre-feet) of SWP water was released to the South Bay Aqueduct. Of the water released, 4 cubic hectometres (3,364 acre-feet) was pumped from Lake Del Valle to the Aqueduct through Del Valle Pumping Plant. Year's beginning storage was 31 cubic hectometres (25,017 acre-feet); year's ending storage was 31 cubic hectometres (24,897 acre-feet) which was also the low for the year.

Water pumped at the Delta Pumping Plant totaled 1661 cubic hectometres (1,346,772 acre-feet), during the year. Of this amount, 7 cubic hectometres (6,018 acre-feet) were pumped for the U. S. Bureau of Reclamation. Weekly pumping rates of the Delta Plant ranged from 4 cubic hectometres (3,263 acre-feet) (April 23-29) to 79 cubic hectometres (64,148 acre-feet) (January 2-8).

In addition to the Project's water pumped from the Delta by the Delta Pumping Plant, there were 172 cubic hectometres (139,160 acre-feet) of Project water pumped at the U. S. Bureau of Reclamation's Tracy Pumping Plant. This pumping was done between July 8 and August 14, during the outage of the California

Aqueduct for lining repair at Pool 10. This pumping exchange is in accordance with Article 10 of the "Supplemental Agreement Between the United States and the State of California for Co-ordinated Operation of the Central Valley Project and the State Water Project". The Project provided energy at the Tracy Pumping Plant switchyard at the rate of 300 KWh per acre-foot pumped.

Total Project water pumped from the Delta this year, excluding mitigation water, was 1825 cubic hectometres (1,479,914 acre-feet), down 21 percent from that pumped in 1975.

All water pumped, 7 cubic hectometres (6,018 acre-feet) for the U. S. Bureau of Reclamation at the Delta Pumping Plant this year was conveyed through the California Aqueduct to O'Neill Forebay. Of this total, 3 cubic hectometres (2,081 acre-feet) were pumped in January for delivery to U. S. Bureau of Reclamation's Cross Valley Canal customers. The remaining 5 cubic hectometres (3,937 acre-feet) were pumped during May to compensate the U. S. Bureau of Reclamation for reducing their pumping earlier so the water could be used to increase Delta outflow during critical periods. The U. S. Bureau of Reclamation provided all power required for pumping its water at the Delta Pumping Plant.

This year's critique of the annual inspection of the Delta Field Division was held June 25. Mr. Howard H. Eastin, Chief, Division of Operations and Maintenance, conducted the critique with Mr. Charles F. Tarbox, Chief, Delta Field Division, representing the Field Division. Mr. Samuel B. Nelson represented the California Water Commission at this inspection.

Between May 22 and June 30, all Project pumping from the Delta was limited to South Bay Aqueduct and North San Joaquin water demands. This was to comply with an interim agreement with the State Department of Fish and Game for the Project to curtail exports from the Delta to the maximum degree practical in a five-week period from April 25 through May 31 of each year during the peak of striped bass spawning. The Department of Fish and Game requested this period of minimum pumping be rescheduled to the period May 22 through June 30.

From July 1 through August 14, pumping at the Delta Pumping Plant was limited to South Bay Aqueduct and North San Joaquin Division demands to repair a section of the Aqueduct embankment in Pool 10 because of excessive leakage.

The installation and testing of the Delta Pumping Plant's acoustic flow meter was completed July 13.

Noteable success on controlling algae growth was realized from an intensified copper sulphate program implemented on the South Bay Aqueduct.

Water delivered to State Water Contractors within the San Francisco Bay area and North San Joaquin Valley, excluding regulated delivery of local supply from Lake Del Valle, totaled 215 cubic hectometres (173,993 acre-feet), up 15 percent over 1975 deliveries. The Project's share of mitigation water totaled 5 cubic hectometres (4,245 acre-feet). Annual water deliveries to each contractor are summarized in Section I, page 1.

The rock barrier installation at the head of Old River was completed on November 1 and removed November 24. The Old River barrier is installed each year to aid the fall migration

of salmon to spawning areas upstream of Stockton in keeping with the March 10, 1969 Memorandum of Understanding between the U. S. Bureau of Reclamation, Department of Water Resources, and the Department of Fish and Game to maintain and rebuild salmon stocks in the San Joaquin River drainage area. The barrier's prime function this year was to act as a fish attractor during the salmon migration. Normally the barrier installation is to increase the dissolved oxygen level in the San Joaquin River.

San Luis Field Division

Marked variation of this year's operation of the San Luis Reservoir from a typical year's operation included:

- (a) record storage drawdown;
- (b) early releases to supplement pumping from the Delta;
- (c) lack of Project pumping during December; and
- (d) utilization of San Luis facilities for a pumpback operation by Pacific Gas and Electric Company.

San Luis Reservoir storage ranged from a high of 2424 cubic hectometres (1,965,268 acre-feet) on March 18 to a low of 599 cubic hectometres (485,423 acre-feet) on August 23. This was the lowest minimum storage recorded for San Luis Reservoir since initial filling.

Water pumped into San Luis totaled 1004 cubic hectometres (813,576 acre-feet) and of this total, 394 cubic hectometres (319,801 acre-feet) was Project water. Project's share of 2006 cubic hectometres (1,626,389 acre-feet) of water released from San Luis Reservoir to O'Neill Forebay was 944 cubic hectometres (765,497 acre-feet). On December 31, 1976, San Luis Reservoir

storage was 1048 cubic hectometres (849,676 acre-feet) of which 56 percent, 582 cubic hectometres (471,834 acre-feet) was Project water.

Project releases from San Luis Reservoir to meet water demands were initiated in March and again in December. Releases during March were the highest for the month since March 1972, also a dry year, but in 1972, the releases were to supplement the Project's power supply. The volume of December releases from San Luis Reservoir was unprecedented for the month although pumpback operations have been conducted in December during other years. Operation of the San Luis Reservoir and the San Luis Pumping and Generation Plant are summarized in Section I pages 10 and 11.

Los Banos Reservoir releases for the year totaled 4934 cubic metres (4 acre-feet) compared to 8 cubic hectometres (6,220 acre-feet) during 1975. Beginning and ending storages of the Los Banos Reservoir for the year were 24 cubic hectometres (19,231 acre-feet) and 22 cubic hectometres (18,099 acre-feet), respectively.

Little Panoche Reservoir releases total one cubic hectometre (766 acre-feet) for the year, compared to one-half cubic hectometre (454 acre-feet) in 1975. The year's beginning and ending storage of Little Panoche Reservoir was 379 918 cubic metres (308 acre-feet) and 387 319 cubic metres (314 acre-feet), respectively.

Project's share of mitigation water totaled 5 cubic hectometres (4,295 acre-feet). All mitigation water was conveyed to the three parties (California Department of Fish and Game, Grassland Water District and William Affonso) through the

Delta-Mendota Canal, although for the first time the California Department of Fish and Game took deliveries from O'Neill Forebay. Conveying of mitigation water through U. S. Bureau of Reclamation facilities provides an overall saving to both agencies. The Project provided the U. S. Bureau of Reclamation electrical energy for pumping its share of the mitigation water at their Tracy and O'Neill Pumping Plants.

Water delivered to federal customers from the Joint Facilities comprising the San Luis Field Division totaled 1649 cubic hectometres (1,337,209 acre-feet), down less than one percent from 1974 deliveries. Water deliveries from the Joint Facilities to federal customers were made from 171 turnouts (56 permanent and 115 temporary). In addition, 109 cubic hectometres (88,300 acre-feet) of federal water was conveyed through the Joint Facilities for delivery by the San Joaquin Field Division to the Cross Valley Canal turnout.

The annual inspection critique of the San Luis Field Division was held July 23. Mr. Howard H. Eastin, Chief, Division of Operations and Maintenance, conducted the critique with Mr. Herman Musgrove, acting Field Division Chief, San Luis Field Division, representing the Field Division. Representatives from the U. S. Bureau of Reclamation included: Messrs Dave Coleman, Chief, Central Valley Operations Coordinating Office; E. R. Klinke, Chief, Power O&M Branch; W. O. Brown, Chief, Irrigation O&M Branch; and Barry Beal, Fresno Office. Mr. Samuel B. Nelson represented the California Water Commission at this inspection.

Because of system unit outage, including units at the Edward Hyatt Powerplant, and above normal temperatures, the generation schedule for the San Luis Pumping-Generating plant was revised during one day in May and three days in June to provide additional energy to the PG&E system during peak loads. This rescheduling did not require any additional water to be released from San Luis Reservoir storage and all associated energy not required for Project demands was banked and used during off-peak hours. The rescheduling was done with the approval of the U. S. Bureau of Reclamation.

Two exchanges of water were made in 1976 between the State Water Project and the Central Valley Project within the Joint Facilities which accomplished operations objectives and provided an overall saving of electrical energy. In February, 45 cubic hectometres (36,374 acre-feet) of federal water stored in San Luis Reservoir was exchanged for Project water in O'Neill Forebay. This exchange satisfied the energy repayment for the 1975 "Fish Test" (see 1975 Report of Operations) and provided water in O'Neill Forebay the USBR needed to service its customers. During July, when the USBR was pumping for the Project at the Tracy Pumping Plant, while Pool 10 was out for repairs, the USBR transferred 119 cubic hectometres (96,170 acre-feet) of its O'Neill Forebay storage to the SWP rather than pump and generate at O'Neill Pumping and Generating Plant. The transfer was in addition to two cubic hectometres (1,490 acre-feet) pumped into O'Neill Forebay by the USBR at their O'Neill Pumping Plant for the Project.

In July, 199 827 cubic metres (162 acre-feet) were released from O'Neill Forebay storage back through Check 12. This release was to help refill upstream pools during the repair of Pool 10.

Between April 2 and August 10, Unit No. 1 San Luis Pumping and Generating Plant was out-of-service to replace a broken wear ring.

The high intensity rain of October 26 and 27 caused some damage to the lining in Pool 14, just downstream of the Dos Amigos Pumping Plant. Inlets that drain storm water into the Aqueduct became plugged causing backwater which got behind the canal lining. Repairs were completed without dewatering the Aqueduct and without noticeable loss of water.

The San Luis Pumping-Generating Plant's control system, for remotely operating the units, became operational as a "Test" system this year. Under this system, the plant units can be operated from the Project Operations Control Center; additional development is necessary before the units can be operated from the Area Control Center. The present system allows the plant system to be scanned from the Area Control Center continuously with the data being displayed at the Project Operations Control Center.

San Joaquin Field Division

Water delivered to State Water Contractors totaled 1365 cubic hectometres (1,106,276 acre-feet), down five percent from 1975 water deliveries. In addition, a total of 109 cubic hectometres (88,300 acre-feet) of U. S. Bureau of Reclamation water was conveyed from Check 21 for delivery to federal customers through the Cross Valley Canal turnout. This was the first full

year of operation for the Cross Valley Canal. Annual water deliveries by contractors are summarized in Section I, page 1.

Also included in this year's total water deliveries to State Water Contractors was 13 cubic hectometres (10,500 acre-feet) of Metropolitan Water District of Southern California entitlement water exchanged to Dudley Ridge Water District for a like amount of Colorado River water. The Dudley Ridge Water District reimbursed the MWD for its additional cost to pump the exchange water from the Colorado River plus paying an adjustment charge to compensate for other charges to State Water Contractors which occurred because of the exchange.

The annual inspection critique of the San Joaquin Field Division was held October 8. Mr. Howard H. Eastin, Chief, Division of Operations and Maintenance, conducted the critique with Mr. Merle S. Bashor, Chief, San Joaquin Field Division, representing the Field Division. Mr. Samuel B. Nelson represented the California Water Commission at this inspection.

Between October 13 and November 22 was the scheduled outage for the Kern River Intertie. During this outage, the intertie construction progressed to the point of cutting into the Aqueduct in Pool 29 near State Highway 119. This Corps of Engineers' facilities to be completed in 1977, can bring flood water from the Kern River into the Aqueduct, similar to the 1969 operation when temporary facilities diverted some 111 cubic hectometres (90,000 acre-feet) into the Aqueduct from the Buena Vista Lake area.

Unscheduled unit outage occurred at Buena Vista, Wheeler Ridge, and Wind Gap Pumping Plants when the units wear ring slipped. A program to fasten the wear rings with stainless steel pins was determined to be the best method to correct the problem for all units of this type design.

Dewatering, inspection, and maintenance was performed on first the East and then the West discharge line of the A. D. Edmonston Pumping Plant.

Installation of radial gates at the Tehachapi control structure was completed.

New Turnout Construction Completions Include:

Berrenda Mesa No. 2, Berrenda Mesa Water District, MP 196.40;

Belridge No. 1A, Belridge Water Storage District, MP 209.75; and

Buena Vista No. 6, Buena Vista Water Storage District, MP 230.40.

Completion of Existing Turnout Stubs in the Aqueduct Include:

Lost Hills No. 5, Lost Hills Water Storage District, MP 202.05; and

Buena Vista No. 5, Kern Delta and Cawelo Water District, MP 242.85.

Southern Field Division

Pyramid Lake end-of-year storage was 205 cubic hectometres (166,185 acre-feet). The combined storage of Pyramid Lake and Elderberry Forebay generally ranged between 222 and 234 cubic hectometres (180,000 and 190,000 acre-feet), except for two short periods. In both instances, September 15-25 and November 25-December 2, space was provided in Pyramid Lake from Los Angeles

Department of Water and Power's operating space while Elderberry Forebay was drawn down to work on Elderberry Forebay outlet tower gates.

Castaic end-of-year storage was 198 cubic hectometres (160,918 acre-feet). This year's filling operation lasted through April 17, when the maximum storage of 355 cubic hectometres (288,043 acre-feet) was last attained. By the end of the five-week period of minimum Delta pumping, June 30, reservoir storage had been reduced to 292 cubic hectometres (236,622 acre-feet). Through August 16, reservoir storage was further reduced to 279 cubic hectometres (226,258 acre-feet) while repairs were being made to the canal lining in the North San Joaquin Division. Although there was some refilling before and after the Kern River Intertie outage, the lack of water in the Delta for export limited the pumping at the A. D. Edmonston Pumping Plant to East Branch requirements during the last three weeks of December.

Silverwood Lake end-of-year storage was 67 cubic hectometres (54,645 acre-feet). Filling was stopped March 15 to lower Silverwood Lake for a scheduled 48-day outage. During this outage, modification was made on the hydraulic system that operates the butterfly valves in the San Bernardino Tunnel Intake Tower. The outage also allowed work to be completed at Devil Canyon Powerplant. On May 17, filling resumed through May 26, after which the summer drawdown began. A new filling operation was conducted between July 3 and September 28 in preparation for the Kern River Intertie outage. Filling did not resume until after December 1. Silverwood Lake storage ranged between a minimum of

61 cubic hectometres (49,120 acre-feet) on November 30 and a maximum of 90 cubic hectometres (72,935 acre-feet) September 28.

Lake Perris end-of-year storage was 104 cubic hectometres (84,457 acre-feet). Project water conveyed to Lake Perris totaled 3 cubic hectometres (2,155 acre-feet) for the year. Measured outflow totaled 2 cubic hectometres (2,023 acre-feet) which included seepage collected and delivered to the Metropolitan Water District and water used in construction of recreation facilities.

Water deliveries to State Water Contractors in the Southern Field Division totaled 846 cubic hectometres (685,914 acre-feet), up 19 percent over 1975 water deliveries. Of this year's water delivered in the Southern Field Division, 61 percent went to West Branch Contractors compared to 31 percent delivered in 1975.

Water from local inflow passed through Project facilities in the Southern Field Division to satisfy water rights totaled 25 cubic hectometres (20,489 acre-feet), down 31 percent from the 1975 total. End-of-year storage of local inflow in Southern Field Division reservoirs totaled 4 cubic hectometres (3,020 acre-feet).

The critique of this year's annual inspection of the Southern Field Division was held November 19. Mr. Howard H. Eastin, Chief, Division of Operations and Maintenance, conducted the critique and Mr. Joseph H. Sherrard, Chief, Southern Field Division, represented the Field Division. Mr. Samuel B. Nelson represented the California Water Commission at this inspection.

The 48-day scheduled outage of the East Branch began April 1 when the Devil Canyon Powerplant was taken out-of-service. Prime purpose of the outage was to install the spherical valve for Devil Canyon unit 2. Other work accomplished included:

- (a) modification of the San Bernardino Intake Tower valve hydraulic system;
- (b) removal of mud and debris from Pool 58 and Pearblossom Pumping Plant Forebay;
- (c) draining of Pearblossom Pumping Plant discharge line for the inspection of unit 4 valve seat;
- (d) draining and inspection of both the Mojave Siphon and the San Bernardino Tunnel; and
- (e) connection of Devil Canyon unit 2 transformer to switchyard.

During the scheduled outage for the Kern River Intertie work, October 13 to November 22, some temporary turnouts of Antelope Valley-East Kern Water Agency were replaced with permanent turnouts; modifications were made on the San Bernardino Intake Tower; flow measurement equipment installation was completed at Quail Lake outlet; and silt was removed from various sections of the Aqueduct.

Devil Canyon Powerplant unit 2 began generation on July 29 for testing and went on line August 6.

Pearblossom Pumping Plant unit 3 was out-of-service throughout the year during fabrication of units 1 and 2.

Temporary turnouts upgraded to permanent turnouts and permanent turnouts completed in the Southern Field Division this year included:

320th St., Antelope Valley-East Kern Water Agency,
MP 304.75;

319th St., Antelope Valley-East Kern Water Agency,
MP 304.90;

305th St., Antelope Valley-East Kern Water Agency,
MP 306.70;

294th St., Antelope Valley-East Kern Water Agency,
MP 308.05;

280th St., Antelope Valley-East Kern Water Agency,
MP 309.53;

245th St., Antelope Valley-East Kern Water Agency,
MP 313.43;

180th St., Antelope Valley-East Kern Water Agency,
MP 321.52;

Fairmont, Antelope Valley-East Kern Water Agency,
MP 323.19;

Willow Springs, Antelope Valley-East Kern Water
Agency, MP 326.91;

70th St., West (Quartz Hill), Antelope Valley-East
Kern Water Agency, MP 336.73;

30th St. West (City Ranch Rd.), Antelope Valley-East
Kern Water Agency, MP 342.80; and

Box Springs, Metropolitan Water District of Southern
California, MP 433.06.

Castaic Lagoon was closed after an outbreak of swimmer's
itch occurred over the May 15-16 weekend. Following a treatment of
the lagoon with copper sulfate, the facility was reopened with no
further reports of the problem.

Lake Perris swimming areas were closed September 10 due
to pondweed infestations. No treatment was recommended as the
season was almost over and natural degeneration was expected to
take care of the problem.

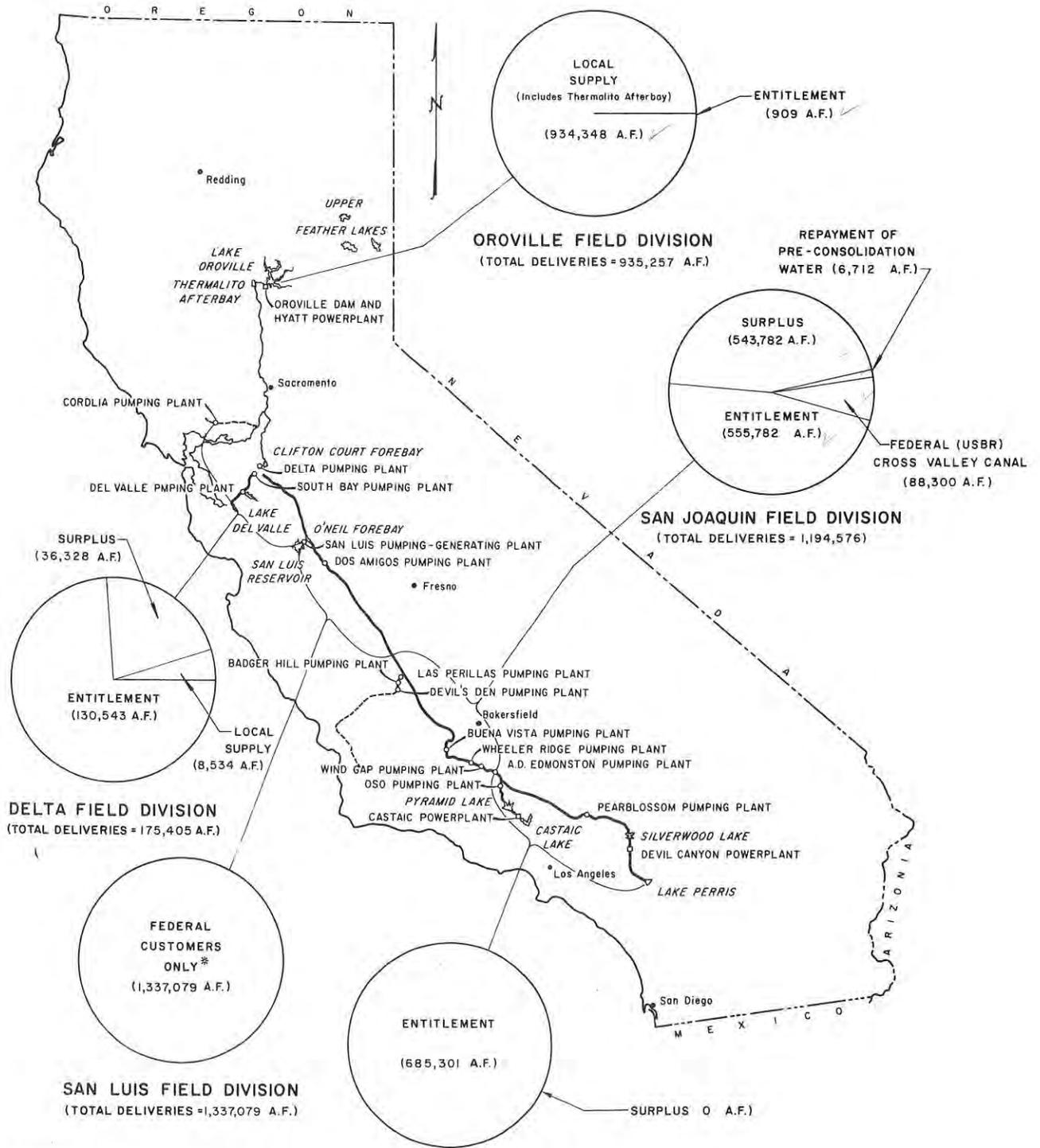
CONVERSION FACTORS

English to Metric System of Measurement

<u>Quantity</u>	<u>English unit</u>	<u>Multiply by</u>	<u>To get metric equivalent</u>
Length	inches (in)	25.4	millimetres (mm)
		.0254	metres (m)
	feet (ft)	.3048	metres (m)
	miles (mi)	1.6093	kilometres (km)
Area	square inches (in ²)	6.4516×10^{-4}	square metres (m ²)
	square feet (ft ²)	.092903	square metres (m ²)
	acres	4046.9	square metres (m ²)
		.40469	hectares (ha)
		.40469	square hectometres (hm ²)
		.0040469	square kilometres (km ²)
	square miles (mi ²)	2.590	square kilometres (km ²)
Volume	gallons (gal)	3.7854	litres (l)
		.0037854	cubic metres (m ³)
	million gallons (10 ⁶ gal)	3785.4	cubic metres (m ³)
	cubic feet (ft ³)	.028317	cubic metres (m ³)
	cubic yards (yd ³)	.76455	cubic metres (m ³)
	acre-feet (ac-ft)	1233.5	cubic metres (m ³)
		.0012335	cubic hectometres (hm ³)
		1.233×10^{-6}	cubic kilometres (km ³)
Volume/Time (Flow)	cubic feet per second (ft ³ /s)	28.317	litres per second (l/s)
		.028317	cubic metres per second (m ³ /s)
	gallons per minute (gal/min)	.06309	litres per second (l/s)
		6.309×10^{-5}	cubic metres per second (m ³ /s)
	million gallons per day (mgd)	.043813	cubic metres per second (m ³ /s)
Mass	pounds (lb)	.45359	kilograms (kg)
	tons (short, 2,000 lb)	.90718	tonne (t)
		907.18	kilograms (kg)
Power	horsepower (hp)	0.7460	kilowatts (kW)
Pressure	pounds per square inch (psi)	6894.8	pascal (Pa)
Temperature	Degrees Fahrenheit (°F)	$\frac{t_F - 32}{1.8} = t_C$	Degrees Celsius (°C)

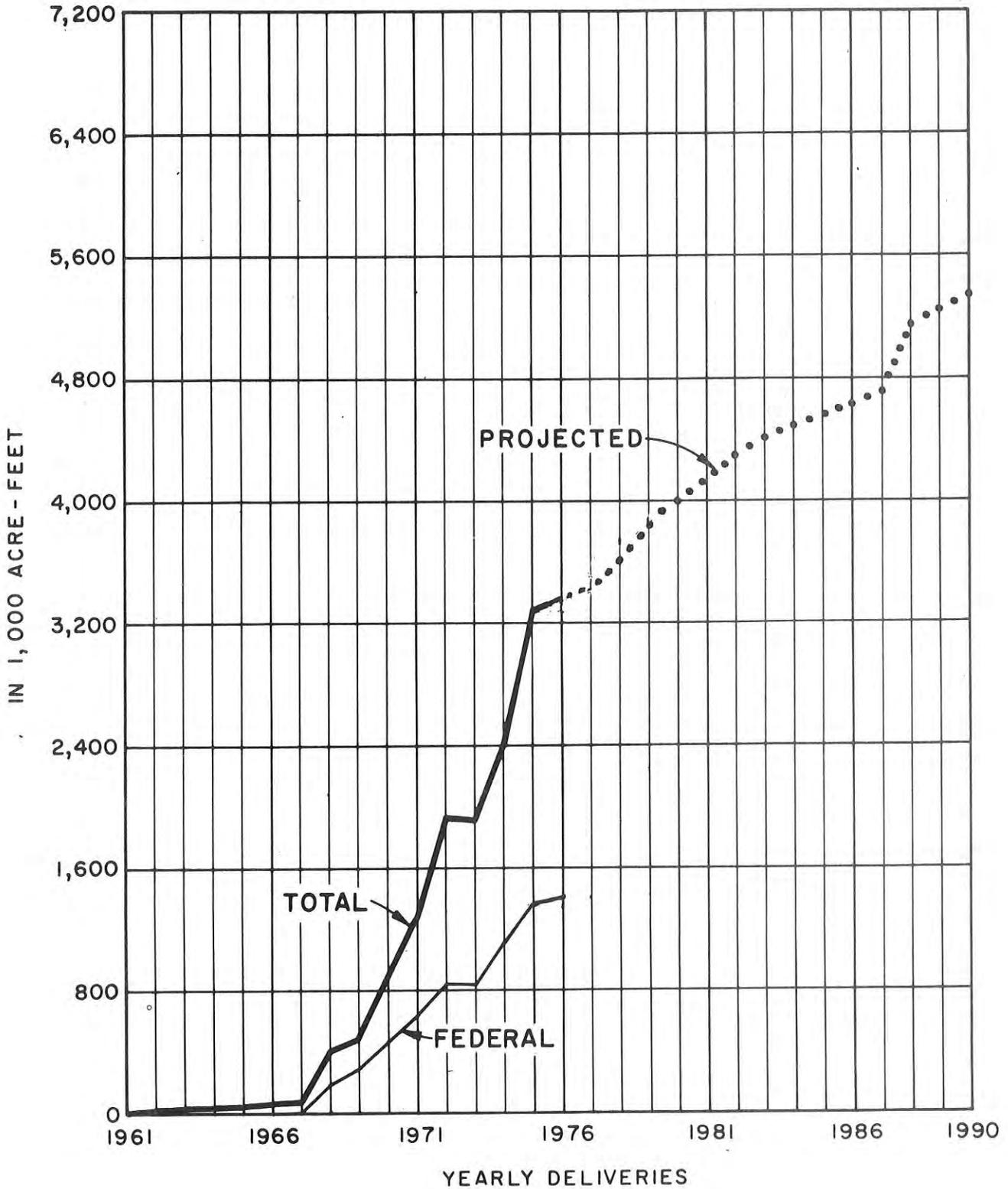
PROJECT DELIVERIES

1976



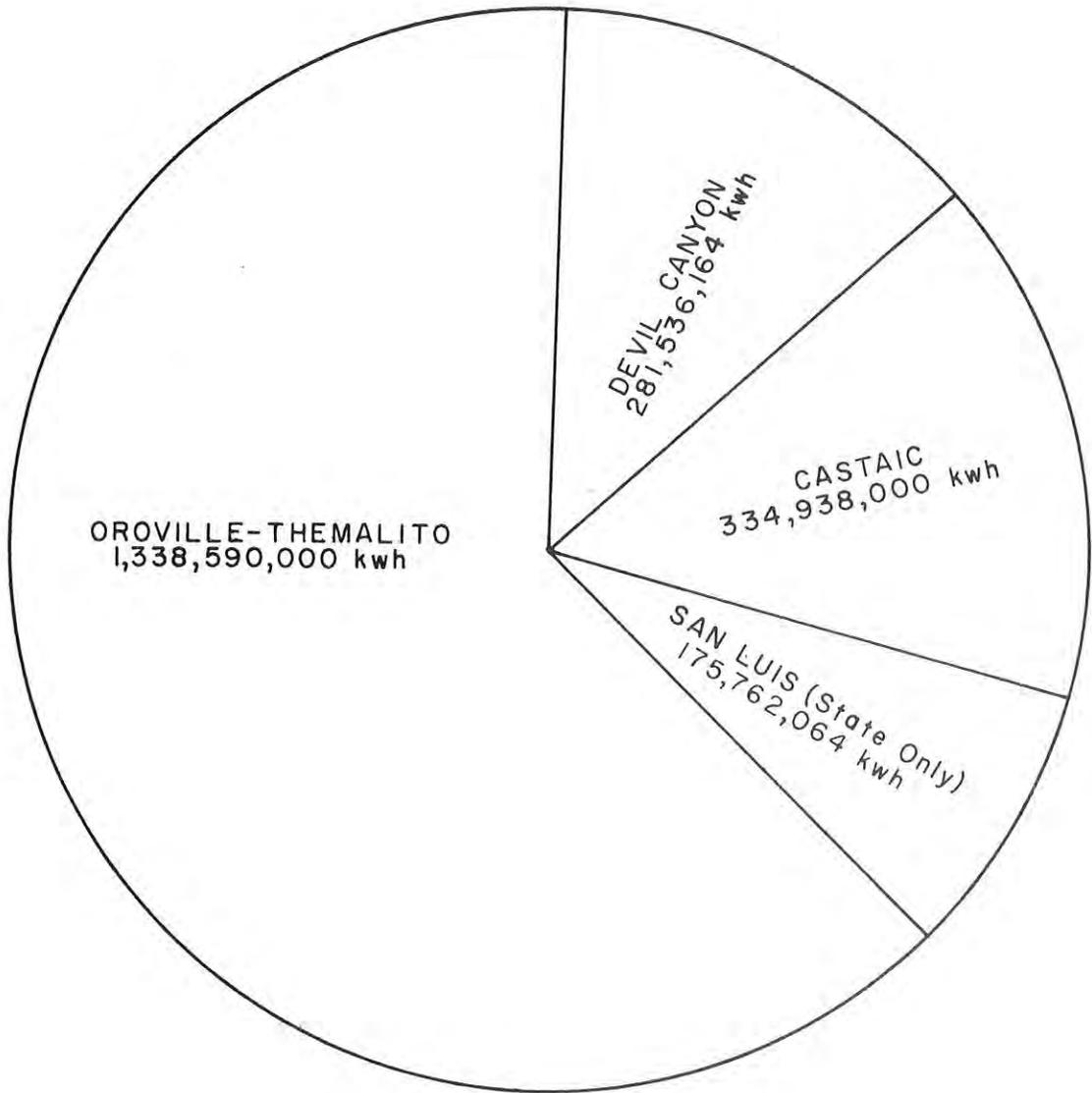
*EXCEPTION = RECREATION, FISH & GAME WATER NOT INCLUDED (SEE TABLE I-1)

PROJECT DELIVERIES - YEARLY TOTALS

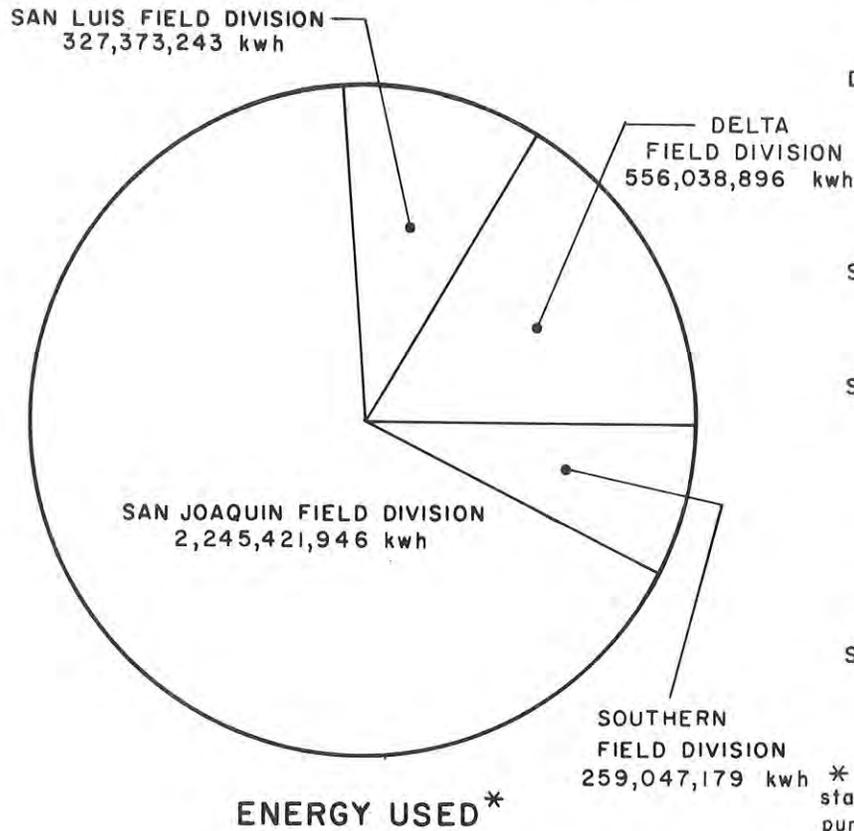


Excludes Thermalito Afterbay and includes Federal deliveries

PROJECT GROSS POWER GENERATION
1976



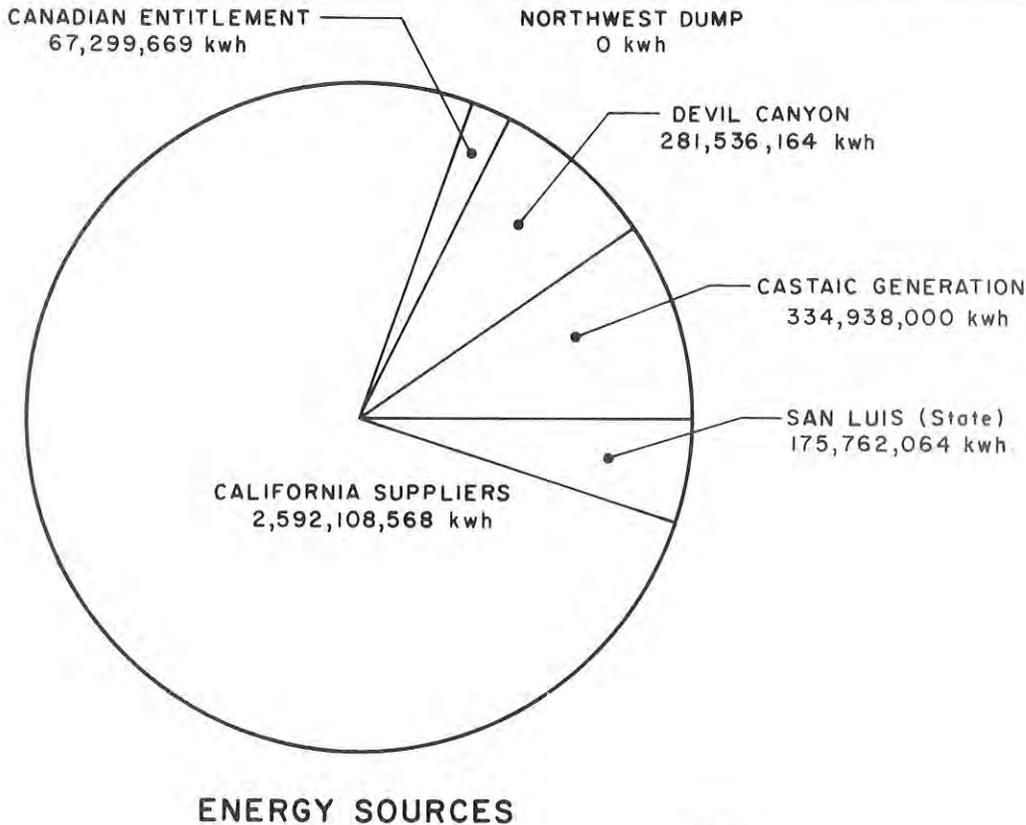
**PROJECT POWER OPERATIONS
(STATE ONLY)
1976**



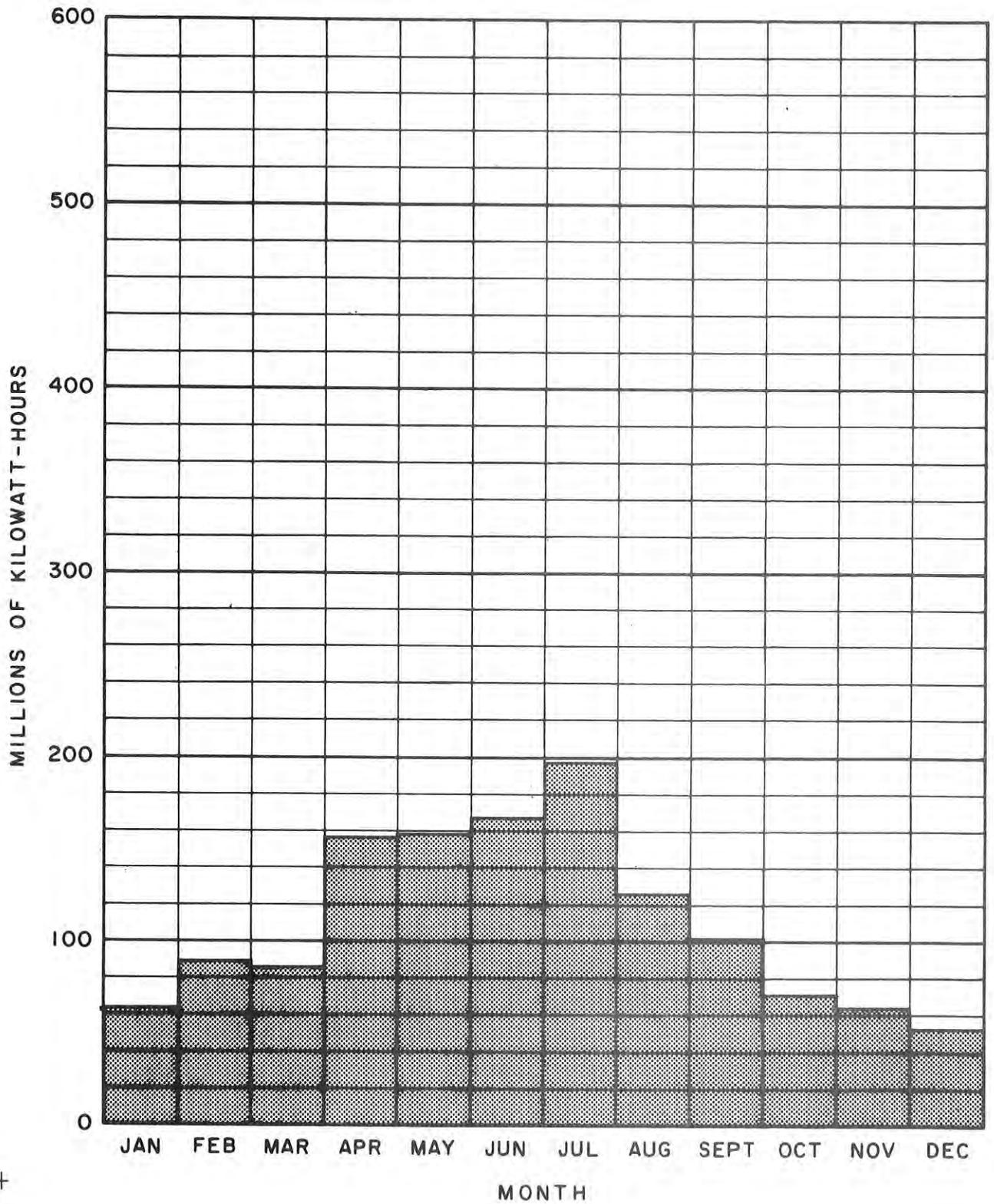
PUMPING PLANTS

- 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. WIND GAP
 6. A. D. EDMONSTON
- SOUTHERN FIELD DIVISION
 1. OSO
 2. PEARBLOSSOM

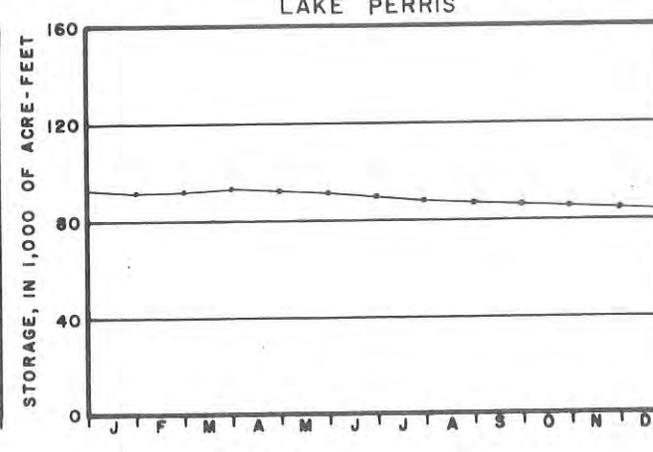
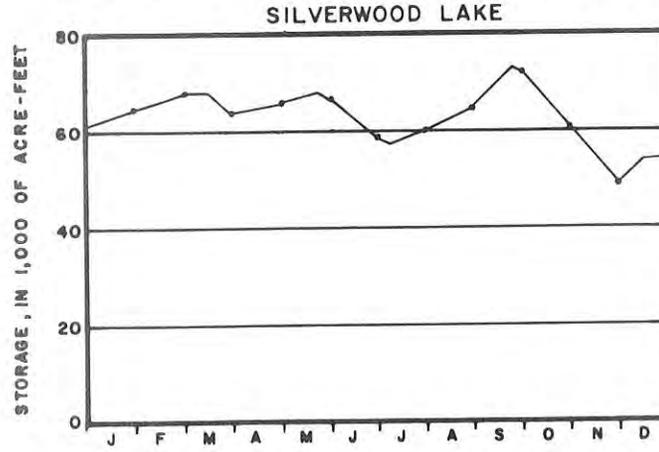
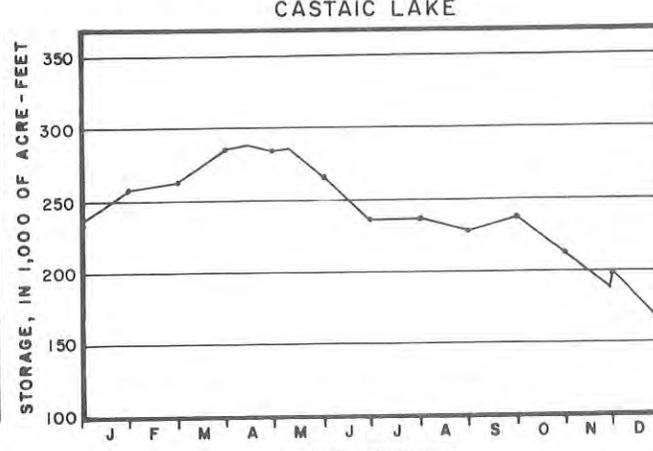
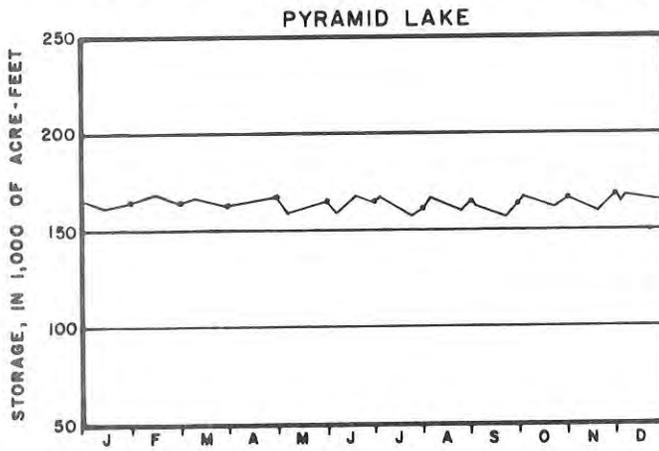
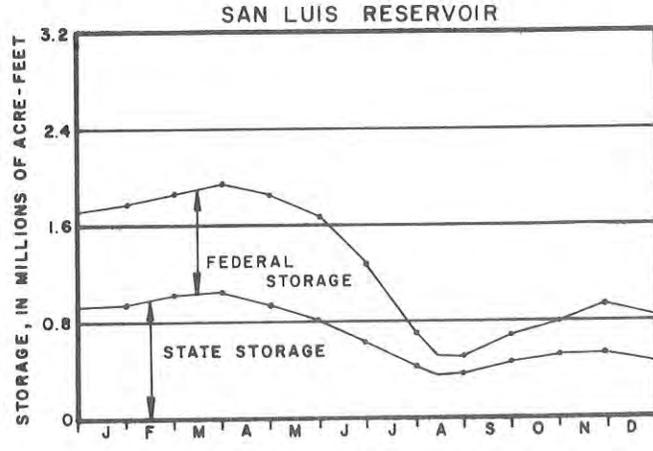
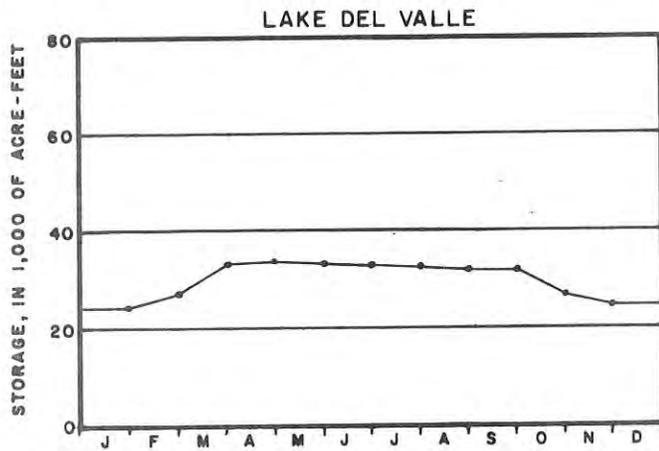
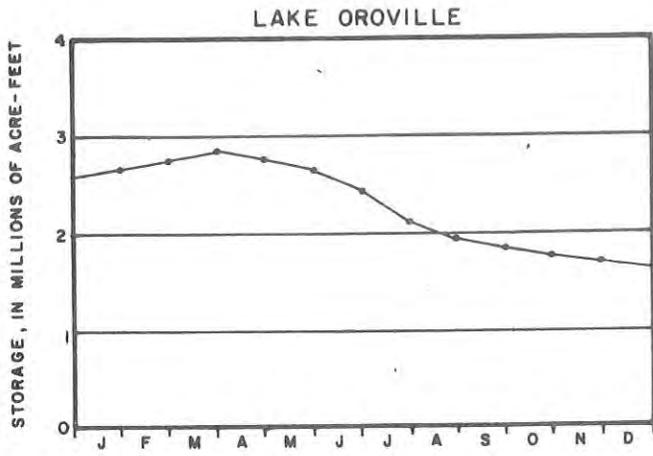
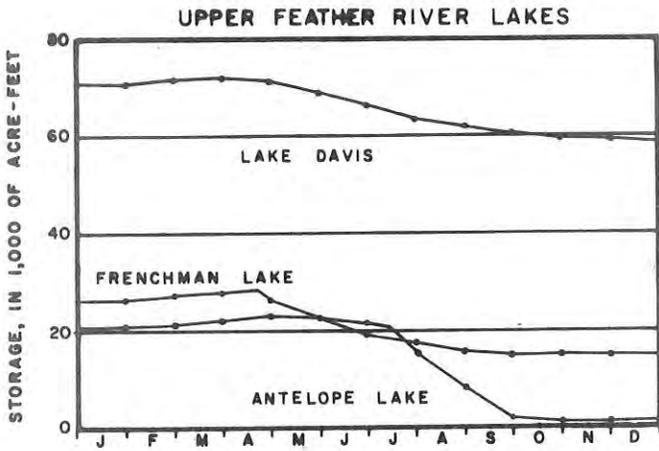
* Not included are Devil Canyon Powerplant station service and states share of power to pump waterfowl mitigation water at Tracy Pumping Plant



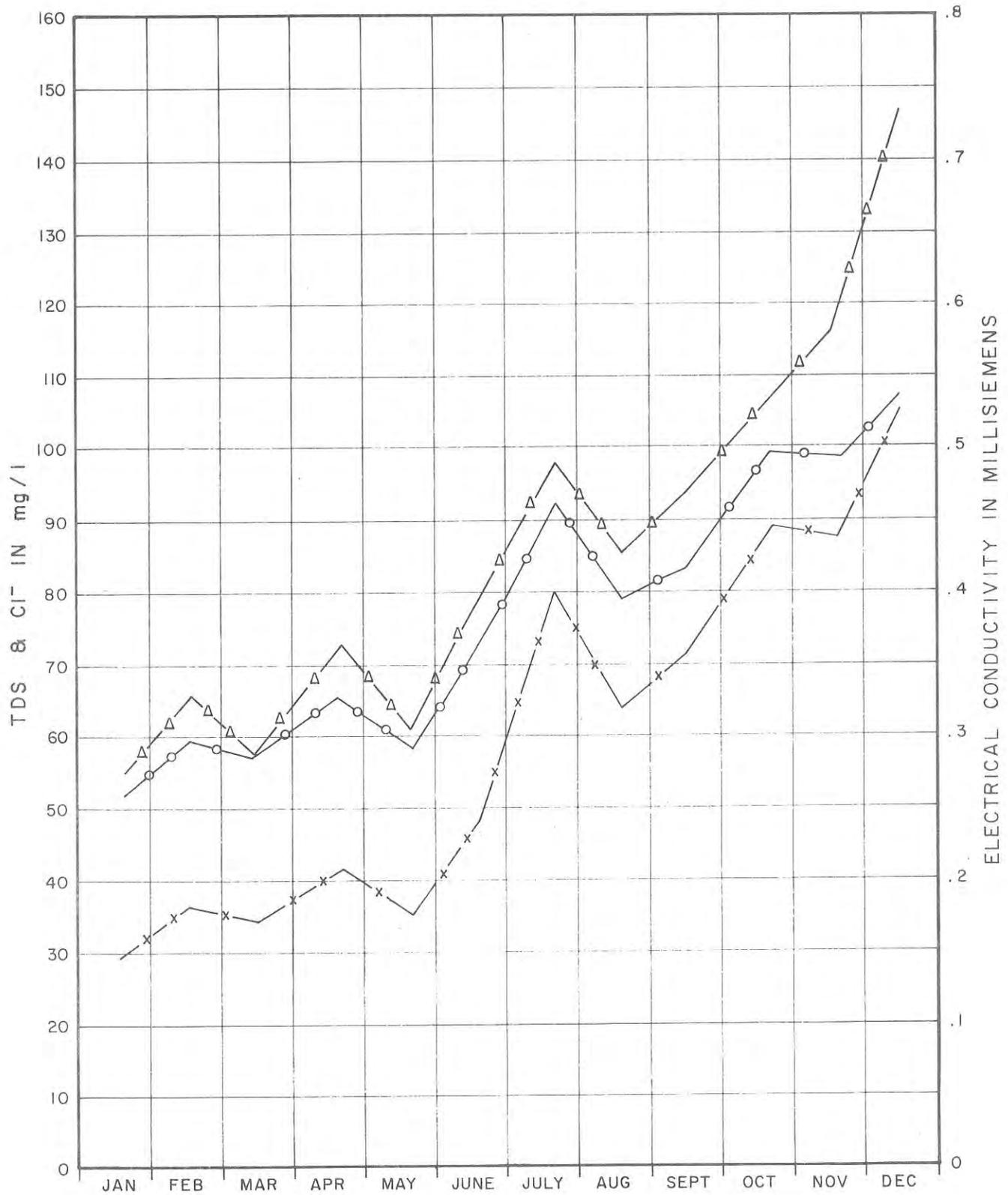
GROSS GENERATION AT HYATT AND THERMALITO POWERPLANTS 1976



PROJECT RESERVOIRS 1976

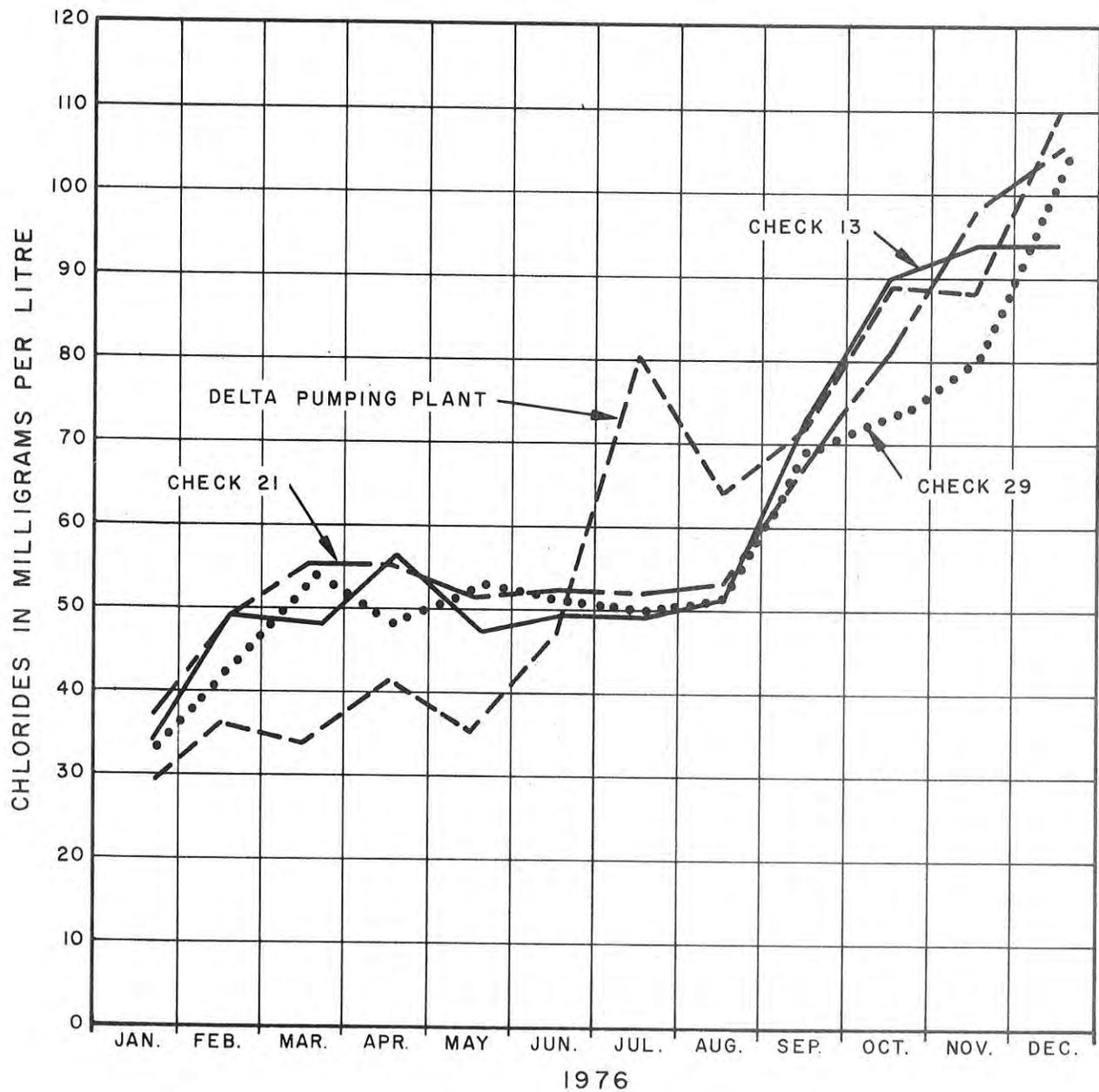


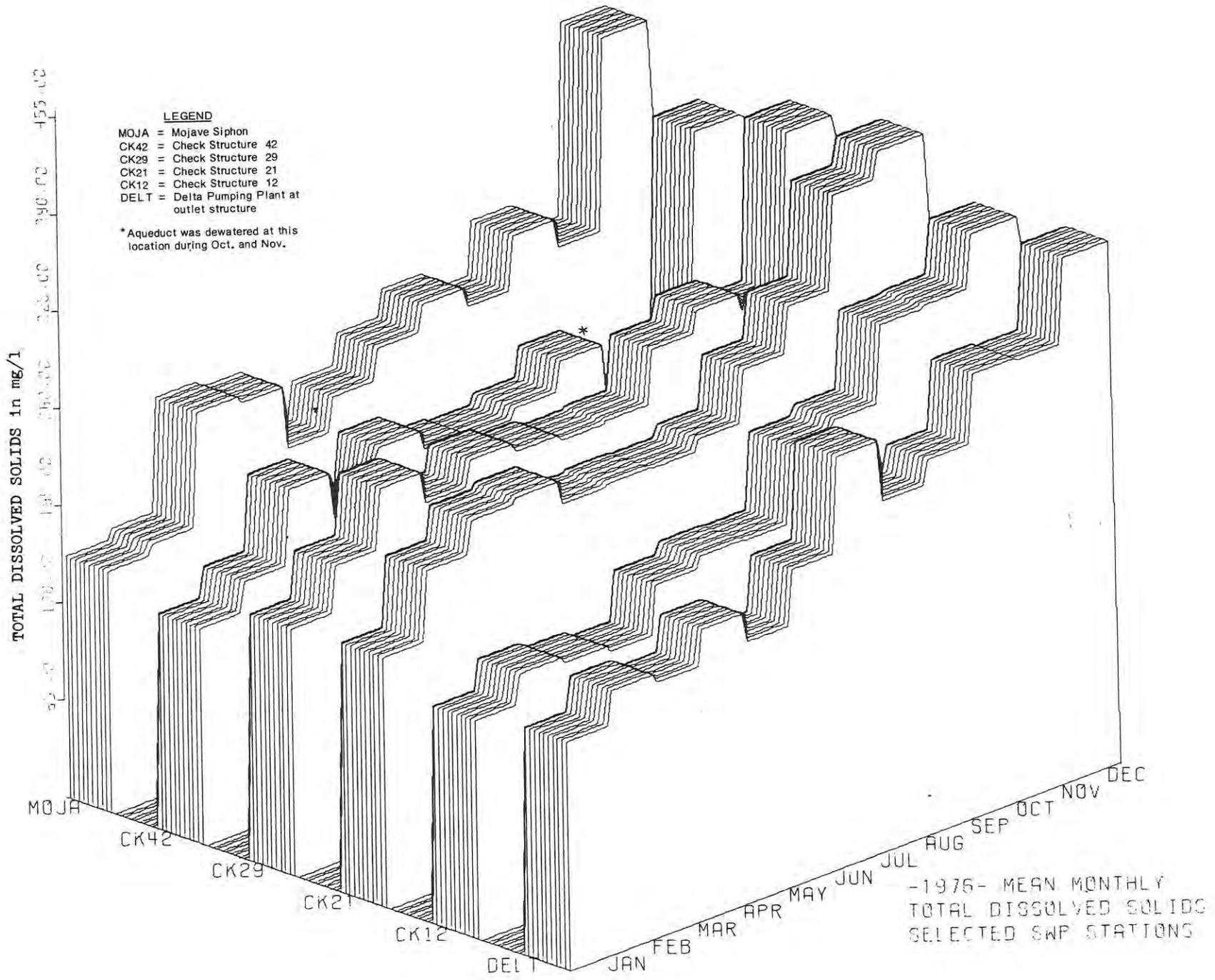
DELTA PUMPING PLANT WATER QUALITY 1976

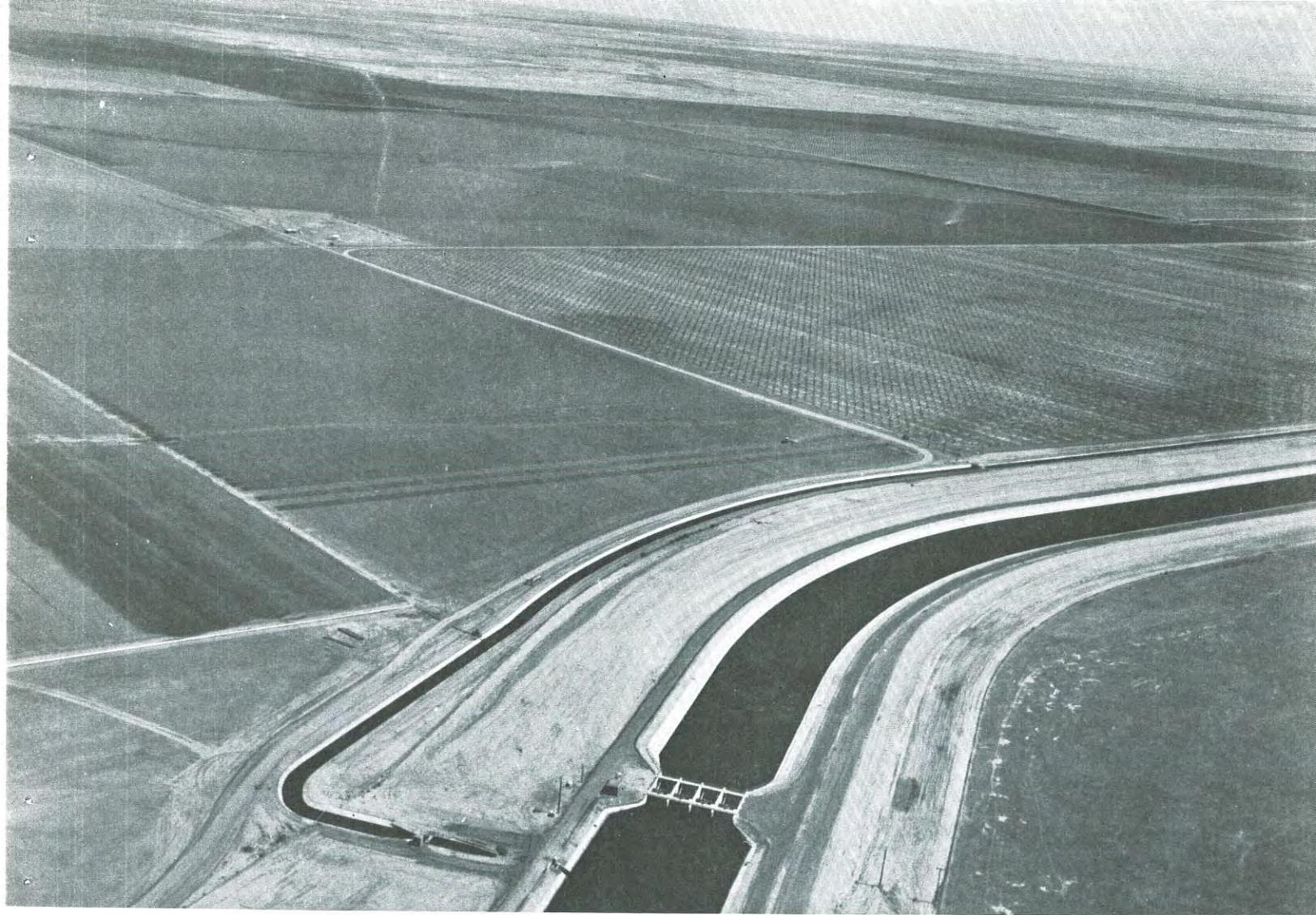


- Δ- ELECTRICAL CONDUCTIVITY
- TDS, TOTAL DISSOLVED SOLIDS
- X- Cl⁻, CHLORIDES

CHLORIDE CONCENTRATIONS AT
SELECTED LOCATIONS OF THE STATE WATER PROJECT







PROJECT
DELIVERIES

WATER DELIVERIES*
(in acre-feet)

AGENCY	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	TOTALS
OROVILLE FIELD DIVISION																
Last Chance Creek W.D.	9,383	9,811	11,596	10,079	13,015	8,380	13,563	10,137	13,855	10,119	14,432	12,971	16,090	18,602	11,437	183,470
Plumas County F.C. & W.C.D.									70	64	505	679	648	405	382	2,753
County of Butte										192	186	53	127	253	527	1,338
Thermalito I.D.													393	413	234	1,040
DELTA FIELD DIVISION																
Napa County F.C. & W.C.D.							1,214	2,687	3,618	2,521	3,647	3,792	4,070	6,840	7,122	36,311
Alameda County W.D. ^{1/}	8,412	10,914	19,238	16,407	14,864	12,882	24,817	6,818	20,607	11,652	27,786	7,900	1,433	8,725	26,643	219,098
Alameda County F.C. & W.C.D., Zone 7 ^{1/}	494	1,731	1,673	2,605	5,511	4,780	6,133	6,635	9,249	14,777	14,141	13,041	14,416	16,320	20,983	132,489
Pleasanton Township W.D.										674						674
Santa Clara Valley W.D.				15,014	34,538	39,101	70,105	62,264	80,311	87,606	100,266	91,081	90,934	106,470	112,705	890,395
Oak Flat W.D.							3,084	3,016	5,911	7,212	8,166	4,227	6,942	7,152	7,952	53,662
Mustang W.D.									1,176	1,438	1,642					
Tracy Golf and Country Club													11			11
Dept. of Parks & Recreation (Lake Del Valle)															141	141
SAN LUIS FIELD DIVISION																
Department of Parks and Recreation											15	15	10	19	23	82
Department of Fish and Game (State's Share)															72	72
Federal Customers						1,100	185,393	290,761	468,951	633,269	846,687	845,774	1,121,747	1,361,573	1,337,137 ^{2/}	7,092,392
SAN JOAQUIN FIELD DIVISION																
Tulare Lake Basin W.S.D.							25,100	7,081	0	115,826	252,542	111,552	137,978	214,706	112,717	977,502
Empire West Side I.D.							1,978	56	3,942	5,990	5,795	5,814	4,539	6,448	6,457	41,019
County of Kings							900	100	0	3,700	1,400	1,500	1,500	1,600	1,600	12,300
Reclenda W.D.								2,842	9,578	6,659	5,851	8,500	5,272	7,517	7,620	53,839
Kern County W.A.							127,384	141,265	204,634	360,151	490,781	505,243	646,433	821,640	881,400	4,178,931
Dudley Ridge W.D.							26,360	31,375	40,407	41,053	42,443	35,249	66,781	81,110	72,343 ^{3/}	437,121
Devil's Den W.D.							7,382	9,970	11,739	12,490	13,905	13,522	13,828	18,195	17,427	118,458
J. G. Boswell Company										7,113	25,542	4,358	2,500	0	6,712	46,225
Buena Vista W.S.D.										8,241	19,250	5,945	7,840	6,797	0	48,073
Green Valley W.D.													1,741	2,217	0	3,958
Federal, USBR (U.S. Fish & Wildlife Serv.)														11,700	0	11,700
Federal, USBR (Cross Valley Canal)															88,300	88,300
SOUTHERN FIELD DIVISION																
Antelope Valley-East Kern W.A.											53	20	1,259	8,069	27,732	37,122
Metropolitan W.D. of So. California											71,733	159,363	277,715	324,958	618,541 ^{4/}	1,654,945
Littlecreek Creek I.D.											336	370	457	576	539	2,340
Mojave W.A.											55	0	14	0	0	69
Desert W.A.												1,000	10,000	11,000	12,000	42,000
Coachella Valley County W.D.												5,800	6,400	7,000	7,600	26,800
Crestline-Lake Arrowhead W.A.											464	461	627	825	1,002	3,379
San Geronimo Pass W.A.															0	0
San Gabriel Valley M.W.D.													612	5,450	6,071	12,133
San Bernardino Valley M.W.D.											1,275	32,426	16,605	13,865	12,273	76,444
Department of Parks and Recreation													44	70	613 ^{2/}	727
Piru Creek Fish Enhancement													1,362	1,553	0	2,915

* Does not include Thermalito Afterbay deliveries of prior water right entitlements.
^{1/} Includes regulated delivery of local supply.
^{2/} Includes 1000 ac-feet for Mendota Waterfowl Management Area and 58 acre-feet for State Department of Fish and Game.
^{3/} Of this amount 10,500 acre-feet was acquired by exchange agreement with Metropolitan W.D.S.C.
^{4/} Does not include amount shown in footnote 3/
^{5/} Includes: Reach 24, 129 acre-feet; Reach 28J, 23 acre-feet; and Reach 30, 461 acre-feet.

I-I



SUMMARY OF
CALIFORNIA AQUEDUCT
OPERATION

SUMMARY OF CALIFORNIA AQUEDUCT OPERATION
1976

(Amounts in Acre-feet)

Description	January	February	March	April	May	June
<u>DELTA FIELD DIVISION</u>						
North Bay Aqueduct						
Pumped at Cordelia Pumping Plant	718	676	772	539	486	488
Storage Change	-10	3	-6	1	-2	11
Operational Losses (-), Gains (+)	0	0	0	0	0	0
Delivered to Napa Co. FC&WCD	728	673	778	538	488	477
California Aqueduct						
Pumped at Delta Pumping Plant	253,880	175,102	227,950	26,081	41,604	17,789
South Bay Diversion (So. Bay P.P.)	10,939	13,627	18,143	14,660	16,170	16,060
Storage Change	-373	203	406	-752	-717	-647
Operational Losses (-), Gains (+)	-200	-246	-411	294	-480	-641
Delivered to Contracting Agencies	117	221	715	1,325	1,352	1,091
Outflow at Check 12	242,997	160,805	208,275	11,142	24,319	644
South Bay Aqueduct						
Pumped at South Bay P.P.	10,939	13,627	18,143	14,660	16,170	16,060
Inflow from Lake Del Valle	0	0	0	0	0	0
Storage Change	0	0	0	0	0	0
Operational Losses (-), Gains (+)	-9	-9	-10	-15	-10	-52
Outflow, Del Valle Pumping Plant	0	2,550	5,930	658	0	0
Delivered to Contracting Agencies:						
Project Water	9,644	10,958	12,187	13,987	16,160	16,008
1/ Del Valle Inflow Exchanged and Released from Aqueduct	90	110	16	0	0	0
1/ Del Valle Stored Water Exchanged and Released from Aqueduct	1,196	0	0	0	0	0
Lake Del Valle Operation						
End of Month Storage	25,032	27,636	33,455	33,924	33,575	33,203
Storage Change	15	2,604	5,819	469	-349	-372
<u>SAN LUIS FIELD DIVISION</u>						
O'Neill Forebay Operation						
End of Month Storage	43,907	44,976	41,917	47,887	38,797	41,454
Storage Change	-7,942	1,069	-3,059	5,970	-9,090	2,657
2/ Inflow, California Aqueduct	242,997	160,805	208,275	11,142	24,319	644
Inflow, O'Neill P-G Plant	171,454	159,248	159,703	126,466	68,031	28,620
Inflow, San Luis P-G Plant	12,731	5,790	26,411	92,810	172,200	408,384
Delivered to Federal Customers	548	1,163	1,029	953	1,211	1,300
Outflow, O'Neill P-G Plant	0	0	0	795	22	40,224
Outflow, San Luis P-G Plant	76,904	106,639	110,034	18,309	0	0
Operational Losses (-), Gains (+)	-2,393	8,072	7,175	-4,290	-1,659	-6,987
Outflow, Dos Amigos P.P.	355,279	225,044	293,560	200,101	270,748	386,480
San Luis Reservoir Operation						
End of Month Storage	1,777,719	1,864,721	1,936,802	1,859,666	1,684,544	1,279,350
Storage Change	55,144	87,002	72,081	-77,136	-175,122	-405,194
Inflow, San Luis P-G Plant	76,904	106,639	110,034	18,309	0	0
Operational Losses (-), Gains (+)	-9,029	-13,847	-11,542	-2,635	-2,922	3,190
Outflow, San Luis P-G Plant	12,731	5,790	26,411	92,810	172,200	408,384
California Aqueduct (Pools 14 thru 21)						
Inflow, Dos Amigos P.P.	355,279	225,044	293,560	200,101	270,748	386,480
Storage Change	688	344	-1,205	448	134	826
Delivered to Federal Customers	155,514	104,831	122,833	80,505	118,323	175,406
Operational Losses (-), Gains (+)	1,263	-2,645	-3,748	-4,499	-6,151	3,221
Outflow, Check 21 (State)	198,048	117,224	168,184	105,787	132,702	192,729
3/ Outflow, Check 21 (Federal)	2,292	0	0	8,862	13,438	20,744

- 1/ Includes only water delivered from aqueduct.
 2/ State pumped water at Delta P.P. for Federal as follows:
 Jan. 2,081 ac-ft. ; May 3,937 ac-ft.
 3/ To Cross Valley Canal

SUMMARY OF CALIFORNIA AQUEDUCT OPERATION
1976

(Amounts in Acre-feet)

July	August	September	October	November	December	Total	Description
							DELTA FIELD DIVISION
							North Bay Aqueduct
243	347	491	728	748	882	7,118	Pumped at Cordelia Pumping Plant
-1	-4	-3	6	-1	2	-4	Storage Change
0	0	0	0	0	0	0	Operational Losses (-), Gains (+)
244	351	494	722	749	880	7,122	Delivered to Napa Co. FC&WCD
							California Aqueduct
19,374	130,377	209,148	84,032	93,643	67,792	1,346,772	Pumped at Delta Pumping Plant
17,243	15,423	15,145	8,905	8,032	8,535	162,882	South Bay Diversion (So. Bay P.P.)
-12	1,511	243	120	0	96	78	Storage Change
-678	-551	-529	-401	-212	-218	-4,273	Operational Losses (-), Gains (+)
1,627	955	304	21	64	161	7,953	Delivered to Contracting Agencies
-162	111,937	192,927	74,585	85,335	58,782	1,171,586	Outflow at Check 12
							South Bay Aqueduct
17,243	15,423	15,145	8,905	8,032	8,535	162,882	Pumped at South Bay P.P.
0	279	0	4,493	2,000	0	6,772	Inflow from Lake Del Valle
0	0	0	0	0	0	0	Storage Change
-10	-20	-12	-18	-11	-9	-185	Operational Losses (-), Gains (+)
0	0	0	0	0	0	9,138	Outflow, Del Valle Pumping Plant
17,233	15,682	15,133	13,380	10,021	8,526	158,919	Delivered to Contracting Agencies:
0	0	0	0	0	0	216	Project Water
0	0	0	0	0	0	1,196	Del Valle Inflow Exchanged and Released from Aqueduct 1/
32,778	32,184	31,903	27,202	24,997	24,897	-120	Del Valle Stored Water Exchanged and Released from Aqueduct 1/
-425	-594	-281	-4,701	-2,205	-100		Lake Del Valle Operation
							SAN LUIS FIELD DIVISION
							O'Neill Forebay Operation
39,174	50,243	51,232	48,812	46,547	46,310		End of Month Storage
-2,280	11,069	989	-2,420	-2,265	-237	-5,539	Storage Change
-162	111,937	192,927	74,585	85,335	58,782	1,171,586	Inflow, California Aqueduct 2/
1,490	64,657	143,966	104,902	141,296	87,667	1,257,500	Inflow, O'Neill P-G Plant
580,728	228,853	0	0	0	98,482	1,626,389	Inflow, San Luis P-G Plant
1,695	920	683	134	275	591	10,502	Delivered to Federal Customers
66,727	0	0	0	0	0	107,768	Outflow, O'Neill P-G Plant
0	16,396	200,955	136,601	140,280	7,458	813,576	Outflow, San Luis P-G Plant
-13,772	-4,356	17,695	1,289	2,192	-4,129	-1,163	Operational Losses (-), Gains (+)
502,143	372,706	151,961	46,461	90,533	232,991	3,128,007	Outflow, Dos Amigos P.P.
							San Luis Reservoir Operation
709,888	499,889	677,813	808,347	940,028	849,676		End of Month Storage
-569,462	-209,999	177,924	130,534	131,681	-90,352	-872,899	Storage Change
0	16,396	200,955	136,601	140,280	7,458	813,576	Inflow, San Luis P-G Plant
11,266	2,458	-23,031	-6,067	-8,599	672	-60,086	Operational Losses (-), Gains (+)
580,728	228,853	0	0	0	98,482	1,626,389	Outflow, San Luis P-G Plant
							California Aqueduct (Pools 14 thru 21)
502,143	372,706	151,961	46,461	90,533	232,991	3,128,007	Inflow, Dos Amigos P.P.
758	-278	8	-870	421	430	1,704	Storage Change
213,912	147,959	40,549	22,791	30,213	113,861	1,326,697	Delivered to Federal Customers
240	5,393	-2,033	-4,382	-4,880	-5,376	-23,597	Operational Losses (-), Gains (+)
266,441	215,193	103,807	20,158	55,019	112,421	1,687,709	Outflow, Check 21 (State)
21,272	15,225	5,564	0	0	903	88,300	Outflow, Check 21 (Federal) 3/

SUMMARY OF CALIFORNIA AQUEDUCT OPERATION
1976

(Amounts in Acre-feet)

Description	January	February	March	April	May	June
SAN JOAQUIN FIELD DIVISION						
California Aqueduct, Check 21 to Buena Vista Pumping Plant						
Inflow, Check 21 Total State & Federal	200,340	117,224	168,184	114,649	146,140	213,469
1/ Delivered to State Contracting Agencies	88,793	38,560	60,312	48,227	54,807	85,033
Delivered Exchange of MWDSC's Entitlement	0	0	0	0	0	0
Delivered for Repayment of Preconsolidation Water	404	423	830	810	830	830
Delivered to Federal Customers (Cross Valley Canal)	2,292	0	0	8,862	13,438	20,744
Coastal Br. Diversion (Las Per. P.P.)	13,023	9,805	12,418	9,405	16,910	22,333
Storage Change	283	-225	112	633	166	-1,257
Operational Losses (-), Gains (+)	4,358	5,215	5,360	7,188	4,176	-1,142
Outflow, Buena Vista P.P.	99,903	73,876	99,872	53,900	64,165	84,644
California Aqueduct, Buena Vista P.P. to Wheeler Ridge P.P.						
Inflow, Buena Vista P.P.	99,903	73,876	99,872	53,900	64,165	84,644
Delivered to Contracting Agencies	11,600	16,665	20,905	8,305	16,535	26,927
Storage Change	92	92	-72	-98	59	-91
Operational Losses (-), Gains (+)	-1,087	-305	-2,178	-892	-960	-1,786
Outflow, Wheeler Ridge P.P.	87,124	56,814	76,861	44,801	46,611	56,022
California Aqueduct, Wheeler Ridge P.P. to Wind Gap P.P.						
Inflow, Wheeler Ridge P.P.	87,124	56,814	76,861	44,801	46,611	56,022
Delivered to Contracting Agencies	1,208	1,720	3,651	4,183	5,958	6,612
Storage Change	7	-62	14	-2	24	19
Operational Losses (-), Gains (+)	530	-337	254	1,083	515	1,166
Outflow, Wind Gap P.P.	86,439	54,819	73,450	41,703	41,144	50,557
California Aqueduct, Wind Gap P.P. to A. D. Edmonston P.P.						
Inflow, Wind Gap P.P.	86,439	54,819	73,450	41,703	41,144	50,557
Delivered to Contracting Agencies	777	1,519	1,267	1,450	1,953	2,490
Storage Change	15	-111	64	-57	-6	85
Operational Losses (-), Gains (+)	-1,301	401	-73	496	199	690
Outflow, A. D. Edmonston P.P.	84,346	53,812	72,046	40,806	39,396	48,672
Coastal Branch, California Aqueduct						
Inflow, Las Perillas P.P.	13,023	9,805	12,418	9,405	16,910	22,333
Delivered to Contracting Agencies	12,515	9,752	12,350	9,319	15,470	21,292
Storage Change	17	6	-37	20	-2	9
Operational Losses (-), Gains (+)	-491	-47	-105	-66	-1,442	-1,032
SOUTHERN FIELD DIVISION						
California Aqueduct, A. D. Edmonston P.P. through Tehachapi Afterbay						
Inflow, A. D. Edmonston P.P.	84,346	53,812	72,046	40,806	39,396	48,672
Storage Change	-9	16	-10	2	-3	-7
Operational Losses (-), Gains (+)	14	1	12	-3	-11	-11
Outflow, West Branch	53,484	35,268	44,713	35,574	23,889	12,460
Outflow, East Branch	30,885	18,529	27,355	5,227	15,499	36,208
California Aqueduct, Tehachapi Afterbay to Pearblossom P.P.						
Inflow	30,885	18,529	27,355	5,227	15,499	36,208
Delivered to Contracting Agencies	759	190	1,324	2,972	4,482	4,293
Storage Change	613	192	-673	168	156	60
Operational Losses (-), Gains (+)	980	83	823	-179	-779	-739
Outflow, Pearblossom P.P.	30,493	18,230	27,527	1,908	10,082	31,116

1/ Includes deliveries to Federal - Kern National Wildlife Refuge as Follows:
Sept. - 2,222; Oct. - 5,371; Nov. - 4,107

SUMMARY OF CALIFORNIA AQUEDUCT OPERATION
1976

(Amounts in Acre-feet)

July	August	September	October	November	December	Total	Description
							SAN JOAQUIN FIELD DIVISION
							California Aqueduct, Check 21 to Buena Vista Pumping Plant
287,713	230,418	109,371	20,158	55,019	113,324	1,776,009	Inflow, Check 21 Total State & Federal
126,984	91,034	19,143	6,862	23,954	67,014	710,723	Delivered to State Contracting Agencies
0	1,552	1,478	57	4,913	2,500	10,500	Delivered Exchange of MWDSC's Entitlement
863	1,027	76	230	230	159	6,712	Delivered for Repayment of Preconsolidation Water
21,272	15,225	5,564	0	0	903	88,300	Delivered to Federal Customers (Cross Valley Canal)
26,722	20,042	5,763	1,282	2,970	10,024	150,697	Coastal Br. Diversion (Las Per. P.P.)
963	447	-967	-5,942	5,661	248	122	Storage Change
6,852	2,467	3,553	1,916	3,194	7,842	50,979	Operational Losses (-), Gains (+)
117,761	103,558	81,867	19,585	20,485	40,318	859,934	Outflow, Buena Vista P.P.
							California Aqueduct, Buena Vista P.P. to Wheeler Ridge P.P.
117,761	103,558	81,867	19,585	20,485	40,318	859,934	Inflow, Buena Vista P.P.
31,595	22,161	4,774	3,224	2,442	8,797	173,930	Delivered to Contracting Agencies
-34	33	20	-862	954	-83	10	Storage Change
-1,643	-843	353	-381	-123	-1,021	-10,866	Operational Losses (-), Gains (+)
84,557	80,521	77,426	16,842	16,966	30,583	675,128	Outflow, Wheeler Ridge P.P.
							California Aqueduct, Wheeler Ridge P.P. to Wind Gap P.P.
84,557	80,521	77,426	16,842	16,966	30,583	675,128	Inflow, Wheeler Ridge P.P.
6,610	4,910	2,053	962	445	3,897	42,209	Delivered to Contracting Agencies
-48	14	36	-6	25	-29	-8	Storage Change
202	127	-370	6	-321	53	2,908	Operational Losses (-), Gains (+)
78,197	75,724	74,967	15,892	16,175	26,768	635,835	Outflow, Wind Gap P.P.
							California Aqueduct, Wind Gap P.P. A. D. Edmonston P.P.
78,197	75,724	74,967	15,892	16,175	26,768	635,835	Inflow, Wind Gap P.P.
3,753	3,418	833	119	62	426	18,067	Delivered to Contracting Agencies
-9	12	-77	-14	26	-15	-87	Storage Change
529	-524	-667	-218	2	7	-459	Operational Losses (-), Gain (+)
74,982	71,770	73,544	15,569	16,089	26,364	617,396	Outflow, A. D. Edmonston P.P.
							Coastal Branch, California Aqueduct
26,722	20,042	5,763	1,282	2,970	10,024	150,697	Inflow, Las Perillas P.P.
25,347	19,816	5,916	1,041	2,902	8,415	144,135	Delivered to Contracting Agencies
14	-26	8	4	2	-35	-20	Storage Change
-1,361	-252	161	-237	-66	-1,644	-6,582	Operational Losses (-), Gains (+)
							SOUTHERN FIELD DIVISION
							California Aqueduct, A.D. Edmonston P.P. through Tehachapi Afterbay
74,982	71,770	73,544	15,569	16,089	26,364	617,396	Inflow, A. D. Edmonston P.P.
-3	2	-2	-42	56	-4	-4	Storage Change
3	15	14	6	-5	-3	32	Operational Losses (-), Gains (+)
42,928	35,925	43,838	10,587	12,707	7,334	358,707	Outflow, West Branch
32,060	35,858	29,722	5,030	3,321	19,031	258,725	Outflow, East Branch
							California Aqueduct, Tehachapi Afterbay to Pearblossom P.P.
32,060	35,858	29,722	5,030	3,321	19,031	258,725	Inflow
5,228	5,200	2,709	864	45	281	28,347	Delivered to Contracting Agencies
-241	44	42	-1,873	2,387	-221	654	Storage Change
251	1,019	1,005	405	-359	-216	2,294	Operational Losses (-), Gains (+)
27,324	31,633	27,976	6,444	530	18,755	232,018	Outflow, Pearblossom P.P.

SUMMARY OF CALIFORNIA AQUEDUCT OPERATION
1976

(Amounts in Acre-feet)

Description	January	February	March	April	May	June
SOUTHERN FIELD DIVISION (Cont.)						
California Aqueduct, Pearblossom P.P. to Silverwood Lake						
Inflow, Pearblossom P.P.	30,493	18,230	27,527	1,908	10,082	31,116
Delivered (Exchange of natural inflow)	108	677	859	433	563	235
Storage Change	20	-1	-135	-275	371	-27
Operational Losses (-), Gains (+)	-94	-62	-86	-68	-126	-233
Outflow to Silverwood Lake	30,271	17,492	26,717	1,682	9,022	30,675
Silverwood Lake Operation						
End of Month Storage	65,102	67,937	63,754	65,828	67,383	58,849
Storage Change	3,388	2,835	-4,183	2,074	1,555	-8,534
Inflow, Project	30,271	17,492	26,717	1,682	9,022	30,675
Inflow, Natural	88	3,197	1,691	580	257	88
^{4/} Delivered to Contracting Agencies	71	68	64	66	88	106
Outflow, Natural Inflow Released or Exchanged	0	2,828	461	0	0	0
Outflow, Project Water at San Bernardino Tunnel	27,251	15,936	32,528	0	7,053	38,988
Operational Losses (-), Gains (+)	351	978	462	-122	-583	-203
California Aqueduct, Silverwood Lake to Lake Perris						
Inflow, San Bernardino Tunnel	27,251	15,936	32,528	0	7,053	38,988
Delivered to Contracting Agencies	26,892	15,934	30,626	839	6,038	38,995
Storage Change	1	-1	9	-105	96	2
Operational Losses (-), Gains (+)	-1	-1	-1	0	-1	-3
Outflow to Lake Perris	357	2	1,892	-734	918	-12
Lake Perris Operation						
End of Month Storage	92,798	92,716	93,824	93,023	91,898	90,554
Storage Change	-841	-82	1,108	-801	-1,125	-1,344
Inflow	357	2	1,892	-734	918	-12
^{3/} Delivered to Contracting Agencies	180	168	188	168	179	165
Operational Losses (-), Gains (+)	-1,018	84	-596	101	-1,864	-1,167
Outflow	0	0	0	0	0	0
West Branch California Aqueduct Tehachapi Afterbay to Oso P.P.						
Inflow	53,484	35,268	44,713	35,574	23,889	12,460
Storage Change	-27	48	-30	5	-11	-22
Delivered to Contracting Agencies	0	0	0	0	0	0
Operational Losses (-), Gains (+)	43	3	36	-8	-34	-33
Outflow, Oso Pumping Plant	53,554	35,223	44,779	35,561	23,866	12,449
West Branch California Aqueduct Oso P.P. to Pyramid Lake						
Inflow, Oso P.P.	53,554	35,223	44,779	35,561	23,866	12,449
Storage Change	297	1,539	-1,966	674	1,544	-2,255
Delivered to Contracting Agencies	0	0	0	0	0	24
Operational Losses (-), Gains (+)	-128	-73	-123	-132	-187	-304
Outflow to Pyramid Lake	53,129	33,611	46,622	34,755	22,135	14,376

- ^{1/} Of this amount, 39 ac-ft was used for testing cone valve @ outlet to Mojave River.
- ^{2/} Lake Perris negative inflow for Dec. due to different time frame in reading meters @ turnouts and Devil Canyon Powerplant.
- ^{3/} Includes seepage delivered to M.W.D.S.C. and construction water for recreation development.
- ^{4/} 129 acre-feet of total was delivered to Dept. of Parks and Recreation.
- ^{5/} MWDSC was billed for 467 ac-ft less than amount shown. This adjustment was made to correct for meter error made in 1975.

SUMMARY OF CALIFORNIA AQUEDUCT OPERATION
1976

(Amounts in Acre-feet)

July	August	September	October	November	December	Total	Description
							<u>SOUTHERN FIELD DIVISION (Cont.)</u>
							California Aqueduct, Pearblossom P.P. to Silverwood Lake
27,324	31,633	27,976	6,444	530	18,755	232,018	Inflow, Pearblossom P.P.
73	62	380	183	149	80	3,802	Delivered (Exchange of natural inflow)
79	5	-7	-112	-299	370	-11	Storage Change
-223	-199	-125	-130	-79	-96	-1,521	Operational Losses (-), Gains (+)
26,949	31,367	27,478	6,243	601	18,209	226,706	Outflow to Silverwood Lake
							Silverwood Lake Operation
60,664	64,651	72,647	61,013	49,120	54,645		End of Month Storage
1,815	3,987	7,996	-11,634	-11,893	5,525	-7,069	Storage Change
26,949	31,367	27,478	6,243	601	18,209	226,706	Inflow, Project
3	0	884	138	94	125	7,145	Inflow, Natural
162	142	107	80	87	90	1,131	Delivered to Contracting Agencies ^{4/}
0	0	250	0	0	0	3,539	Outflow, Natural Inflow Released or Exchanged
24,756	26,243	19,990	18,196	12,185	12,774	235,900	Outflow, Project Water at San Bernardino Tunnel
-219	-995	-19	261	-316	55	-350	Operational Losses (-), Gains (+)
							California Aqueduct, Silverwood Lake to Lake Perris
24,756	26,243	19,990	18,196	12,185	12,774	235,900	Inflow, San Bernardino Tunnel
24,906	26,214	19,638 ^{5/}	18,677	12,131	12,821	233,711	Delivered to Contracting Agencies
-2	1	-1	13	-15	1	-1	Storage Change
-4	-3	-2	-2	-16	-1	-35	Operational Losses (-), Gains (+)
-152	25	351	496	53	-49	2,155	Outflow to Lake Perris
							Lake Perris Operation
88,914	87,405	87,285	86,385	85,449	84,457		End of Month Storage
-1,640	-1,509	-120	-900	-936	-992	-9,182	Storage Change
-152	25	351	-496	53	-49	2,155	Inflow
165	163	157	168	159	163	2,023	Delivered to Contracting Agencies ^{3/}
-1,323	-1,371	-314	-236	-830	-780	-9,314	Operational Losses (-), Gains (+)
0	0	0	0	0	0	0	Outflow
							West Branch California Aqueduct Tehachapi Afterbay to Oso P.P.
42,928	35,925	43,838	10,587	12,707	7,334	358,707	Inflow
-10	7	-7	-129	172	-9	-13	Storage Change
0	0	0	0	0	0	0	Delivered to Contracting Agencies
11	45	44	18	-16	-9	100	Operational Losses (-), Gains (+)
42,949	35,963	43,889	10,734	12,519	7,334	358,820	Outflow, Oso Pumping Plant
							West Branch California Aqueduct Oso P.P., to Pyramid Lake
42,949	35,963	43,889	10,734	12,519	7,334	358,820	Inflow, Oso P.P.
757	-76	-1,040	-1,489	3,297	829	2,111	Storage Change
0	0	0	0	0	0	24	Delivered to Contracting Agencies
-425	-261	-239	-107	-89	-105	-2,173	Operational Losses (-), Gains (+)
41,767	35,778	44,690	12,116	9,133	6,400	354,512	Outflow to Pyramid Lake

SUMMARY OF CALIFORNIA AQUEDUCT OPERATION
1976

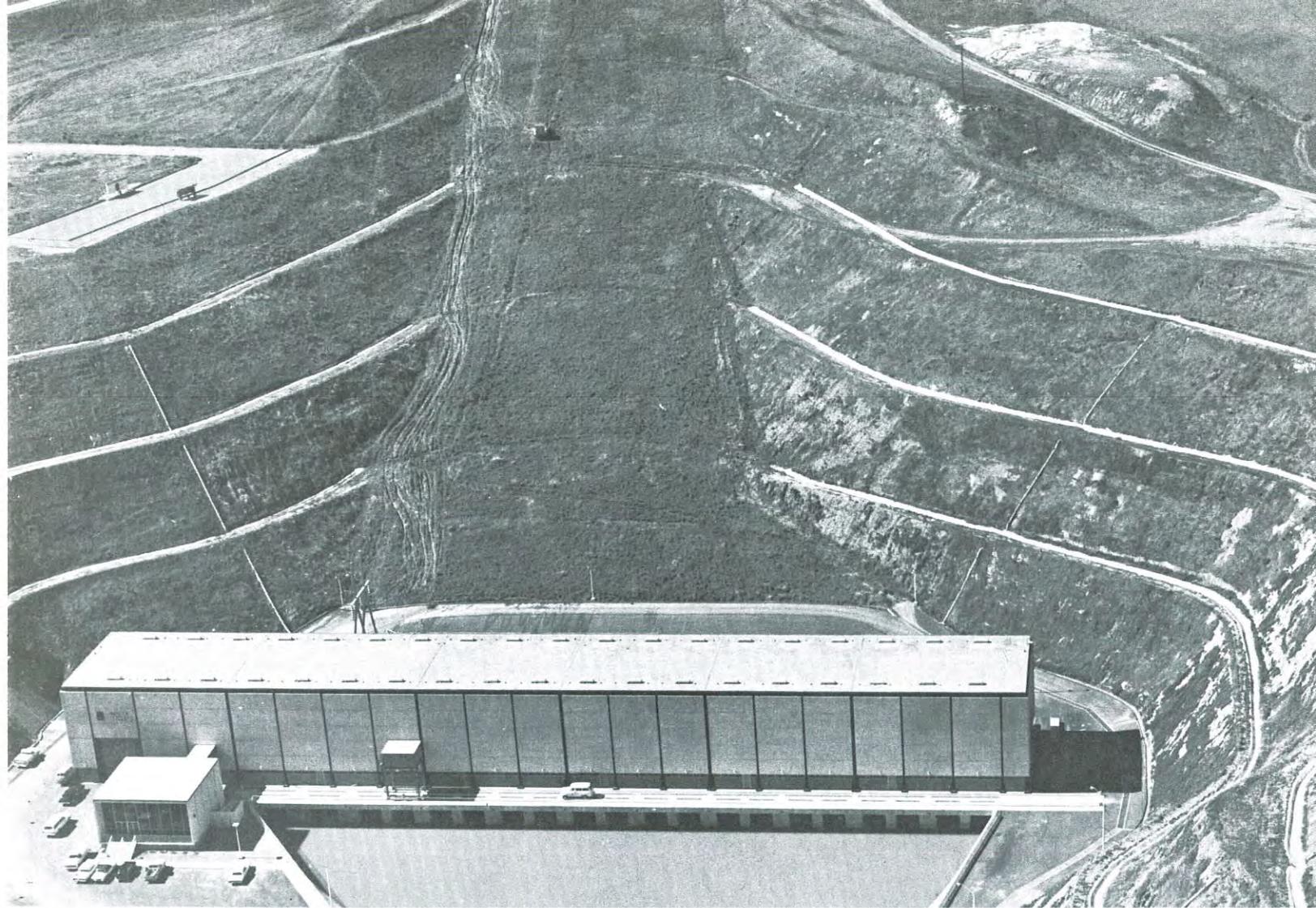
(Amounts in Acre-feet)

Description	January	February	March	April	May	June
<u>SOUTHERN FIELD DIVISION (Cont.)</u>						
Pyramid Lake Operation						
End of Month Storage	163,652	164,157	163,023	166,567	165,169	164,409
Storage Change	-2,660	505	-1,134	3,544	-1,398	-760
Inflow, Project	53,129	33,611	46,622	34,755	22,135	14,376
Inflow, Natural, from Local Runoff	441	5,387	1,863	1,127	678	310
Inflow, Pumpback from Elderb. Forebay	0	10,314	859	5,364	41,286	45,593
Operational Losses (-), Gains (+)	-1,393	-1,617	-1,731	-1,683	-2,728	-1,843
Outflow, Angeles Tunnel to Elderb. Fby.	54,522	43,979	48,416	35,680	62,432	58,899
Outflow, Natural Inflow Released to Piru Creek	315	3,211	331	339	337	297
Elderberry Forebay Operation						
End of Month Storage	21,453	22,791	19,536	20,818	19,805	22,097
Storage Change	478	1,338	-3,255	1,282	-1,013	2,292
Inflow, Project thru Castaic P-G Plant	54,522	43,979	48,416	35,680	62,432	58,899
Inflow, Natural	7	379	155	67	14	3
Operational Losses (-), Gains (+)	59	-1,397	-615	-342	-963	154
Outflow, Pumpback to Pyramid Lake	0	10,314	859	5,364	41,286	45,593
Outflow, Project Water Released to Castaic Lake	54,103	30,930	50,197	28,692	21,196	11,168
Outflow, Natural Inflow Released to Castaic Lake	7	379	155	67	14	3
Castaic Lake Operation						
End of Month Storage	257,122	263,036	285,754	283,269	267,019	236,622
Storage Change	20,874	5,914	22,718	-2,485	-16,250	-30,397
Inflow, Project	54,103	30,930	50,197	28,692	21,196	11,168
Inflow, Natural	36	507	235	95	42	12
Inflow, Natural Released From Elderberry Forebay	7	379	155	67	14	3
Delivered to Contracting Agencies	32,065	28,843	27,680	31,983	40,199	40,985
Operational Losses (-), Gains (+)	-959	3,047	0	942	2,964	-297
Outflow, Castaic Afterbay	248	106	189	298	267	298
Castaic Lagoon Operation						
Inflow	248	106	189	298	267	298
Change in Storage	-6	-10	-41	51	-32	-6
Operational Losses (-), Gains (+)	-67	-43	-72	-65	-90	-131
Outflow, Subsurface	187	73	158	182	209	173
Outflow, Surface	0	0	0	0	0	0

SUMMARY OF CALIFORNIA AQUEDUCT OPERATION
1976

(Amounts in Acre-feet)

July	August	September	October	November	December	Total	Description
							<u>SOUTHERN FIELD DIVISION (Cont.)</u>
							Pyramid Lake Operation
160,648	164,409	163,275	166,567	168,100	166,185		End of Month Storage
-3,761	3,761	-1,134	3,292	1,533	-1,915	-127	Storage Change
41,767	35,778	44,690	12,116	9,133	6,400	354,412	Inflow, Project
116	102	427	391	343	365	11,550	Inflow, Natural, from Local Runoff
22,868	27,076	20,414	30,653	15,188	715	220,330	Inflow, Pumpback from Elderb. Forebay
-2,036	-2,007	-1,525	-1,738	-1,062	-857	-20,220	Operational Losses (-), Gains (+)
65,751	56,380	64,773	37,864	21,758	8,248	558,702	Outflow, Angeles Tunnel
							Outflow, Natural Inflow Released to Piru Creek
725	808	367	266	311	290	7,597	
							Elderberry Forebay Operation
21,493	19,345	22,627	20,660	9,006	15,630		End of Month Storage
-604	-2,148	3,282	-1,967	-11,654	6,624	-5,345	Storage Change
65,751	56,380	64,773	37,864	21,758	8,248	558,702	Inflow, Project thru Castaic P-G Plant
0	0	54	8	6	6	699	Inflow, Natural
-152	431	39	276	58	-145	-2,597	Operational Losses (-), Gains (+)
22,868	27,076	20,414	30,653	15,188	715	220,330	Outflow, Pumpback to Pyramid Lake
							Outflow, Project Water Released to Castaic Lake
43,335	31,883	41,116	9,454	18,282	764	341,120	Outflow, Natural Inflow Released to Castaic Lake
0	0	54	8	6	6	699	
							Castaic Lake Operation
237,372	227,908	237,184	211,679	196,073	160,918		End of Month Storage
750	-9,464	9,276	-25,505	-15,606	-35,155	-75,330	Storage Change
43,335	31,883	41,116	9,454	18,282	764	341,120	Inflow, Project
2	1	55	17	16	26	1,044	Inflow, Natural
							Inflow, Natural Release from Elderberry Forebay
0	0	54	8	6	6	699	Delivered to Contracting Agencies
42,573	40,845	32,381	34,037	33,652	35,902	421,145	Operational Losses (-), Gains (+)
293	-196	623	-709	-34	258	5,932	Outflow, Castaic Afterbay
307	307	191	238	224	307	2,980	
							Castaic Lagoon Operation
307	307	191	238	224	307	2,980	Inflow
-9	-10	2	-103	-2	82	-84	Change in Storage
-140	-127	-102	-94	-76	-45	-1,052	Operational Losses (-), Gains (+)
176	190	87	247	150	180	2,012	Outflow, Subsurface
0	0	0	0	0	0	0	Outflow, Surface



PUMPING
PLANTS

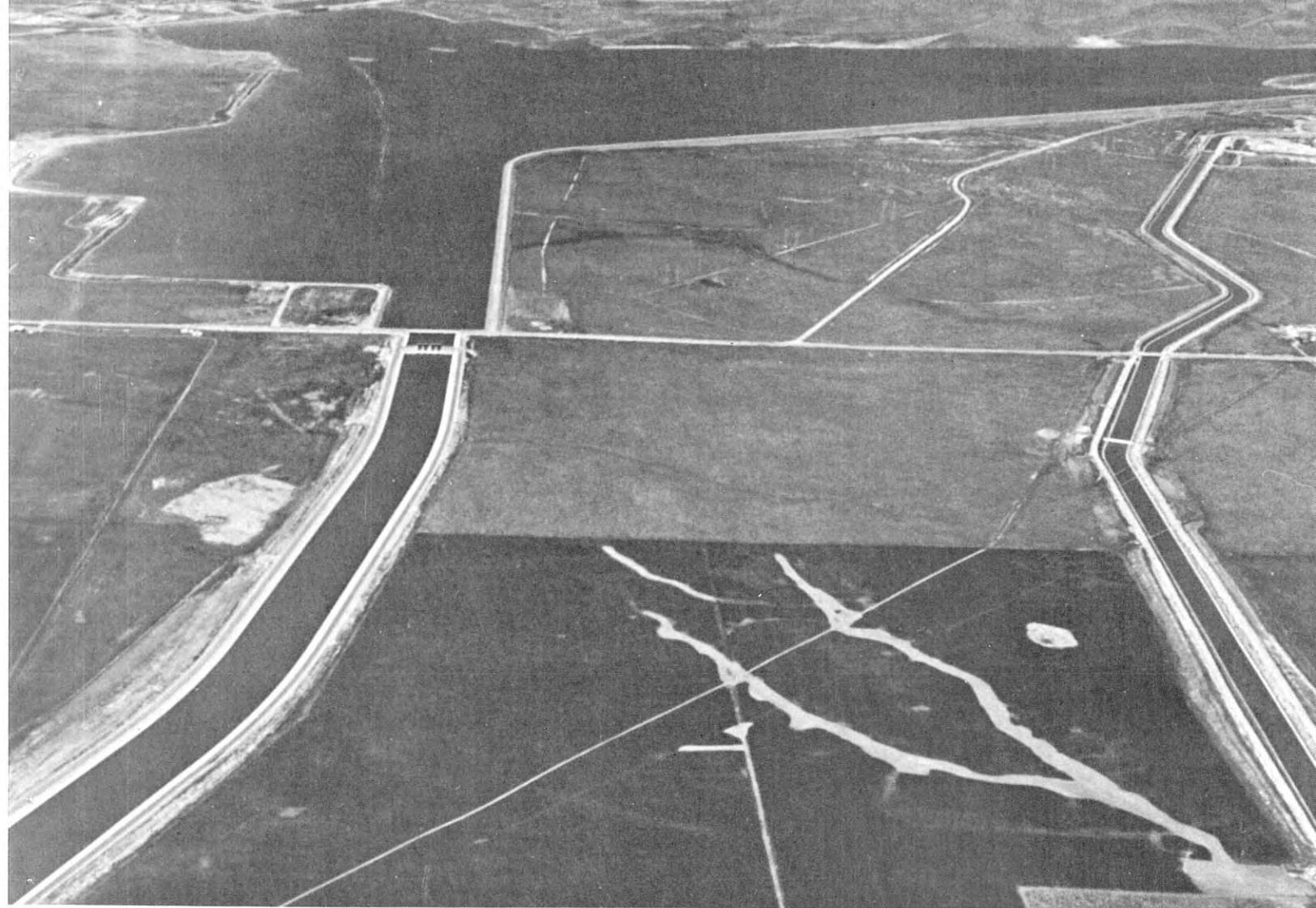
PROJECT PUMPING PLANTS 1/
1976

Amounts in acre-feet

Pumping Plant	January	February	March	April	May	June	July	August	September	October	November	December	Total
Hyatt	0	0	0	0	24,106	8,297	0	0	0	0	13,085	5,611	51,099
Thermalito	0	0	0	0	28,265	8,645	0	0	0	0	12,752	5,708	55,370
Cordelia	718	676	772	539	486	488	243	347	491	728	748	882	7,118
Delta State	251,799	175,102	227,950	26,081	37,667	17,789	19,374	130,377	209,148	84,032	93,643	67,792	1,340,754
Federal	2,081	0	0	0	3,937	0	0	0	0	0	0	0	6,018
South Bay	10,939	13,627	18,143	14,660	16,170	16,060	17,243	15,423	15,145	8,905	8,032	8,535	162,882
Del Valle	0	2,550	5,930	658	0	0	0	0	0	2,329 ^{2/}	1,035 ^{2/}	0	12,502
San Luis State	28,101	39,843	52,036	0	0	0	0	13,968	104,299	54,342	27,212	0	319,801
Federal	48,803	66,796	57,998	18,309	0	0	0	2,428	96,656	82,259	113,068	7,458	493,775
^{1/} O'Neill (USBR) Federal	171,454	159,248	159,703	126,466	68,031	28,620	0	23,157	143,966	104,902	141,296	87,667	1,214,510
State	0	0	0	0	0	0	1,490	41,500	0	0	0	0	42,990
Dos Amigos State	197,918	118,511	169,504	108,550	136,206	192,011	266,941	211,958	104,759	21,701	58,230	115,831	1,702,120
Federal	157,361	106,533	124,056	91,551	134,542	194,469	235,202	160,748	47,202	24,760	32,303	117,160	1,425,887
Las Perillas	13,023	9,805	12,418	9,405	16,910	22,333	26,722	20,042	5,763	1,282	2,970	10,024	150,697
Badger Hill	12,976	9,825	12,491	9,359	16,897	22,232	26,753	20,051	5,766	1,287	2,994	9,924	150,535
Buena Vista	99,903	73,876	99,872	53,900	64,165	84,044	117,761	103,558	81,867	19,585	20,485	40,318	859,934
Wheeler Ridge	37,124	56,814	76,861	44,801	46,611	56,022	84,557	80,521	77,426	16,842	16,966	30,533	675,128
Wind Gap	86,439	54,819	73,450	41,703	41,144	50,557	78,197	75,724	74,967	15,892	16,175	26,768	635,835
A. D. Edmonston	84,346	53,812	72,046	40,806	39,396	48,672	74,982	71,770	73,544	15,569	16,089	26,364	617,396
Oso	53,554	35,223	44,779	35,561	23,866	12,449	42,949	35,963	43,889	10,734	12,519	7,334	358,820
Castaic	0	10,314	859	5,364	41,286	45,593	22,868	27,076	20,414	30,653	15,188	715	220,330
Pearblossom	30,493	18,230	27,527	1,908	10,082	31,116	27,324	31,633	27,976	6,444	530	18,755	232,018

^{1/} O'Neill Pumping Plant is a federal USBR facility

^{2/} Pumped out of Lake Del Valle and into South Bay Aqueduct



JOINT SAN LUIS FACILITIES

MONTHLY OPERATIONS SUMMARY
STATE-FEDERAL JOINT SAN LUIS FACILITIES

19 76

Amounts in acre-feet unless noted.

		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Check 12	State	240,916	160,805	208,275	11,142	20,382	644	-162	111,937	192,927	74,585	85,335	58,782	1,165,568
	Federal	2,081	0	0	0	3,937	0	0	0	0	0	0	0	6,018
	Total	242,997	160,805	208,275	11,142	24,319	644	^{1/} -162	111,937	192,927	74,585	85,335	58,782	1,171,586
O'Neill Pumping and Generating Plant Amount Pumped	State	0	0	0	0	0	0	1,490	41,500	0	0	0	0	42,990
	Federal	171,454	159,248	159,703	126,466	68,031	28,620	0	23,157	143,966	104,902	141,296	87,667	1,214,510
	Total	171,454	159,248	159,703	126,466	68,031	28,620	1,490	64,657	143,966	104,902	141,296	87,667	1,257,500
Released for Generation	Federal	0	0	0	795	22	40,224	66,727	0	0	0	0	0	107,768
O'Neill Forebay End-of-Month Storage	State	41,563	12,080	21,933	13,734	24,252	11,906	23,446	33,886	27,487	26,738	27,837	39,274	
	Federal	2,344	32,896	19,984	34,153	14,545	29,548	15,728	16,357	23,745	22,074	18,710	7,036	XXXX XXXX
	Total	43,907	44,976	41,917	47,887	38,797	41,454	39,174	50,243	51,232	48,812	46,547	46,310	XXXX
San Luis Reservoir End-of-Month Storage	State	937,338	1,035,939	1,032,455	939,437	810,576	629,466	447,105	377,100	468,732	519,737	542,220	471,834	
	Federal	840,381	858,782	904,347	920,229	873,968	649,884	262,783	122,789	209,081	288,610	397,808	377,842	XXXX XXXX
	Total	1,777,719	1,864,721	1,936,802	1,859,666	1,684,544	1,279,350	709,888	499,889	677,813	808,347	940,028	849,676	XXXX
San Luis Pumping and Generating Plant Amount Pumped	State	28,101	39,843	52,036	0	0	0	0	13,968	104,299	54,342	27,212	0	319,801
	Federal	48,803	66,796	57,998	18,309	0	0	0	2,428	96,656	82,259	113,068	7,458	493,775
	Total	76,904	106,639	110,034	18,309	0	0	0	16,396	200,955	136,601	140,280	7,458	813,576
Released for Generation	State	0	0	19,172	91,569	127,254	182,864	188,557	85,325	0	0	0	70,756	765,147
	Federal	12,731	5,790	7,239	1,241	44,946	225,520	392,171	143,528	0	0	0	27,726	860,892
	Total	12,731	5,790	26,411	92,810	172,200	408,384	580,728	228,853	0	0	0	98,482	1,626,389
Dos Amigos Pumping Plant Amount Pumped	State	197,918	118,511	169,504	109,414	136,206	192,011	266,941	211,958	105,500	25,885	58,230	115,831	1,707,909
	Federal	157,361	106,533	124,056	90,687	134,542	194,469	235,202	160,748	46,461	20,576	32,303	117,160	1,420,098
	Total	355,279	225,044	293,560	200,101	270,748	386,480	502,143	372,706	151,961	46,461	90,533	232,991	3,128,007

^{1/} This amount "backed" into aqueduct @ Check 12



OPERATION
OF
RESERVOIRS

**UPPER FEATHER AREA LAKES
MONTHLY OPERATION**

1976

(From preliminary records)

Month	Lake Storage			Outflow						Inflow	
	Water Surface Elevation in feet	Storage	Storage Change	Regulated		Release		Spill	Estimated Evaporation and Seepage	Total Outflow	Computed or Estimated
				Streamflow Maint.	Water Supply Contract	Water Right Entitlement	Total Regulated Release				
	1	2	3	4	5	6	7	8	9	10	11

ANTELOPE LAKE

Capacity 22,566 ac-ft

Jan	4999.79	20,560	62	615	0	0	615	0	62	677	739
Feb	5000.28	20,995	435	575	0	0	575	0	71	646	1081
Mar	5001.43	22,039	1,044	615	0	0	615	0	109	724	1768
Apr	5002.42	22,959	920	595	0	0	595	817	187	1,599	2519
May	5001.52	22,121	-838	1,041	0	0	1,041	720	457	2,218	1380
June	5000.06	20,799	-1,322	1,190	0	0	1,190	0	636	1,826	504
July	4992.88	14,987	-5,812	5,189	0	0	5,189	0	716	5,905	93
Aug	4981.50	8,054	-6,933	6,930	0	0	6,930	0	303	7,233	300
Sept	4960.50	1,418	-6,636	6,120	0	0	6,120	0	546	6,666	30
Oct	4953.20	533	-885	1,039	0	0	1,039	0	31	1,070	185
Nov	4956.03	815	282	0	0	0	0	0	16	16	298
Dec	4958.04	1,062	247	0	0	0	0	0	13	13	260
Tot			-19,436	23,909	0	0	23,909	1,537	3,147	28,593	9157

FRENCHMAN LAKE

Capacity 55,477 ac-ft

Jan	5565.10	26,243	433	0	0	0	0	0	69	69	502
Feb	5565.71	26,851	608	0	0	0	0	0	70	70	678
Mar	5566.38	27,529	678	0	0	0	0	0	122	122	800
Apr	5565.07	26,213	-1,316	4	1,563	0	1,567	0	204	1,771	455
May	5561.03	22,391	-3,822	0	3,654	0	3,654	0	466	4,120	298
June	5557.02	18,944	-3,204	0	2,545	0	2,545	0	739	3,284	80
July	5554.43	16,904	-2,040	0	1,575	0	1,575	0	511	2,086	46E
Aug	5552.20	15,265	-1,639	0	1,360	0	1,360	0	363	1,723	84
Sept	5551.20E	14,566	-699	13	529	0	542	0	376	918	219
Oct	5550.82	14,306	-260	18	211	0	229	0	246	475	215
Nov	5550.72E	14,238	-68	147	0	0	147	0	109	256	188
Dec	5550.77	14,272	34	145	0	0	145	0	75	220	254
Tot			-11,295	327	11,437	0	11,764	0	3,350	15,114	3819

LAKE DAVIS

Capacity 84,371 ac-ft

Jan	5771.43	70,652	-257	512	12	0	524	0	256	780	523
Feb	5771.66	71,497	845	452	11	0	463	0	257	720	1565
Mar	5771.87	72,273	776	617	21	0	638	0	443	1,081	1857
Apr	5771.66	71,497	-776	603	31	111	745	0	739	1,484	708
May	5771.04	69,233	-2,264	307	48	430	785	0	2,064	2,849	585
June	5770.30	66,582	-2,651	379	50	407	836	0	2,295	3,131	480
July	5769.48	63,711	-2,871	316	73	430	819	0	2,135	2,954	83
Aug	5768.92	61,791	-1,920	307	39	430	776	0	1,714	2,490	570
Sept	5768.55	60,541	-1,250	297	27	199	523	0	1,824	2,347	1097
Oct	5768.23	59,471	-1,070	305	23	0	328	0	1,203	1,531	461
Nov	5768.04	58,841	-630	298	21	0	319	0	531	850	220
Dec	5567.88	58,314	-527	311	26	0	337	0	362	699	172
Tot			-12,595	4,704	382	2,007	7,103	0	13,823	20,926	8129

LAKE DROVILLE
MONTHLY OPERATION

Amounts in acre-feet unless noted

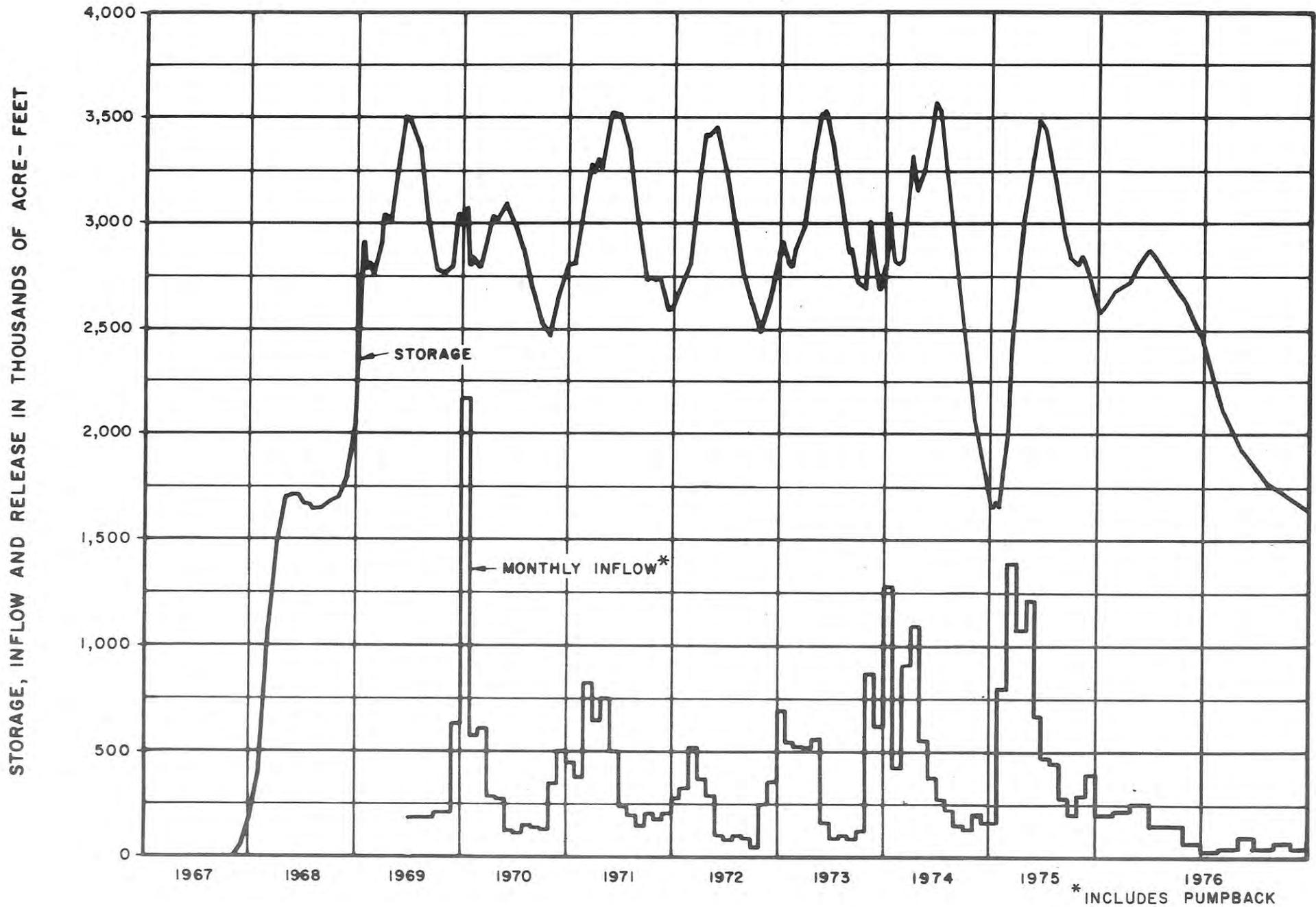
Capacity 3,537,577 acre-feet

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	1976	840.20	2,679,041	96,295	105,260	308	244	1,525	0	107,337	0	203,632
	1975	748.34	1,662,119	-5,010	175,162	245	0	868	0	176,275	361	170,904
FEB	1976	845.73	2,751,482	72,441	145,547	260	173	1,702	0	147,682	0	220,123
	1975	783.97	2,016,133	354,014	88,163	0	0	956	0	89,119	534	442,599
MAR	1976	854.12	2,863,994	112,512	142,015	322	232	3,268	0	145,837	0	258,349
	1975	839.78	2,673,592	657,459	73,741	75	159	1,903	0	75,878	2,907	730,430
APR	1976	845.73	2,751,482	-112,512	254,284	532	222	3,634	0	258,672	0	146,160
	1975	870.87	3,127,081	453,489	156,505	215	1,144	3,577	0	161,441	12,418	602,512
MAY	1976	836.61	2,632,703	-118,779	258,653	1,424	161	7,132	0	267,370	24,106	124,485
	1975	890.23	3,385,559	258,478	693,816	1,038	2,273	7,650	0	704,777	17,889	945,366
JUN	1976	819.71	2,422,062	-210,641	272,321	1,515	86	8,420	0	282,342	8,297	63,404
	1975	896.07	3,475,353	90,294	459,141	1,378	4,604	9,788	0	474,911	17,235	547,970
JUL	1976	792.96	2,113,333	-308,729	336,234	1,521	12	8,386	0	346,153	0	37,424
	1975	879.56	3,224,943	-250,910	442,779	1,506	1,722	10,677	0	456,684	0	205,774
AUG	1976	775.47	1,927,214	-185,573	227,023	1,389	0	5,978	0	234,390	0	48,817
	1975	862.81	2,983,894	-241,049	426,730	1,454	508	9,758	0	438,450	0	197,401
SEP	1976	765.64	1,827,949	-99,265	184,741	1,294	0	5,236	0	191,271	0	92,006
	1975	853.64	2,857,472	-126,422	273,885	1,369	294	7,697	0	283,245	0	156,823
OCT	1976	756.95	1,743,280	-84,669	130,913	974	0	4,567	0	136,454	0	51,785
	1975	850.02	2,808,618	-48,854	192,705	645	246	3,928	0	197,524	0	148,670
NOV	1976	750.94	1,686,340	-56,940	129,895	542	0	1,928	0	132,365	13,085	62,340
	1975	845.74	2,751,615	-57,003	302,337	408	228	2,234	0	305,207	0	248,204
DEC	1976	744.55	1,627,254	-59,086	103,010	350	0	1,828	0	105,188	5,611	40,491
	1975	832.69	2,582,746	-168,869	397,175	302	103	1,142	0	398,722	0	229,853
TOTAL	1976			-954,946	2289,896	10,431	1,130	53,604	0	2,355,061	51,099	1349,016
	1975			915,617	3682,139	8,635	11,281	60,178	0	3,762,233	51,344	4626,506

*Computed inflow excluding pumpback. ** Water level recorder adjusted downward 0.05 foot, August 2, 1976

LAKE OROVILLE OPERATION

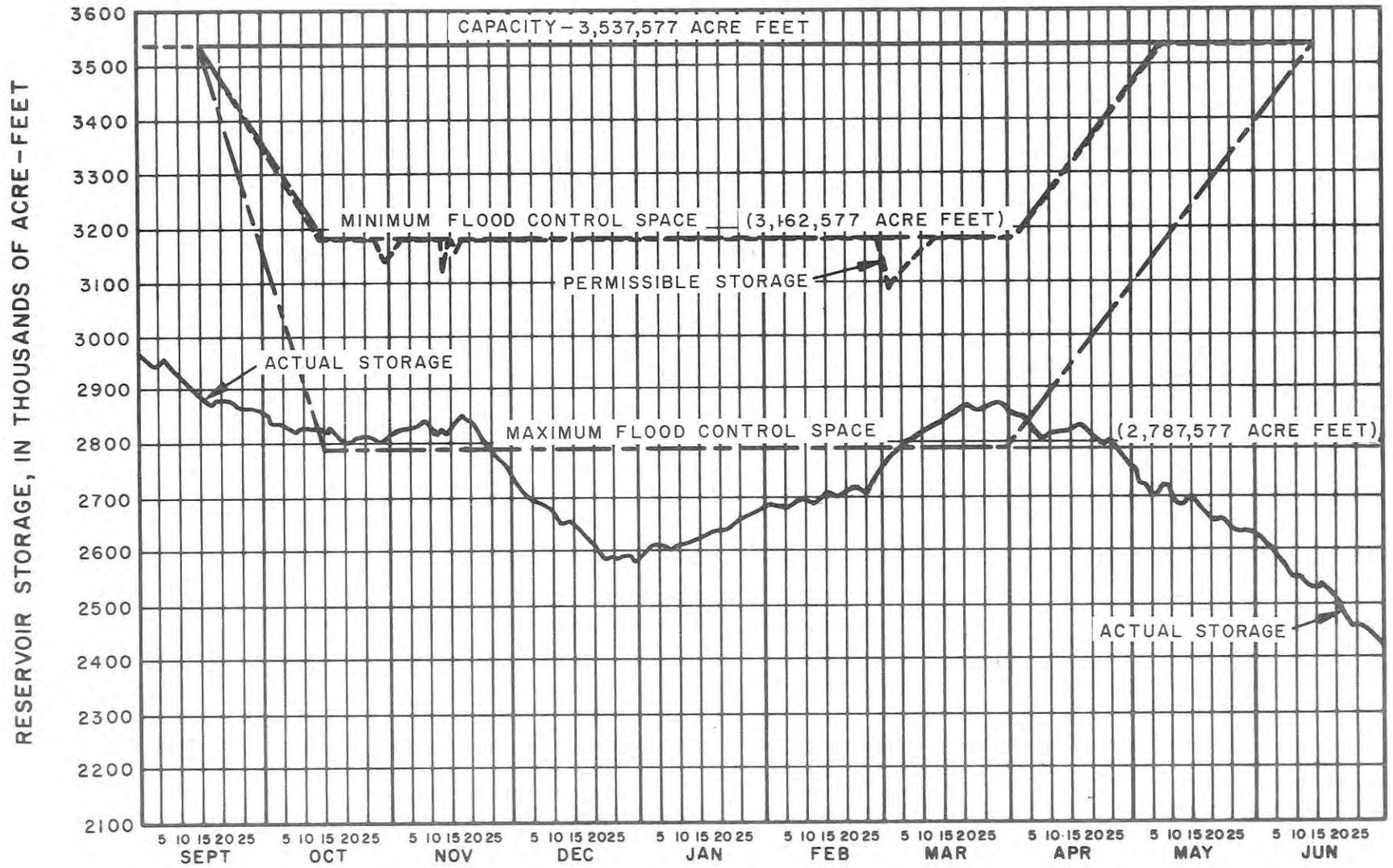
CAPACITY = 3,537,577 A. F.



* INCLUDES PUMPBACK

3-A

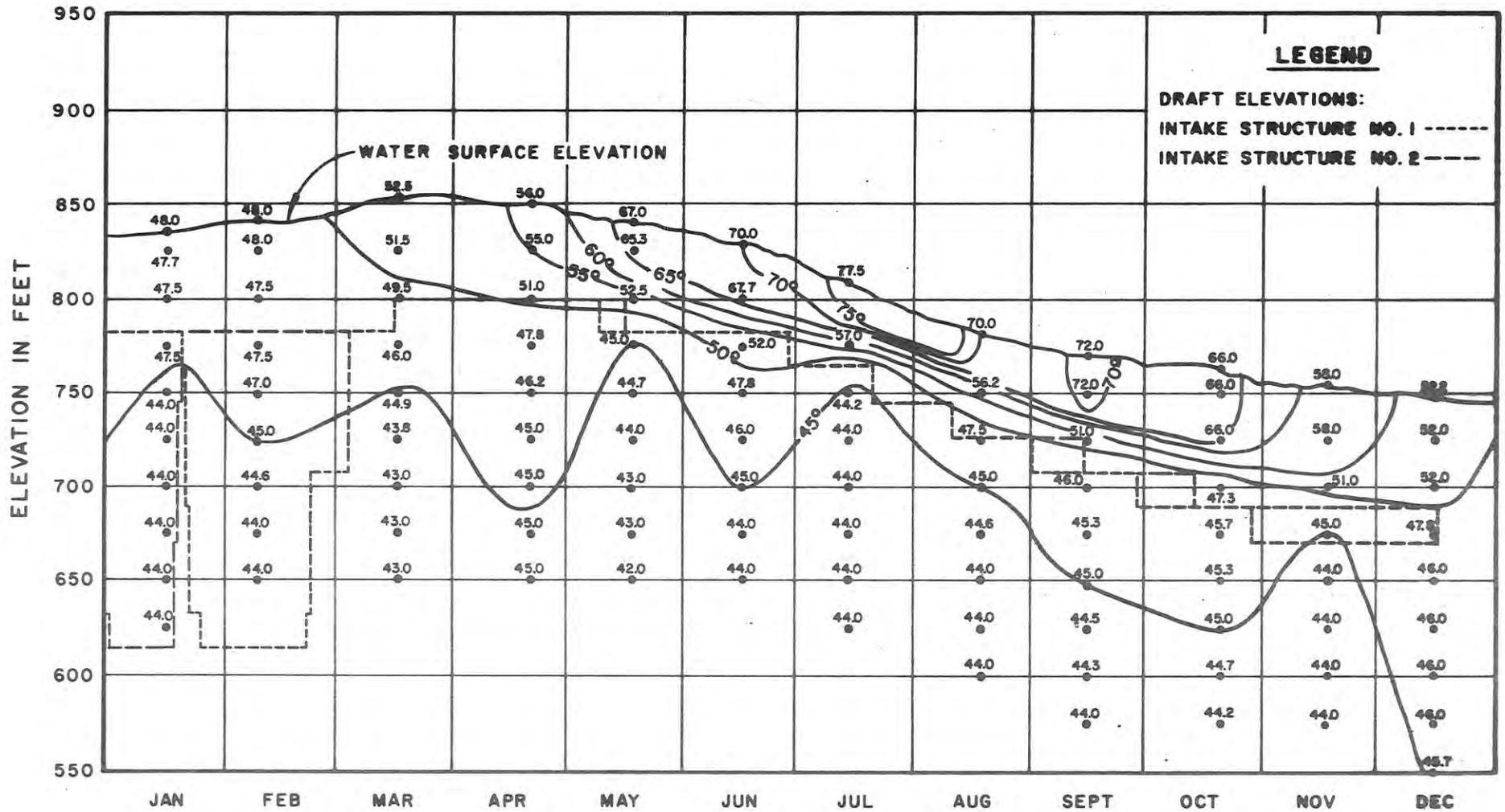
OPERATION OF LAKE OROVILLE FOR FLOOD CONTROL 1975 - 76



7-Δ

**LAKE OROVILLE
ISOTHERMS - 1976
(IN DEGREES FAHRENHEIT)**

5-Δ



QROVILLE-THERMALITO COMPLEX
MONTHLY STORAGE
1976

Elevation in feet, storage in acre-feet

Month	Year	Thermalito Diversion Dam Pool		Thermalito Forebay		Thermalito Afterbay	
		Elevation	Storage	Elevation	Storage	Elevation	Storage
Jan.	1976	223.92	13,006	223.70	10,960	125.61	19,143
	1975	224.50	13,191	224.40	11,392	128.33	26,829
Feb.	1976	222.56	12,575	222.66	10,329	125.74	19,483
	1975	224.03	13,041	223.96	11,120	133.17	43,493
Mar.	1976	223.99	13,028	223.90	11,083	128.47	27,257
	1975	222.60	12,588	222.82	10,425	132.29	40,184
Apr.	1976	223.70	12,935	223.49	10,715	131.57	37,568
	1975	223.84	12,980	222.66	10,329	126.80	22,357
May	1976	224.00	13,031	223.90	11,083	123.80	14,690
	1975	224.00	13,031	223.66	10,935	129.77	31,390
June	1976	223.77	12,958	224.27	11,311	127.45	24,210
	1975	223.50	12,872	224.00	11,144	132.30	40,221
July	1976	223.48	12,866	223.48	10,825	127.21	23,518
	1975	223.44	12,853	222.96	10,509	131.20	36,255
Aug.	1976	222.93	12,692	223.28	10,703	128.70	27,968
	1975	223.33	12,818	223.06	10,570	129.00	28,908
Sept.	1976	223.44	12,853	223.46	10,813	129.65	30,997
	1975	224.36	13,146	224.10	11,206	128.54	27,473
Oct.	1976	222.74	12,632	222.74	10,377	124.13	15,463
	1975	223.81	12,970	223.90	11,803	128.95	28,751
Nov.	1976	223.37	12,831	223.46	10,813	125.36	18,496
	1975	223.95	13,015	223.84	11,046	134.31	47,950
Dec.	1976	224.21	13,098	224.16	11,243	124.01	15,180
	1975	223.30	12,808	223.78	11,009	134.31	47,950

CLIFTON COURT FOREBAY
MONTHLY OPERATION
1976

In acre-feet, except elevation, which is in feet.

Month	Year	Water Surface Elevation	Storage	Storage Change	Inflow
Jan.	1976	-0.11	18,026	-1,637	254,498
	1975	1.72	21,974	201	167,060
Feb.	1976	-0.15	17,940	-86	176,429
	1975	1.30	21,066	-908	134,445
Mar.	1976	-2.01	13,944	-3,996	228,286
	1975	1.84	22,233	1,167	138,149
Apr.	1976	-1.22	15,639	1,695	33,935
	1975	1.64	21,796	-437	118,600
May	1976	0.65	19,663	4,024	53,414
	1975	-2.01	13,944	-7,852	93,531
June	1976	-2.23	13,472	-6,191	19,925
	1975	-2.01	13,944	0	21,250
July	1976	0.69	19,749	6,277	35,312
	1975	-1.90	14,180	236	24,443
Aug.	1976	-1.08	15,940	-3,809	133,821
	1975	0.50	19,340	5,160	265,996
Sept.	1976	1.28	21,022	5,082	219,479
	1975	0.88	20,159	819	239,418
Oct.	1976	-0.58	17,015	-4,007	80,718
	1975	0.28	18,867	-1,292	237,921
Nov.	1976	-0.86	16,412	-603	93,071
	1975	-0.03	18,197	-670	244,880
Dec.	1976	-1.23	15,617	-795	66,996
	1975	0.65	19,663	1,466	259,567
Total	1976			-4,046	1,395,884
	1975			-2,110	1,945,260

LAKE DEL VALLE
MONTHLY OPERATION
1976

Amounts in acre-feet unless noted

MONTH	ELEV. FT.	STORAGE IN LAKE	CHANGE	INFLOW		OUTFLOW			EVAP.	PREC. IN.
				NATURAL*	SOUTH BAY AQ.	SOUTH BAY AQ.	ARROYO VALLE	TOTAL		
JAN.	678.51	25,032	15	90	0	0	0	0	75	.26
FEB.	683.50	27,636	2,604	110	2,550	0	0	0	56	1.31
MAR.	693.36	33,455	5,819	16	5,930	0	0	0	127	.94
APR.	694.10	33,924	469	0	658	0	0	0	189	.62
MAY	693.55	33,575	-349	-53	0	0	0	0	296	0
JUNE	692.96	33,203	-372	-15	0	0	0	0	357	0
JULY	692.28	32,778	-425	-52	0	0	0	0	373	0
AUG.	691.32	32,184	-594	-36	0	279	0	279	279	.99
SEPT.	690.86	31,903	-281	0	0	0	0	0	281	1.15
OCT.	682.70	27,202	-4,701	-5	0	4,493	0	4,493	203	.49
NOV.	678.44	24,997	-2,205	-102	0	2,000	0	2,000	103	.48
DEC.	678.24	24,897	-100	25	0	0	0	0	125	.64
TOTAL			-120	-22	9,138	6,772	0	6,772	2,464	6.88

*Total of stream gaging station above Lang Canyon and accretions (+) between gage and Lake.

O'NEILL FOREBAY
MONTHLY OPERATION

In acre-feet unless noted

Month	Year	Reservoir Storage			Inflow			Outflow				Gain (+) Loss (-)
		Water Surface Elevation in ft.	Storage	Monthly Storage Change	O'Neill Pumping	San Luis Generation	Calif. Aqueduct Check 12	O'Neill Generation	San Luis Pumping	Dos Amigos Pumping	Deliveries	
January	1976	220.29	43,907	-7,942	171,454	12,731	242,997	0	76,904	355,279	548	-2,393
	1975	221.42	46,862	-1,104	109,578	0	157,217	0	2,585	262,647	300	-2,367
February	1976	220.70	44,976	1,069	159,248	5,790	160,805	0	106,639	225,044	1,163	8,072
	1975	219.23	41,171	-5,691	176,715	512	124,969	0	64,048	241,961	361	-1,517
March	1976	219.52	41,917	-3,059	159,703	26,411	208,275	0	110,034	293,560	1,029	7,175
	1975	220.52	44,507	3,336	150,436	0	133,010	0	40	275,595	607	-3,868
April	1976	221.81	47,887	5,970	126,466	92,810	11,142	795	18,309	200,101	953	-4,290
	1975	218.41	39,099	-5,408	106,634	101	112,399	0	7,230	213,566	1,073	-2,673
May	1976	218.29	38,797	-9,090	68,031	172,200	24,319	22	0	270,748	1,211	-1,659
	1975	222.18	48,865	9,766	32,106	160,353	79,502	10,599	0	246,132	1,396	-4,068
June	1976	219.34	41,454	2,657	28,620	408,384	644	40,224	0	386,480	1,300	-6,987
	1975	220.06	43,307	-5,558	3,312	403,785	211	13,257	0	386,894	1,332	-11,383
July	1976	218.44	39,174	-2,280	1,490 ^{1/}	580,728	-162 ^{3/}	66,727	0	502,143	1,695	-13,771
	1975	220.11	43,438	131	28,997	406,581	700	4,378	24	417,259	1,324	-13,162
August	1976	220.70	50,243	11,069	64,657 ^{2/}	228,853	11,937	0	16,396	372,706	920	-4,356
	1975	222.50	49,710	6,272	47,511	138,094	233,971	4,562	0	405,988	971	-1,783
Sept.	1976	223.07	51,232	989	143,966	0	192,927	0	200,955	151,961	683	17,695
	1975	222.60	49,977	267	90,037	0	223,154	1,216	137,166	183,356	375	9,189
October	1976	222.16	48,812	-2,420	104,902	0	74,585	0	136,601	46,461	134	1,289
	1975	223.80	53,192	3,215	136,562	248	231,910	0	209,312	169,210	232	13,249
November	1976	221.30	46,547	-2,265	141,296	0	85,335	0	140,280	90,533	275	2,192
	1975	218.87	40,254	-12,938	225,243	0	235,671	0	329,516	156,438	177	12,279
December	1976	221.21	46,310	-237	87,667	98,482	58,782	0	7,458	232,991	591	-4,128
	1975	223.30	51,849	11,595	249,664	0	225,778	0	224,736	244,931	114	5,934
Total	1976			-5,539	1,257,500	1,626,389	1,171,586	107,768	813,576	3,128,007	10,502 ^{4/}	-1,161
	1975			3,883	1,356,795	1,109,674	1,758,492	34,012	974,657	3,203,977	8,262	-170

1/ Pumped for State.

2/ Of this amount 41,500 acre-feet was State's share.

3/ This amount was "backed into" aqueduct at Check No. 12 and was added as negative inflow.

4/ Total includes 130 acre-feet delivered to California Department of Fish and Game for wildlife habitat area below dam.

SAN LUIS RESERVOIR
MONTHLY OPERATION

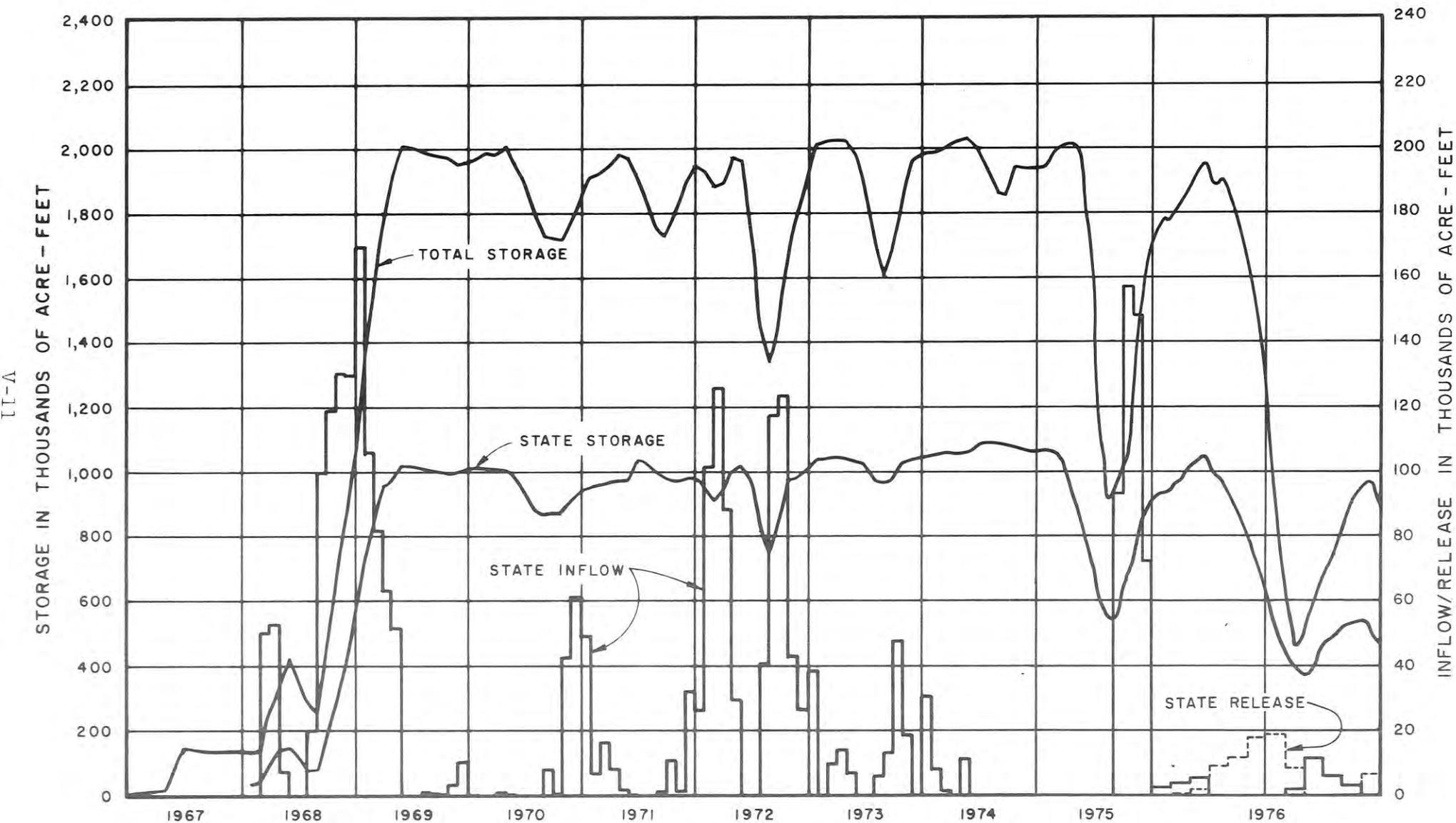
In acre-feet unless noted

Month	Year	Reservoir Storage			Inflow	Outflow			Gain (+) Loss (-) (Computed)	Evaporation	Prec. In Inches
		Water Surface Elevation in feet	Storage	Monthly Storage Change	San Luis P-G Plant Pumping	San Luis P-G Plant Generation	Pacheco Tunnel (Future Facility)				
January	1976	522.87	1,777,719	55,144	76,904	12,731			-9,029	1,857	0.17
	1975	535.78	1,936,801	-1,251	2,585	0			-3,836	1,337	0.17
February	1976	529.98	1,864,721	87,002	106,639	5,790			-13,847	2,426	0.75
	1975	540.63	1,997,799	60,998	64,048	512			-2,538	2,447	2.67
March	1976	535.78	1,936,802	72,081	110,034	26,411			-11,542	5,716	0.77
	1975	540.72	1,998,937	1,138	40	0			1,098	3,973	2.57
April	1976	529.57	1,859,666	-77,136	18,309	92,810			-2,635	7,567	0.43
	1975	541.05	2,003,109	4,172	7,230	101			-2,957	5,893	0.64
May	1976	515.12	1,684,544	-175,122	0	172,200			-2,922	12,496	0.00
	1975	528.07	1,841,200	-161,909	0	160,353			-1,556	11,594	0.00
June	1976	479.55	1,279,350	-405,194	0	408,384			3,190	12,425	0.16
	1975	494.38	1,443,664	-397,536	0	403,785			6,249	12,817	0.00
July	1976	422.16	709,888	-569,462	0	580,728			11,266	13,274	0.00
	1975	457.38	1,046,356	-397,308	24	406,581			9,249	11,986	0.04
August	1976	397.08	499,889	-209,999	16,396	228,853			2,458	6,946	0.72
	1975	443.36	907,172	-139,184	0	138,094			-1,090	10,201	0.27
Sept.	1976	418.53	677,813	177,924	200,955	0			-23,031	5,984	2.07
	1975	455.92	1,031,560	124,388	137,166	0			-12,778	8,150	0.01
October	1976	432.96	808,347	130,534	136,601	0			-6,067	3,724	0.69
	1975	473.97	1,219,251	187,691	209,312	248			-21,373	4,566	0.62
November	1976	446.73	940,028	131,681	140,280	0			-8,599	1,444	0.97
	1975	501.09	1,520,187	300,936	329,516	0			-28,580	2,733	0.03
December	1976	437.36	849,676	-90,352	7,458	98,482			672	1,135	0.90
	1975	518.30	1,722,575	202,388	224,736	0			-22,348	1,549	0.15
Total	1976			-872,899	813,576	1,626,389			-60,086	74,994	7.63
	1975			-215,477	974,657	1,109,674			-80,460	77,246	7.17

01-A

SAN LUIS RESERVOIR OPERATION

CAPACITY = 2,038,771 A. F.



**PYRAMID LAKE
MONTHLY OPERATION
1976**

Amounts in acre-feet unless noted

MONTH	WATER SURFACE ELEVATION	TOTAL STORAGE <u>1/</u>	STORAGE CHANGE	INFLOW			OUTFLOW					COMPUTED LOSSES (-) GAINS (+)
				NATURAL	PROJECT		ANGELES TUNNEL	TO PIRU CREEK				
					GORMAN CREEK	PUMPBACK <u>2/</u>		NATURAL INFLOW RELEASE <u>3/</u>	PROJECT WATER FOR FISH ENHANCEMENT			
									BILLED UWCD <u>4/</u>	EVAP. LOSS	TOTAL	
JAN	2,573.1	(296) 163,652	-2,660	441	53,129	0	54,522	315	0	0	0	-1,393
FEB	2,573.5	(2,472) 164,157	505	5,387	33,611	10,314	43,979	3,211	0	0	0	-1,617
MAR	2,572.6	(4,004) 163,023	-1,134	1,863	46,622	859	48,416	331	0	0	0	-1,731
APR	2,575.4	(4,792) 166,567	3,544	1,127	34,755	5,364	35,680	339	0	0	0	-1,683
MAY	2,574.3	(5,133) 165,169	-1,398	678	22,135	41,286	62,432	337	0	0	0	-2,728
JUN	2,573.7	(5,146) 164,409	-760	310	14,376	45,593	58,899	297	0	0	0	-1,843
JUL	2,570.7	(4,537) 160,648	-3,761	116	41,767	28,868	65,751	725	0	0	0	-2,036
AUG	2,573.7	(3,831) 164,409	3,761	102	35,778	27,076	56,380	808	0	0	0	-2,007
SEP	2,572.8	(3,891) 163,275	-1,134	427	44,690	20,414	64,773	367	0	0	0	-1,525
OCT	2,575.4	(4,016) 166,567	3,292	391	12,116	30,653	37,864	266	0	0	0	-1,738
NOV	2,576.6	(4,048) 168,100	1,533	343	9,133	15,188	21,758	311	0	0	0	-1,062
DEC	2,575.1	(4,123) 166,185	-1,915	365	6,400	715	8,248	290	0	0	0	-857
TOTAL			-127	11,550	354,512	220,330	558,702	7,597	0	0	0	-20,220

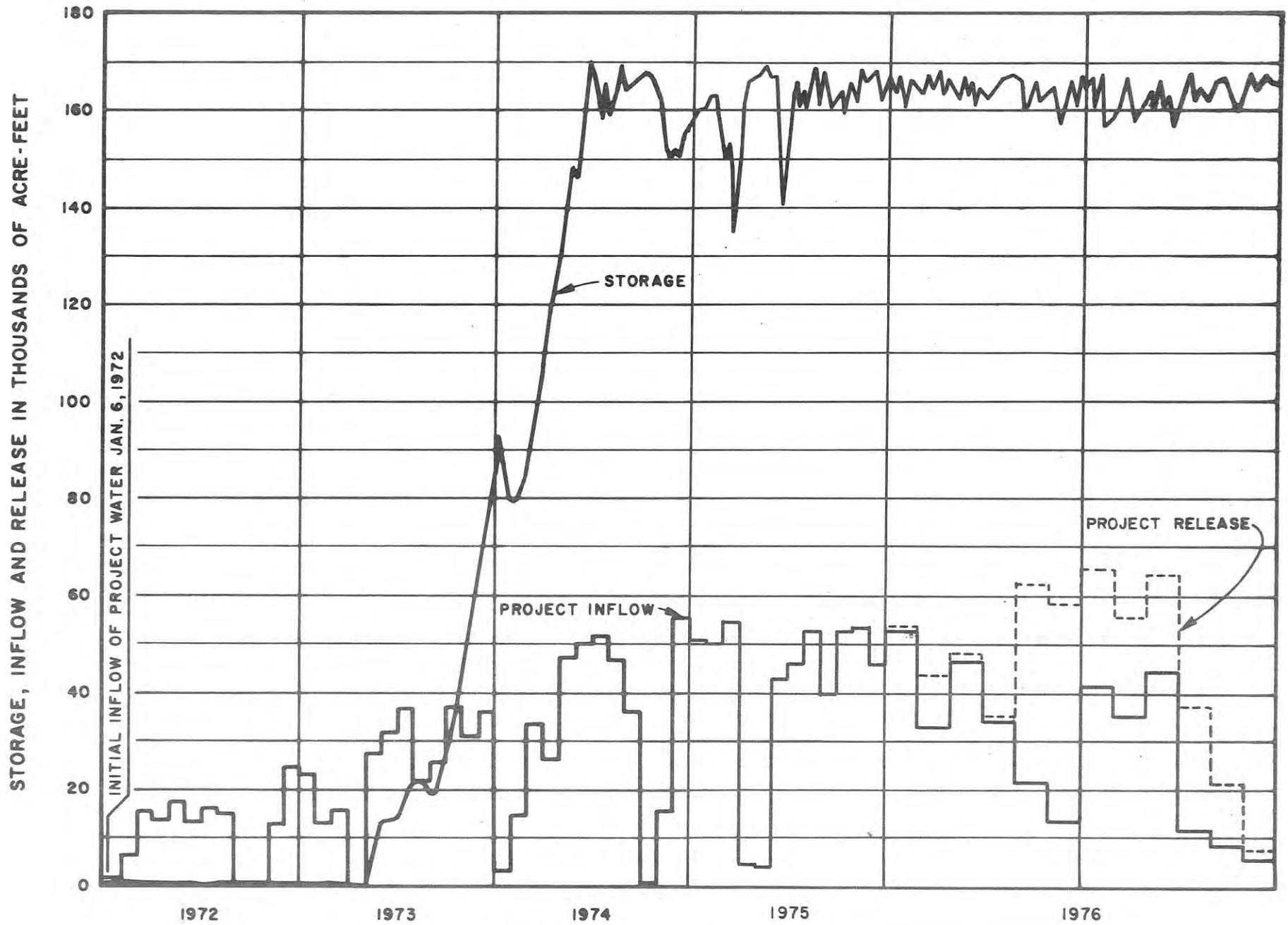
1/ Natural inflow storage shares shown in brackets

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.

4/ Purchased by United Water Conservation District in accordance with Recapture Agreement.

PYRAMID LAKE OPERATION
CAPACITY : 171,196 ACRE- FEET



**ELDERBERRY FOREBAY
MONTHLY OPERATION
1976**

Amounts in acre-feet unless noted

MONTH	WATER SURFACE ELEVATION IN FEET	TOTAL STORAGE	STORAGE CHANGE	INFLOW		OUTFLOW			COMPUTED LOSSES (-) GAINS (+)
				CASTAIC P.P. GENERATION	NATURAL	TO CASTAIC LAKE		PUMP-BACK TO PYRAMID LAKE 1/	
						NATURAL	PROJECT		
JAN	1,514.2	21,453	478	54,522	7	7	54,103	0	59
FEB	1,517.5	22,791	1,338	43,979	379	379	30,930	10,314	-1,397
MAR	1,509.3	19,536	-3,255	48,416	155	155	50,197	859	-615
APR	1,512.6	20,818	1,282	35,680	67	67	28,692	5,364	-342
MAY	1,510.0	19,805	-1,013	62,432	14	14	21,196	41,286	-963
JUN	1,515.8	22,097	2,292	58,899	3	3	11,168	45,593	154
JUL	1,514.3	21,493	-604	65,751	0	0	43,335	22,868	-152
AUG	1,508.8	19,345	-2,148	56,380	0	0	31,883	27,076	431
SEP	1,517.1	22,627	3,282	64,773	54	54	41,116	20,414	39
OCT	1,512.2	20,660	-1,967	37,864	8	8	9,454	30,653	276
NOV	1,476.6	9,006	-11,654	21,758	6	6	18,282	15,188	58
DEC	1,498.6	15,630	6,624	8,248	6	6	764	715	-145
TOTAL			-5,345	558,702	699	699	341,120	220,330	-2,597

1/ Pumpback by Los Angeles Department of Water and Power (LADWP) thru Castaic Power Plant.

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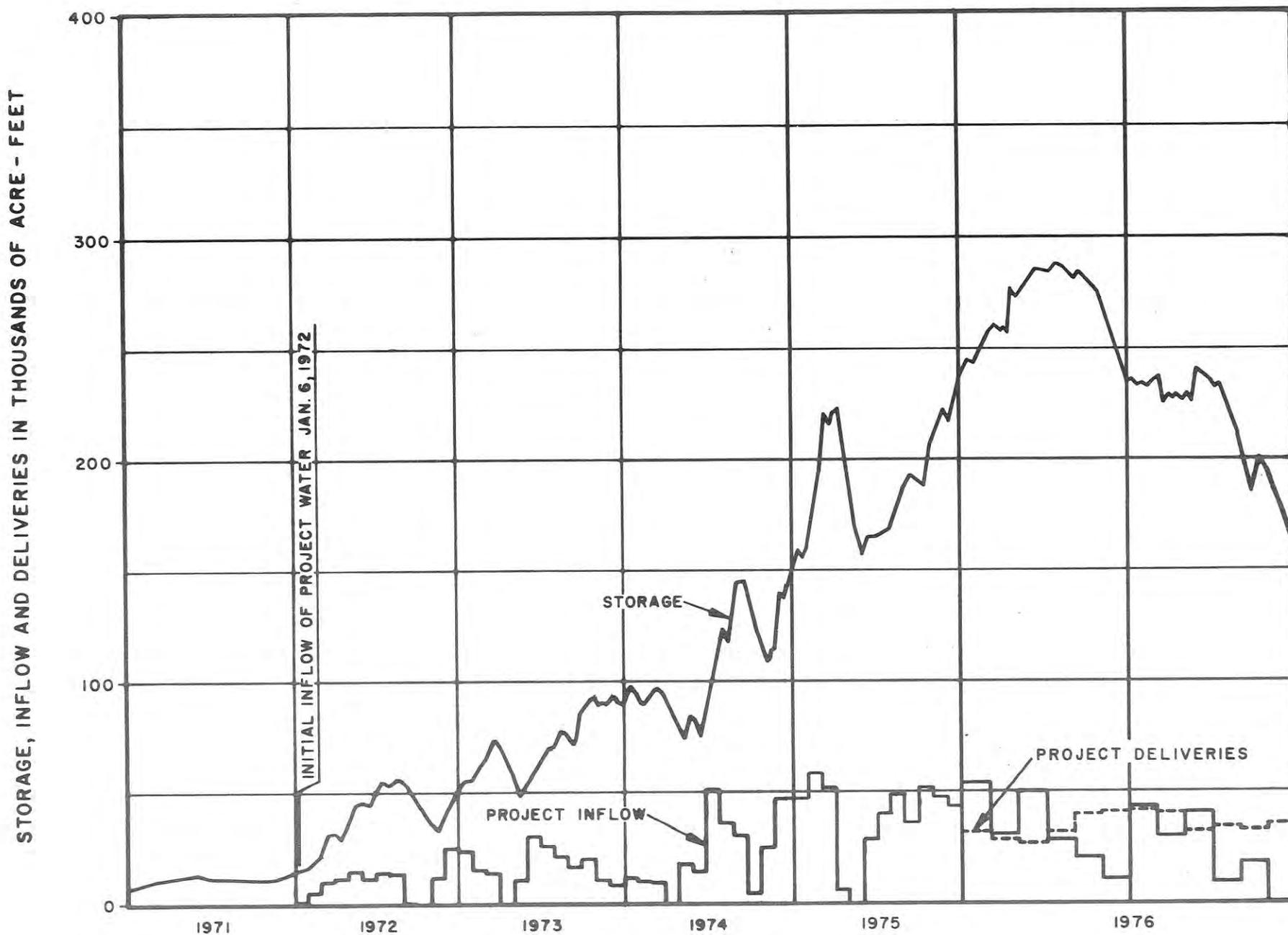
**CASTAIC LAKE
MONTHLY OPERATION
1976**

Amount in acre-feet unless noted

MONTH	WATER SURFACE ELEVATION IN FEET	TOTAL STORAGE <u>1/</u>	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	1,483.2	(-822) 257,122	20,874	36	7	54,103	32,065	248	0	187	-959
FEB	1,486.2	(-9) 263,036	5,914	507	379	30,930	28,843	106	0	73	3,047
MAR	1,497.4	(223) 285,754	22,718	235	155	50,197	27,680	189	0	158	0
APR	1,496.2	(203) 283,269	-2,485	95	67	28,692	31,983	298	0	182	942
MAY	1,488.2	(50) 267,019	-16,250	42	14	21,196	40,199	267	0	209	2,964
JUN	1,472.5	(-108) 236,622	-30,397	12	3	11,168	40,985	298	0	173	-297
JUL	1,472.9	(-282) 237,372	750	2	0	43,335	42,573	307	0	176	293
AUG	1,467.8	(-471) 227,908	-9,464	1	0	31,883	40,845	307	0	190	-196
SEP	1,472.8	(-449) 237,184	9,276	55	54	41,116	32,381	191	0	87	623
OCT	1,458.8	(-671) 211,679	-25,505	17	8	9,454	34,037	238	0	247	-709
NOV	1,449.8	(-799) 196,073	-15,606	16	6	18,282	33,652	224	0	150	-34
DEC	1,428.0	(-947) 160,918	-35,155	26	6	764	35,902	307	0	180	258
TOTAL			-75,330	1,044	699	341,120	421,145	2,980	0	2,012	5,932

1/ Natural inflow storage shares shown in brackets.

CASTAIC LAKE OPERATION
CAPACITY 323,702 ACRE-FEET



**SILVERWOOD LAKE
MONTHLY OPERATION
1976**

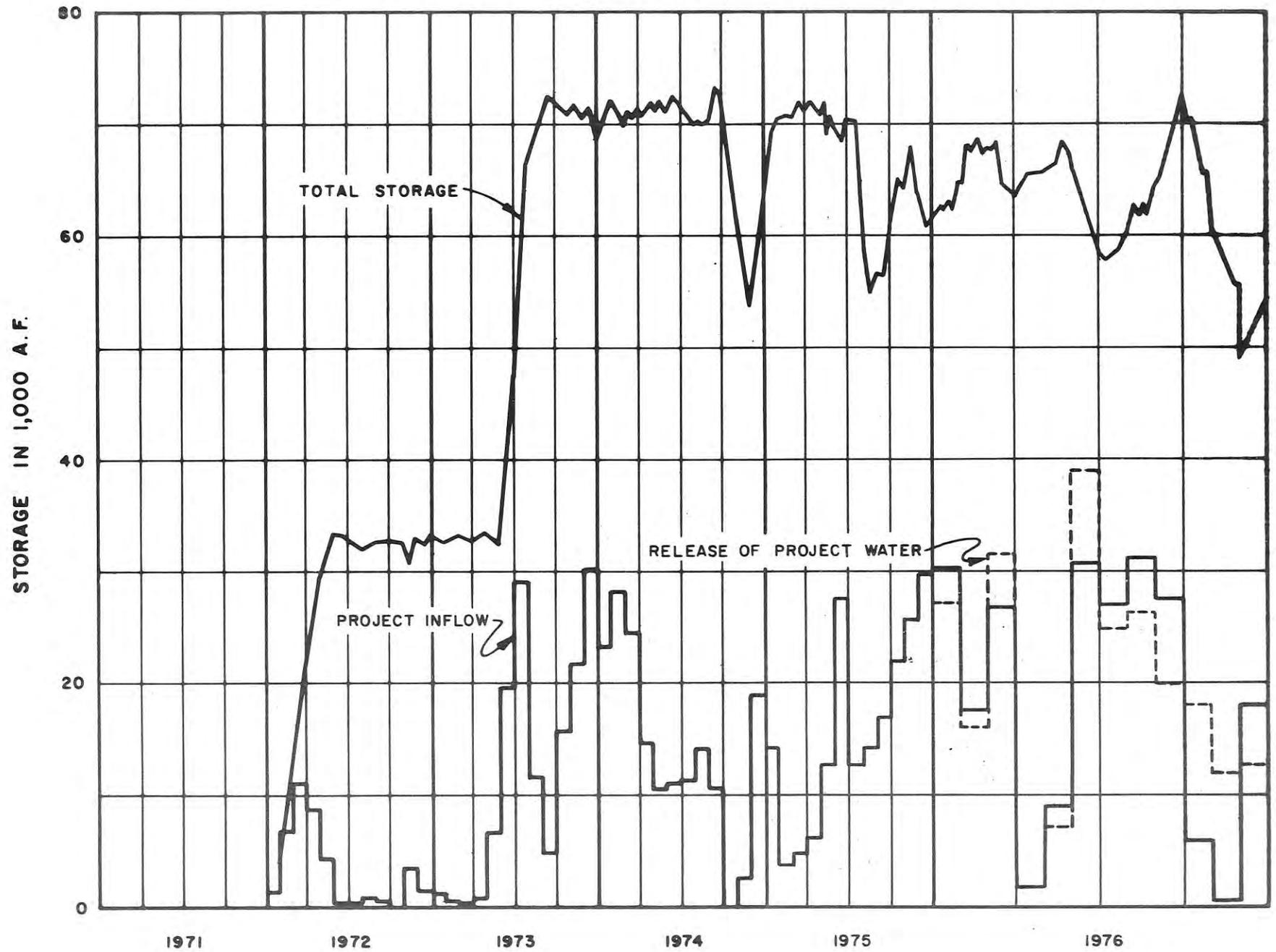
Amounts in acre-feet unless noted

MONTH	WATER SURFACE ELEVATION IN FEET	STORAGE <u>1/</u>	STORAGE CHANGE	INFLOW		OUTFLOW			COMPUTED LOSSES	EXCHANGE OF NATURAL INFLOW <u>2/</u>
				NATURAL	PROJECT	SAN BERNARDINO TUNNEL	AT TURNOUT (CLAWA)	NATURAL INFLOW TO MOJAVE RIVER		
JAN	3,344.5	(20) 65,102	3,388	88	30,271	27,251	71	0	351	108
FEB	3,347.6	(-288) 67,937	2,835	3,197	17,492	15,936	68	2,828	978	3,505
MAR	3,343.0	(83) 63,754	-4,183	1,691	26,717	32,528	64	461	462	1,320
APR	3,345.3	(230) 65,828	2,074	580	1,682	0	66	0	-122	433
MAY	3,347.0	(-76) 67,383	1,555	257	9,022	7,053	88	0	-583	563
JUN	3,337.4	(-223) 58,849	-8,534	88	30,675	38,988	106	0	-203	235
JUL	3,339.5	(-293) 60,664	1,815	3	26,949	24,756	162	0	-219	73
AUG	3,344.0	(-355) 64,651	3,987	0	31,367	26,243	142	0	-995	62
SEP	3,352.6	(-101) 72,647	7,996	884	27,478	19,990	107	250	-19	630
OCT	3,339.9	(-146) 61,013	-11,634	138	6,243	18,196	80	0	261	183
NOV	3,325.5	(-201) 49,120	-11,893	94	601	12,185	87	0	-316	149
DEC	3,332.4	(-156) 54,645	5,525	125	18,209	12,774	90	0	55	80
TOTAL			-7,069	7,145	226,706	235,900	1,131	3,539	-350	7,341

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.

SILVERWOOD LAKE OPERATION
CAPACITY = 74,970 A.F.



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**LAKE PERRIS
MONTHLY OPERATION**

1976

Amounts in acre-feet unless noted

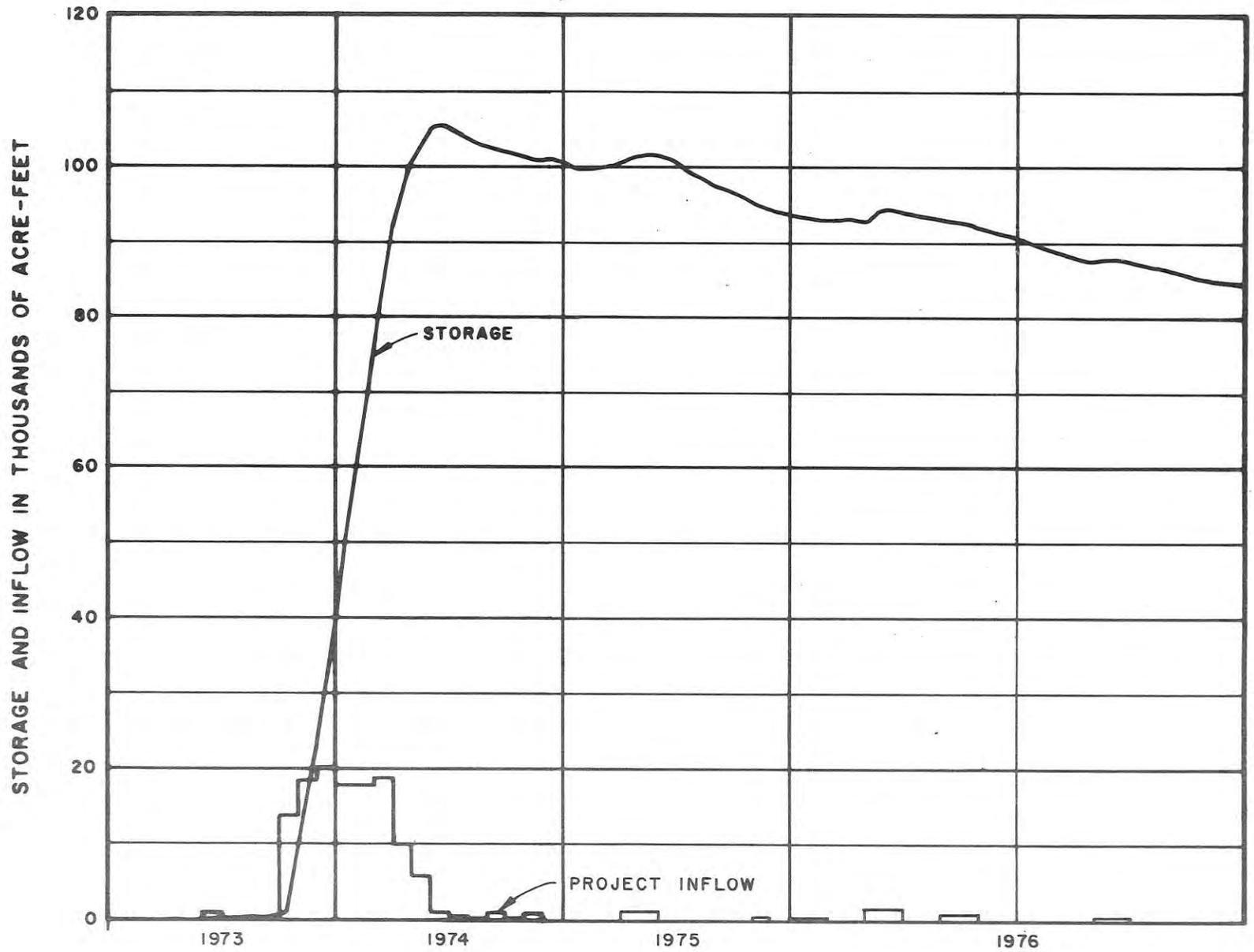
MONTH	WATER SURFACE ELEVATION IN FEET	TOTAL STORAGE	STORAGE CHANGE	INFLOW	OUTFLOW	COMPUTED LOSSES (-) GAINS (+)
JAN	1,572.31	92,798	-841	357	180 ^{1/}	-1,018
FEB	1,572.27	92,716	-82	2	168 ^{1/}	84
MAR	1,572.81	93,824	1,108	1,892	188 ^{1/}	-596
APR	1,572.42	93,023	-801	-734	168 ^{1/}	101
MAY	1,571.87	91,898	-1,125	918	179 ^{1/}	-1,864
JUN	1,571.21	90,554	-1,344	-12	165 ^{1/}	-1,167
JUL	1,570.40	88,914	-1,640	-152	165	-1,323
AUG	1,569.65	87,405	-1,509	25	163	-1,371
SEP	1,569.59	87,285	-120	351	157	-314
OCT	1,569.14	86,385	-900	-496	168	-236
NOV	1,568.67	85,449	-936	53	159	-830
DEC	1,568.17	84,457	-992	-49	163	-780
TOTAL			-9,182	2,155	2,023	-9,314

^{1/} Includes water used in construction of recreation facilities, and water delivered to MWD.

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LAKE PERRIS OPERATION

CAPACITY 131,452 ACRE-FEET



V-20

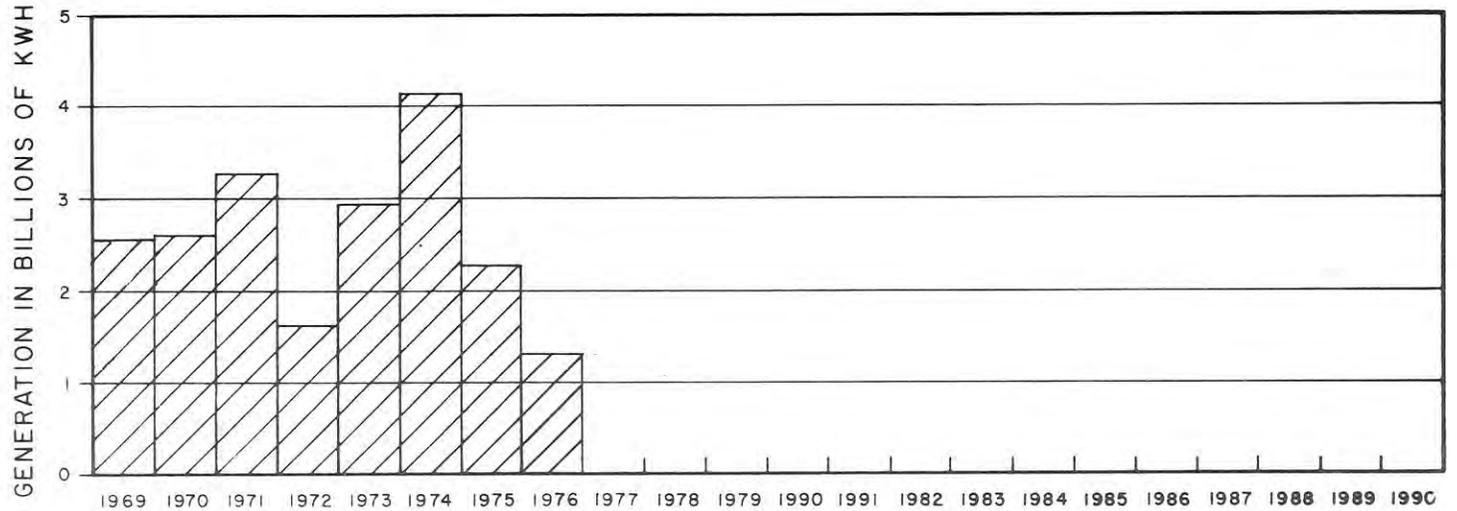


POWER SUPPLY & USE

OPERATION OF EDWARD HYATT & THERMALITO POWERPLANTS

ENERGY IN MILLIONS OF KWH

OPERATIONS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOTAL
ENERGY GENERATED BY EDWARD HYATT AND THERMALITO POWERPLANTS													
GROSS GENERATION	63.25	89.25	86.42	157.90	159.82	167.16	198.19	126.14	102.01	71.09	64.45	52.91	1,338.59
POWERPLANT USE AND PUMPBACK REQUIREMENTS	.80	.64	.69	.46	22.70	7.68	.45	.54	.67	.99	12.21	5.52	53.35
DELIVERED TO CALIFORNIA POWER POOL COMPANIES	62.45	88.61	85.73	157.44	137.12	159.48	197.74	125.60	101.34	70.10	52.24	47.39	1,285.24



PROJECT POWER SUPPLY

1976

(in kilowatt hours)

Source	January	February	March	April	May	June	July	August	September	October	November	December	Total
San Luis Generation													
State	0	0	5,528,833	25,097,118	34,133,458	44,619,376	38,543,205	14,137,373	0	0	0	13,702,701	175,762,064
USBR	3,427,000	1,565,000	2,148,167	340,882	12,079,029	54,329,624	77,518,795	23,564,627	0	0	0	5,338,299	180,311,423
Total	3,427,000	1,565,000	7,677,000	25,438,000	46,212,487	98,949,000	116,062,000	37,702,000	0	0	0	19,041,000	356,073,487
Castaic	52,080,000	32,592,000	47,160,000	32,594,000	18,288,000	12,792,000	41,016,000	32,868,000	42,624,000	7,488,000	9,796,000	5,640,000	334,938,000
Devil Canyon	32,714,011	19,139,272	38,708,854	0	8,233,282	45,947,640	29,203,765	31,608,725	24,193,034	21,974,542	14,697,507	15,115,532	281,536,164
Northwest Dump	0	0	0	0	0	0	0	0	0	0	0	0	0
Canadian Entitlement	5,839,760	5,464,510	5,841,735	5,464,510	5,655,510	5,472,150	5,654,555	5,655,510	5,472,150	5,661,310	5,462,459	5,655,510	67,299,669
Suppliers	366,826,057	254,682,483	328,560,020	130,337,976	138,624,177	144,898,880	284,023,126	311,085,972	330,408,407	79,585,080	97,402,618	125,673,772	2,592,108,568

VI-2

PROJECT POWER USE
1976

(in kilowatt hours)

PUMPING PLANT	January	February	March	April	May	June	July	August	September	October	November	December	Total
Cordelia	369,075	357,166	404,673	262,181	248,765	255,421	125,795	174,350	258,784	378,348	396,264	469,086	3,699,908
Tracy State	0	0	0	0	0	0	29,300,000	12,450,000	0	0	0	0	41,750,000
Delta State	76,215,320	53,281,763	69,060,399	8,331,890	11,607,959	5,464,796	6,163,827	39,754,468	63,518,634	25,572,937	28,613,211	21,008,950	408,594,154
USBR	636,786	0	0	0	1,204,722	0	0	0	0	0	0	0	1,841,508
South Bay	9,136,100	12,017,752	16,237,151	12,837,458	14,155,286	14,287,903	15,555,180	13,556,552	13,173,512	7,769,073	6,846,372	7,320,946	142,893,285
Del Valle	23,849	152,300	369,706	41,610	11,601	11,067	15,571	17,708	17,174	120,333	54,405	16,225	851,549
San Luis State	9,626,242	13,783,858	25,115,332	1,571	2,096	2,096	0	2,742,563	21,827,981	14,105,532	7,163,883	4,715	94,375,869
USBR	16,723,758	22,779,142	26,477,668	8,042,429	1,904	1,904	0	472,437	20,642,019	21,254,468	29,954,117	2,002,285	148,352,131
Dos Amigos State	27,192,754	16,667,217	22,680,689	14,644,644	18,490,682	25,430,396	37,213,500	28,794,625	14,115,496	3,534,054	8,097,185	16,136,132	232,997,374
USBR	21,660,246	13,671,783	16,904,311	12,149,356	17,964,916	27,786,962	32,067,500	22,353,375	6,238,504	2,874,946	4,345,815	15,725,868	193,743,582
Las Perillas	931,219	724,023	910,619	682,411	1,219,733	1,635,276	1,980,125	1,473,893	439,680	117,776	222,510	716,986	11,054,251
Badger Hill	2,545,347	1,990,448	2,504,574	1,847,232	3,349,047	4,517,937	5,417,057	4,110,583	1,202,189	244,712	578,471	1,953,571	30,261,168
Buena Vista	24,252,453	17,966,124	24,153,246	13,160,640	15,601,969	20,579,378	28,610,426	25,181,610	19,940,583	4,986,960	5,168,436	10,071,971	209,673,796
Wheeler Ridge	24,644,441	16,202,177	21,973,114	12,982,279	13,305,820	16,209,436	24,172,603	22,916,789	21,631,939	4,849,039	4,862,637	8,929,414	192,679,688
Wind Gap	54,384,728	35,075,681	46,922,435	26,451,942	26,190,616	32,491,463	50,232,557	48,795,267	47,982,254	10,104,584	10,482,054	17,145,639	406,259,220
A. D. Edmonston	192,369,886	121,212,474	164,137,390	90,819,328	87,434,310	107,816,443	169,106,886	163,921,325	167,450,387	35,434,663	36,154,879	59,635,852	1,395,493,823
Osco	14,577,782	9,647,392	12,202,435	9,619,314	6,536,417	3,464,750	11,618,425	9,714,778	11,876,737	2,897,587	3,408,595	1,998,939	97,563,151
Pearblossom	21,190,632	12,780,615	19,127,679	1,378,961	7,091,800	21,563,684	18,925,880	21,751,069	19,252,603	4,593,334	590,983	13,236,788	161,484,028
Devil Canyon (Station Service)	0	20,000	0	60,000	60,000	0	0	0	10,000	0	0	0	150,000
Julian Hinds 1/	0	0	0	0	0	0	0	0	0	0	14,718,699	7,142,301	21,861,000

1/ This facility is owned and operated by Metropolitan Water District of So. Calif. These amounts of energy were exchanged for water delivered to Dudley Ridge Water District from MWDC's entitlement.

VI-1



WATER QUALITY

WATER QUALITY
THERMALITO AFTERBAY AT FEATHER RIVER OUTLET

1976

Constitutents		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Average
Total Dissolved Solids (mg/l)	b	60	66	53	58	40	64	*	65	61	84	100	60	65
Total Hardness (mg/l)	b	35	34	36	38	37	38	*	40	40	40	41	44	38
Chlorides (mg/l)	b	1.4	0.4	0.6	0.0	1.7	1.2	*	1.8	1.8	1.5	2.2	1.7	1.3
Sulfates (mg/l)	b	2.0	4.1	1.3	2.1	3.0	6.9	*	4.9	3.3	4.3	0.3	2.3	3.1
Sodium (%)	b	20	20	17	17	20	19	*	20	20	18	19	19	19
Boron (mg/l)	b	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.1	0.0	0.1	0.02
pH	c	7.2	7.3	8.0	7.4	7.3	7.6	*	7.6	7.6	7.2	7.8	7.3	7.5
Electrical Conductivity (Micromhos)	b	85	85	86	89	90	92	*	96	99	98	100	107	93
Sampling Date		1/21	2/18	3/17	4/21	5/19	6/16	NR	8/18	9/15	10/20	11/17	12/15	

* No analyses made in July

b- Laboratory analysis of monthly samples.

c- Field analysis of monthly samples.

WATER QUALITY
 PUTAH SOUTH CANAL TERMINAL RESERVOIR
 (INFLOW TO NORTH BAY AQUEDUCT)
 1976

Constituents		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Average
Total Dissolved Solids (mg/l)	b	181	190	188	186	178	192	198	194	188	209	177	187	189
Total Hardness (mg/l)	b	159	156	158	160	160	162	162	162	162	163	163	168	161
Chlorides (mg/l)	b	7.1	5.7	5.5	4.4	6.3	6.5	6.0	6.2	5.6	6.2	6.7	6.0	6.0
Sulfates (mg/l)	b	20	21	19	23	20	24	21	21	20	22	19	20	21
Sodium (%)	b	12	12	11	12	12	12	12	13	12	11	13	12	12
Boron (mg/l)	b	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2
pH	c	8.6	8.1	7.3	8.6	8.6	8.9	8.8	8.5	9.1	8.9	8.5	8.9	8.6
Electrical Conductivity (Micromhos)	b	332	328	329	331	351	329	331	324	330	332	331	320 ^c	331
Sampling Date		1/20	2/17	3/16	4/20	5/18	6/15	7/20	8/17	9/14	10/19	11/16	12/14	

b - Laboratory analysis of monthly samples.
 c - Field analysis of monthly samples.

WATER QUALITY
CALIFORNIA AQUEDUCT AT DELTA PUMPING PLANT

1976

Constituents		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Average
Total Dissolved Solids (mg/l)	a	154	177	171	195	175	212	276 ^e	235 ^e	251 ^e	297 ^e	295	352	233
Total Hardness (mg/l)	a	71	79	77	85	78	90	93 ^e	79 ^e	85 ^e	101 ^e	99	120	88
Chlorides (mg/l)	a	29	36	34	41	35	47	80 ^e	64 ^e	71 ^e	89 ^e	88	110	60
Sulfates (mg/l)	a	22	27	25	30	26	34	29 ^e	23 ^e	26 ^e	32 ^e	32	40	29
Sodium (%)	a	43	45	44	46	45	47	56 ^e	56 ^e	57 ^e	58 ^e	58	59	52
Boron (mg/l)	b	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.2	0.2	0.3	0.2
pH	c	7.4	8.7	9.0	7.5	7.7	7.5	7.9	7.8	8.5	7.6	7.9	8.1	8.0
Elect. Cond. (Micromhos)	b	272	328	286	362	301	387	487	427	466	533	580	736	430
Fluoride (mg/l)	b	0.1	0.2	0.1	0.0	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1
Lead (mg/l)	b	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 (mg/l)	b	0.01	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 (mg/l)	b ^d		0.00							0.00				0.00
Arsenic (mg/l)	b	0.01	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 (mg/l)	b	0.04	0.02	0.01	0.01	0.28	0.08	0.24	0.01	0.01	0.01	0.01	0.02	0.06
Manganese (mg/l)	b	0.01	0.01	0.00	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.03	0.02	0.01
Magnesium (mg/l)	b	9	12	9.5	11	10	13	13	13	14	16	18	21	13
Copper (mg/l)	b	0.00	0.00	0.00	0.00	0.03	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01
Calcium (mg/l)	b	16	17	16	18	15	13	14	12	13	13	19	21	16
Zinc (mg/l)	b	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
Phenol (mg/l)	b ^d		0.000							0.001				0.001
Color (units)	b	25	15	10	10	10	20	25	15	8	15	20	25	16
Sampling Date		1/21	2/18	3/17	4/21	5/19	6/16	7/21	8/18	9/15	10/20	11/17	12/15	

- a - Weighted averages resulting from flow and correlation with continuous electrical conductivity.
- b - Laboratory analysis of monthly samples.
- c - Field analysis of monthly samples.
- d - Sampling performed twice annually.
- e - Values changed to reflect revised correlations.

WATER QUALITY
SOUTH BAY AQUEDUCT TERMINAL RESERVOIR

1976

Constituents		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Average
Total Dissolved Solids (mg/l)	a	165	173	174	194	182	198	280 ^e	268 ^e	271 ^e	295 ^b	302 ^b	344	237
Total Hardness (mg/l)	a	76	79	80	87	97	88	98 ^e	90 ^e	92 ^e	144 ^b	114 ^b	117	97
Chlorides (mg/l)	a	35	37	37	43	30	45	82 ^e	77 ^e	79 ^e	55 ^b	94 ^b	107	60
Sulfates (mg/l)	a	26	28	28	32	30	33	30 ^e	28 ^e	29 ^e	41 ^b	38 ^b	39	32
Sodium (%)	a	38	39	35	41	36	38	57 ^e	57 ^e	57 ^e	40 ^b	57 ^b	59	46
Boron (mg/l)	b	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.15
pH	c	8.0	8.4	8.6	8.8	8.0	8.4	7.9	7.7	8.3	8.1	8.2	8.4	8.2
Elect. Cond. (micromhos)	b	272	311	292	361	298	358	465	468	438	482	569	678	416
Fluoride (mg/l)	b	0.1	0.1	0.1	0.0	0.2	0.1	0.2	0.2	0.1	0.2	0.1	0.2	0.1
Lead (mg/l)	b	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 (mg/l)	b	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.01	0.003
Hexavalent Chromium(mg/l)	b		0.00							0.00				0.00
Arsenic (mg/l)	b	0.01	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 (mg/l)	b	0.06	0.02	0.01	0.01	0.29	0.08	0.2	0.01	0.37	0.01	0.00	0.02	0.09
Manganese (mg/l)	b	0.01	0.01	0.00	0.01	0.02	0.01	0.02	0.00	0.00	0.00	0.01	0.01	0.01
Magnesium (mg/l)	b	9	11	8.5	11	10	12	13	13	14	20	17	20	13
Copper (mg/l)	b	0.00	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Calcium (mg/l)	b	17	18	16	17	14	14	15	13	13	24	18	20	17
Zinc (mg/l)	b	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00
Phenol (mg/l)	b									0.006				0.003
Color (units)	b	20	15	15	10	15	15	25	15	10	25	25	20	16
Sampling Date		1/21	2/18	3/17	4/21	5/19	6/16	7/21	8/18	9/15	10/20	11/17	12/14	

- a - Weighted averages resulting from flow and correlation with continuous electrical conductivity.
- b - Laboratory analysis of monthly samples.
- c - Field analysis on monthly samples.
- d - Sampling performed twice annually.
- e - Values changed to reflect revised correlations.

7-11A

WATER QUALITY
CALIFORNIA AQUEDUCT ENTRANCE TO O'NEILL FOREBAY

1976

Constituents		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Average
Total Dissolved Solids (mg/l)	a	147	167	163	159	192	200	199	250 ^e	257 ^e	309 ^e	311	347	225
Total Hardness (mg/l)	a	69	75	74	73	83	85	85	84 ^e	87 ^e	105 ^e	106	118	87
Chlorides (mg/l)	a	28	34	32	31	41	44	43	70 ^e	73 ^e	93 ^e	94	108	58
Sulfates (mg/l)	a	20	26	24	23	32	34	34	26 ^e	27 ^e	34 ^e	34	39	29
Sodium (mg/l)	a	43	45	44	44	47	48	48	57 ^e	57 ^e	58 ^e	58	59	51
Boron (mg/l)	b	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.1
pH	c	7.5	8.1	8.2	8.4	8.1	8.8	8.8	7.9	8.4	8.4	8.5	8.2	8.3
Elect. Cond. (micromhos)	b	270	279	289	301	349	357	390	488	436	529	525 ^c	615	402
Fluoride (mg/l)	b	0.1	0.1	0.1	0.0	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.1
Lead (mg/l)	b	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 (mg/l)	b	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.01	0.00
Hexavalent Chromium (mg/l)	b d		0.00							0.00				0.00
Arsenic (mg/l)	b	0.01	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 (mg/l)	b	0.07	0.02	0.01	0.01	0.19	0.03	0.01	0.01	0.04	0.01	0.01	0.02	0.04
Manganese (mg/l)	b	0.02	0.01	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.01
Magnesium (mg/l)	b	9	10	10	10	11	12	12	14	13	18	15	20	13
Copper (mg/l)	b	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Calcium (mg/l)	b	16	16	15	15	16	17	20	13	13	16	16	17	16
Zinc (mg/l)	b	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00
Phenol (mg/l)	b d		0.000							0.001				0.001
Color (units)	b	20	15	20	10	15	10	5	10	8	15	20	20	14
Sampling Date		1/21	2/18	3/17	4/21	5/19	6/16	7/21	8/18	8/15	10/20	11/17	12/15	

- a - Weighted average resulting from flow and correlation with continuous electrical conductivity
 b - Laboratory analysis of monthly samples.
 c - Field analysis of monthly samples.
 d - Sampling performed twice annually.
 e - Values changed to reflect revised correlations.

WATER QUALITY
CALIFORNIA AQUEDUCT AT CHECK 13

1976

Constituents		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Average
Total Dissolved Solids (mg/l)	a	162	216	213	242	211	215	217	224	272 ^e	332 ^e	358	347	251
Total Hardness (mg/l)	a	75	94	92	102	92	93	94	96	99 ^e	127 ^e	135	134	103
Chlorides (mg/l)	a	34	49	48	56	47	49	49	51	73 ^e	90 ^e	94	94	61
Sulfates (mg/l)	a	22	37	36	44	35	36	37	39	29 ^e	41 ^e	44	44	37
Sodium (%)	a	44	48	48	49	48	48	48	48	54 ^e	55 ^e	55 ^e	55	50
Boron (mg/l)	b	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.1	0.2	0.2
pH	c	7.3	7.5	7.5	7.7	7.8	8.3	8.2	7.7	7.2	7.6	7.5	7.5	7.6
Elect. Cond. (micromhos)	b	307	464	374	506	410	407	400	409	463	616	604	644	467
Fluoride (mg/l)	b	0.1	0.2	0.0	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Lead (mg/l)	b	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 (mg/l)	b	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.003
Hexavalent Chromium(mg/l)	b d		0.00							0.00				0.00
Arsenic (mg/l)	b	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 (mg/l)	b	0.05	0.01	0.01	0.02	0.08	0.01	0.03	0.01	0.02	0.01	0.01	0.01	0.02
Manganese (mg/l)	b	0.01	0.01	0.00	0.01	0.03	0.01	0.01	0.00	0.00	0.03	0.01	0.01	0.01
Magnesium (mg/l)	b	9	13	12	14	12	12	12	12	15	19	17	19	14
Copper (mg/l)	b	0.00	0.02	0.01	0.02	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.01
Calcium (mg/l)	b	17	24	18	25	20	21	21	20	15	22	21	23	21
Zinc (mg/l)	b	0.01	0.00	0.01	0.02	0.01	0.01	0.00	0.02	0.01	0.02	0.01	0.01	0.01
Phenol (mg/l)	b d		0.000											0.000
Color (units)	b	20	15	15	5	5	2	2	2	8	15	20	15	10
Sampling Date		1/21	2/18	3/17	4/21	5/19	6/16	7/21	8/18	8/15	10/20	11/17	12/14	

9-11A

- a - Weighted average resulting from flow and correlation with continuous electrical conductivity.
- b - Laboratory analysis of monthly samples.
- c - Field analysis of monthly samples.
- d - Sampling performed twice annually.
- e - Values changed to reflect revised correlations.

WATER QUALITY
CALIFORNIA AQUEDUCT NEAR KETTLEMAN CITY

1976

Constituents		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Average
Total Dissolved Solids (mg/l)	a	168	215	237	241	225	227	226	234	269 ^e	300 ^e	363	381	257
Total Hardness (mg/l)	a	77	91	98	100	94	95	95	97	98 ^e	111 ^e	135	142	103
Chlorides (mg/l)	a	37	48	55	55	51	52	52	53	72 ^e	81 ^e	98	105	63
Sulfates (mg/l)	a	20	35	43	44	39	39	39	42	28 ^e	34 ^e	44	52	38
Sodium (%)	a	46	48	49	49	49	49	49	49	54 ^e	55 ^e	55	55	51
Boron (mg/l)	b	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2
pH	c	7.5	7.7	7.8	8.4	8.4	8.3	8.3	8.4	7.8	8.8	8.2	7.8	8.1
Elect. Cond. (micromhos)	b	307	361	414	421	414	402	384	408	425	512	624	736	451
Fluoride (mg/l)	b	0.1	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Lead (mg/l)	b	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 (mg/l)	b	0.01	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 (mg/l)	b		0.00							0.00				0.00
Arsenic (mg/l)	b	0.01	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 (mg/l)	b	0.04	0.01	0.01	0.02	0.06	0.02	0.04	0.01	0.01	0.01	0.00	0.01	0.02
Manganese (mg/l)	b	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.00
Magnesium (mg/l)	b	9	10	13	12	12	12	11	10	13	16	18	19	13
Copper (mg/l)	b	0.02	0.01	0.01	0.02	0.08	0.01	0.01	0.02	0.02	0.01	0.03	0.06	0.02
Calcium (mg/l)	b	17	21	19	22	20	21	22	25	15	18	22	27	21
Zinc (mg/l)	b	0.01	0.01	0.01	0.02	0.05	0.02	0.01	0.02	0.02	0.00	0.04	0.10	0.02
Phenol (mg/l)	b		0.000							0.001				0.001
Color (units)	b	15	15	10	5	5	0	2	2	8	15	20	20	10
Sampling Date		1/21	2/18	3/17	4/21	5/19	6/16	7/21	8/18	9/15	10/20	11/17	12/15	

a - Weighted average resulting from flow and correlation with continuous electrical conductivity.

b - Laboratory analysis of monthly samples.

c - Field analysis of monthly samples.

d - Sampling performed twice annually.

e - Values changed to reflect revised correlations.

WATER QUALITY
COASTAL BRANCH AQUEDUCT AT CHECK 5

1976

Constituents		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Average
Total Dissolved Solids (mg/l)	a	159	191	212	226	211	215	216	209	259 ^d	284 ^d	322	342	237
Total Hardness (mg/l)	a	74	85	91	96	91	92	92	90	93 ^d	105 ^d	122	132	97
Chlorides (mg/l)	a	35	44	49	53	49	50	50	48	69 ^d	76 ^d	87	95	59
Sulfates (mg/l)	a	19	29	35	40	35	36	36	34	26 ^d	31 ^d	39	43	34
Sodium (%)	a	44	46	48	49	48	48	48	48	54 ^d	54 ^d	55	55	50
Boron (mg/l)	b	0.1	0.1	0.2	0.2	0.2	0.1	0.2	0.1	0.1	0.2	0.2	0.2	0.2
pH	c	7.5	7.7	8.7	8.2	7.1	8.1 b	7.0	8.0 ^b	7.0	8.6	8.2	7.1	7.8
Elect. Cond. (micromhos)	b	308	357	403	423	406	412	389	417	432	496	579	716	445
Fluoride (mg/l)	b	0.1	0.1	0.0	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Lead (mg/l)	b	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 (mg/l)	b	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00
Hexavalent Chromium (mg/l)	b d									0.00				0.00
Arsenic (mg/l)	b	0.02	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 (mg/l)	b	0.06	0.01	0.00	0.02	0.09	0.03	0.04	0.01	0.04	0.01	0.00	0.01	0.03
Manganese (mg/l)	b	0.01	0.00	0.00	0.00	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Magnesium (mg/l)	b	9	12	10	12	11	13	11	12	13	14	16	20	13
Copper (mg/l)	b	0.00	0.02	0.00	0.00	0.01	0.01	0.02	0.02	0.01	0.06	0.02	0.01	0.02
Calcium (mg/l)	b	17	19	18	22	20	20	22	21	15	18	22	27	20
Zinc (mg/l)	b	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.00	0.00	0.01	0.01	0.01
Phenol (mg/l)	b d		0.000							0.002				0.001
Color (units)	b													
Sampling Date		1/20	2/17	3/16	4/20	5/18	6/15	7/20	8/17	9/14	10/20	11/16	12/14	

a - Weighted average resulting from flow and correlation with continuous electrical conductivity

b - Laboratory analysis of monthly samples.

c - Field analysis of monthly samples

d - Values changed to reflect revised correlations.

WATER QUALITY
CALIFORNIA AQUEDUCT AT CHECK 29

1976

Constituents		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Average
Total Dissolved Solids (mg/l)	a	166	197	237	216	233	227	223	225	261 ^e	276 ^e	264 ^b	372	241
Total Hardness (mg/l)	a	76	85	98	91	97	95	93	94	94 ^e	101 ^e	106 ^b	139	97
Chlorides (mg/l)	a	33	42	54	48	53	51	50	51	69 ^e	74 ^e	80 ^b	104	59
Sulfates (mg/l)	a	22	31	41	36	40	39	36	38	27 ^e	30 ^e	29 ^b	46	35
Sodium (%)	a	44	47	49	48	49	49	48	49	54 ^e	54 ^e	55 ^b	55 ^e	50
Boron (mg/l)	b	0.1	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.1	0.2	0.2	0.3	0.2
pH	c	7.6	8.0	7.9	8.5	7.0	8.0 ^b	7.0	8.0 ^b	7.7 ^b	8.9	7.1	7.2	7.7
Elect. Cond. (micromhos)	b	287	355	407	398	422	401	396	400	430	495	512	692	433
Fluoride (mg/l)	b	0.1	0.2	0.1	0.0	0.2	0.1	0.2	0.2	0.2	0.2	0.1	0.2	0.2
Lead (mg/l)	b	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 (mg/l)	b	0.01	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(mg/l)	b									0.00				0.00
Arsenic (mg/l)	b	0.02	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 (mg/l)	b	0.06	0.00	0.01	0.02	0.08	0.03	0.04	0.01	0.05	0.01	0.00	0.00	0.03
Manganese (mg/l)	b	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Magnesium (mg/l)	b	8	11	8.9	11	11	14	12	12	13	15	14	19	12
Copper (mg/l)	b	0.00	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01
Calcium (mg/l)	b	17	20	19	21	21	18	22	22	15	19	19	27	20
Zinc (mg/l)	b	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.02	0.00
Phenol (mg/l)	b		0.000							0.001				0.001
Color (units)	b	20	10	5	5	0	5	2	5	8	10	20	15	9
Sampling Date		1/20	2/17	3/16	4/20	5/18	6/15	7/20	8/17	9/14	10/20	11/16	12/14	

6-III

- a - Weighted averages resulting from flow and correlation with continuous electrical conductivity.
- b - Laboratory analysis of monthly samples.
- c - Field analysis of monthly samples.
- d - Sampling performed twice annually.
- e - Values changed to reflect revised correlation.

WATER QUALITY
CALIFORNIA AQUEDUCT AT TEHACHAPI AFTERBAY

1976

Constituents		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Average
Total Dissolved Solids (mg/l)	a	145	165	215*	184*	220*	207	205	212*	232 ^e	**	**	351	214
Total Hardness (mg/l)	a	71	78	95*	84*	97*	92	92	94*	92 ^e			134	93
Chlorides (mg/l)	a	29	35	50*	40*	51*	47	46	49*	68 ^e			100	52
Sulfates (mg/l)	a	23	27	38*	31*	39*	36	35	37*	26 ^e			44	34
Sodium (%)	a	24	44	48*	46*	48*	47	47	48*	54 ^e			55	46
Boron (mg/l)	b	0.1	0.2	0.14	0.2	0.2	0.2	0.2	0.1	0.2			0.1	0.2
pH	c	8.5	8.3	8.3	8.7	8.7	8.7	9.0	8.8	8.8			8.6	8.6
Elect. Cond. (micromhos)	b	304	305	419	382	394	404	401	419	449			656	413
Fluoride (mg/l)	b	0.1	0.3	0.2	0.2	0.3	0.3	0.1	0.1	0.2			0.2	0.2
Lead (mg/l)	b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	0.00
Selenium (mg/l)	b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	0.00
Hexavalent Chromium (mg/l)	b d	0.00												0.00
Arsenic (mg/l)	b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	0.00
Iron (mg/l)	b	0.03	0.03	0.03	0.02	0.01	0.02	0.03	0.01	0.03			0.01	0.02
Manganese (mg/l)	b	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.03	0.01			0.00	0.01
Magnesium (mg/l)	b	9	9	12	10	12	11	11	11	11			17	11
Copper (mg/l)	b	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01			0.01	0.01
Calcium (mg/l)	b	17	19	23	23	19	24	23	24	18			26	22
Zinc (mg/l)	b	0.01	0.01	0.03	0.00	0.01	0.01	0.00	0.02	0.00			0.01	0.01
Phenol (mg/l)	b d	0.000												0.000
Color (units)	b	9	9	6	8	7	5	4	6	12			9	
Sampling Date		1/21	2/18	3/17	4/21	5/19	6/16	7/21	8/18	9/15			12/14	

a - Weighted averages resulting from flow and correlation with continuous electrical conductivity.

b - Laboratory analysis of monthly samples.

c - Field analysis of monthly samples.

d - Sampling performed twice annually.

e - Values changed to reflect revised correlations.

* Values changed to reflect footnote "A"

** Afterbay drained 10/8/76.

01-11A

WATER QUALITY
PYRAMID LAKE AT ENTRANCE TO ANGELES TUNNEL

1976

Constituents		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Average
Total Dissolved Solids (mg/l)	b	195	194	217	226	291	235	257	257	242	252	252	299	243
Total Hardness (mg/l)	b	96	93	103	106	110	107	105	108	107	111	114	114	106
Chlorides (mg/l)	b	39	37	42	45	56	53	54	55	60	61	61	61	52
Sulfates (mg/l)	b	33	36	41	41	44	43	42	42	38	38	41	41	40
Sodium (%)	b	41	42	42	43	45	46	46	46	48	46	46	47	45
Boron (mg/l)	b	0.2	0.2	0.2	0.2	0.1	0.3	0.2	0.2	0.1	0.2	0.2	0.2	0.02
pH	c	8.5	8.4	8.6	9.1	9.2	9.0	9.1	9.0	8.9	8.5	8.4	8.1	8.7
Elect. Cond. (micromhos)	b	354	351	382	390 c	421	418	419	424	443	444	452	466	414
Fluoride (mg/l)	b	0.2	0.4	0.2	0.2	0.3	0.3	0.1	0.3	0.2	0.2	0.2	0.2	0.2
Lead (mg/l)	b	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 (mg/l)	b	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 (mg/l)	b	0.00												0.00
Arsenic (mg/l)	b	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 (mg/l)	b	0.01	0.01	0.02	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.03	0.00	0.01
Manganese (mg/l)	b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00
Magnesium (mg/l)	b	10	9	11	13	12	12	11	11	12	13	13	13	12
Copper (mg/l)	b	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00
Calcium (mg/l)	b	22	22	23	21	24	23	24	25	23	23	24	24	23
Zinc (mg/l)	b	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.01	0.00	0.01	0.00
Phenol (mg/l)	b	0.000												0.000
Color (units)	b	5	2	8	6	9	5	5	4	5	6	4	3	
Sampling Date		1/23	2/18	3/16	4/20	5/22	6/15	7/20	8/17	9.14	10/20	11/16	12/13	

b - Laboratory analysis of monthly samples.
c - Field analysis of monthly samples.
d - Sampling performed twice annually.

WATER QUALITY
CASTAIC LAKE AT OUTLET WORKS

1976

Constituents		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Average
Total Dissolved Solids (mg/l)	b	252	237	250	240	224	243	281	258	250	267	254	311	256
Total Hardness (mg/l)	b	129	125	125	129	125	131	130	129	126	135	131	131	129
Chlorides (mg/l)	b	45	44	43	43	42	43	45	48	47	48	48	47	45
Sulfates (mg/l)	b	60	55	55	58	58	61	62	61	60	58	61	60	59
Sodium (%)	b	39	39	38	37	39	38	39	40	40	37	40	40	39
Boron (mg/l)	b	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.2
pH	c	8.2	8.2	8.3	8.6	9.4	8.8	9.1	9.0	8.9	8.5	8.2	8.1	8.6
Elect. Cond. (micromhos)	b	450	433	430	424	417	435	439	442	449	444	458	466	441
Fluoride (mg/l)	b	0.3	0.4	0.3	0.3	0.3	0.4	0.2	0.3	0.3	0.2	0.2	0.3	0.3
Lead (mg/l)	b	0.01	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 (mg/l)	b	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 (mg/l)	b	0.00												0.00
Arsenic (mg/l)	d	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 (mg/l)	b	0.01	0.01	0.01	0.00	0.01	0.01	0.02	0.01	0.01	0.01	0.00	0.00	0.01
Manganese (mg/l)	b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.00	0.00	0.00
Magnesium (mg/l)	b	13	12	12	13	12	13	12	13	13	14	13	13	13
Copper (mg/l)	b	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
Calcium (mg/l)	b	30	30	30	30	30	31	32	30	29	31	31	31	30
Zinc (mg/l)	b	0.00	0.01	0.02	0.01	0.00	0.00	0.00	0.05	0.01	0.00	0.00	0.00	0.01
Phenol (mg/l)	b	0.004												0.004
Color (units)	d	5	2	4	5	8	4	5	5	5	5	4	3	5
Sampling Date	b	1/21	2/16	3/15	4/19	5/18	6/14	7/19	8/16	9/14	10/18	11/15	12/13	

b - Laboratory analysis of monthly samples.
c - Field analysis of monthly samples.
d - Sampling performed twice annually.

WATER QUALITY
CALIFORNIA AQUEDUCT AT PEARBLOSSOM PUMPING PLANT

1976

Constituents		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Average
Total Dissolved Solids (mg/l)	b	183	178	279	*	188	243	251	246	257	277	283	399	253
Total Hardness (mg/l)	b	79	86	110		95	105	103	104	97	105	109	130	102
Chlorides (mg/l)	b	32	34	59		50	57	51	56	79	80	84	105	62
Sulfates (mg/l)	b	32	33	48		37	37	37	38	31	29	31	45	36
Sodium (%)	b	40	40	47		47	48	46	47	54	52	53	55	48
Boron (mg/l)	b	0.1	0.1	0.2		0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.2
pH	c	8.5	8.3	8.5		9.2	8.8	8.9	8.8	8.8	8.6	8.6	8.5	8.7
Elect. Cond. (micromhos)	b	294	308	447		373	424	404	419	474	433	498	639	428
Fluoride (mg/l)	b	0.1	0.3	0.1		0.3	0.3	0.1	0.2	0.2	0.2	0.2	0.2	0.2
Lead (mg/l)	b	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 (mg/l)	b	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 (mg/l)	b	0.00												0.00
	d													
Arsenic (mg/l)	b	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 (mg/l)	b	0.03	0.02	0.02		0.01	0.02	0.07	0.01	0.04	0.01	0.01	0.02	0.02
Manganese (mg/l)	b	0.00	0.00	0.01		0.00	0.00	0.01	0.02	0.01	0.02	0.01	0.01	0.01
Magnesium (mg/l)	b	9	9	12		12	11	11	10	12	14	15	17	12
Copper (mg/l)	b	0.00	0.00	0.01		0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.01
Calcium (mg/l)	b	17	19	24		18	24	23	25	19	19	19	24	21
Zinc (mg/l)	b	0.00	0.00	0.02		0.00	0.02	0.00	0.00	0.01	0.00	0.01	0.01	0.01
Phenol (mg/l)	b	0.000												0.000
	d													
Color (units)	b	6	7	10		5	4	4	6	16	7	5	10	
Sampling Date		1/21	2/18	3/17		5/19	6/16	7/21	8/18	9/15	10/20	11/17	12/14	

b - Laboratory analysis of monthly samples.
c - Field analysis of monthly samples.
d - Sampling performed twice annually.
* - Pool was dewatered during April.

WATER QUALITY
CALIFORNIA AQUEDUCT AT INLET TO MOJAVE SIPHON

1976

Constituents		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Average
Total Dissolved Solids (mg/l)	b	162	169	245	240	198	221	242	260	247	283	264	392	244
Total Hardness (mg/l)	b	74	81	113	108	96	105	103	105	99	108	107	130	102
Chlorides (mg/l)	b	28	33	58	57	55	54	51	54	80	81	85	105	62
Sulfates (mg/l)	b	27	31	47	45	39	36	39	38	30	27	29	48	36
Sodium (%)	b	38	41	45	47	49	46	46	46	54	52	54	56	48
Boron (mg/l)	b	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
pH	c	8.5	8.3	8.5	8.7	9.2	8.7	8.9	8.8	8.8	8.6	8.5	8.5	8.7
Elect. Cond. (micromhos)	b	276	300	447	419	398	408	404	408	461	489	498	649	430
Fluoride (mg/l)	b	0.1	0.3	0.2	0.2	0.3	0.3	0.1	0.2	0.1	0.2	0.2	0.2	0.2
Lead (mg/l)	b	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 (mg/l)	b	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 (mg/l)	b	0.00												0.00
Arsenic (mg/l)	b	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 (mg/l)	b	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.01	0.03	0.02	0.07	0.01	0.02
Manganese (mg/l)	b	0.02	0.00	0.00	0.02	0.00	0.00	0.01	0.05	0.02	0.01	0.01	0.00	0.01
Magnesium (mg/l)	b	8	8	14	11	13	12	11	11	13	14	15	17	13
Copper (mg/l)	b	0.01	0.00	0.02	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.01	0.01
Calcium (mg/l)	b	16	19	22	25	17	22	23	24	18	20	18	24	23
Zinc (mg/l)	b	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.01	0.02	0.00	0.01	0.01	0.01
Phenol (mg/l)	b	0.000												0.000
Color (units)	b	8	8	7	7		4	5	5	12	7	5	9	7
Sampling Date		1/21	2/18	3/17	4/21	5/19	6/16	7/21	8/18	9/15	10/20	11/17	12/14	

b - Laboratory analysis of monthly samples.
c - Field analysis of monthly samples.
d - Sampling performed twice annually.

7T-11A

WATER QUALITY
SILVERWOOD LAKE AT OUTLET TO MOJAVE RIVER

1976

Constituents		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Average
Total Dissolved Solids (mg/l)	b	171	161	139	186	166	202	256	234	227	237	231	285	208
Total Hardness (mg/l)	b	83	79	89	89	89	98	101	102	100	101	104	105	95
Chlorides (mg/l)	b	34	34	36	41	40	47	51	51	58	62	62	63	48
Sulfates (mg/l)	b	28	26	31	34	34	36	37	37	36	31	33	33	33
Sodium (%)	b	41	43	42	45	45	45	46	46	49	48	48	49	46
Boron (mg/l)	b	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.2	0.1	0.1
pH	c	8.7	8.5	8.3	9.6	9.5	8.8 b	9.0	8.9	8.7	8.5	8.2	7.6	8.7
Elect. Cond. (micromhos)	b	312	297	326	344	342	372	401	408	427	422	425	455	378
Fluoride (mg/l)	b	0.1	0.3	0.1	0.1	0.3	0.3	0.1	0.2	0.2	0.2	0.2	0.2	0.2
Lead (mg/l)	b	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 (mg/l)	b	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(mg/l)	b	0.00												0.00
	d													
Arsenic (mg/l)	b	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 (mg/l)	b	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.00	0.01	0.00	0.00	0.01	0.01
Manganese (mg/l)	b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Magnesium (mg/l)	b	9	8	10	9	9	11	10	12	11	10	13	12	10
Copper (mg/l)	b	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00
Calcium (mg/l)	b	18	18	19	21	21	21	24	21	22	24	20	22	21
Zinc (mg/l)	b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Phenol (mg/l)	b	0.002												0.002
	d													
Color (units)	b	5	7	7	5	6	5	5	5	5	6	4	5	5
Sampling Date		1/19	2/17	3/15	4/19	5/17	6/14	7/19	8/16	9/13	10/18	11/15	12/13	

b - Laboratory analysis of monthly samples.
c - Field analysis of monthly samples.
d - Sampling performed twice annually.

VI-15

WATER QUALITY
SILVERWOOD LAKE AT INLET TO SAN BERNARDINO TUNNEL

1976

Constituents		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Average
Total Dissolved Solids (mg/l)	b	170	146	112	185	151	185	239	227	218	231	210	280	196
Total Hardness (mg/l)	b	84	77	84	92	89	98	101	104	100	102	100	105	95
Chlorides (mg/l)	b	35	32	33	40	40	46	51	52	55	62	62	60	47
Sulfates (mg/l)	b	26	26	28	33	35	36	37	37	34	32	34	31	32
Sodium (%)	b	41	44	42	43	45	45	46	46	48	48	49	48	45
Boron (mg/l)	b	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.2	0.1	0.2	0.2	0.2
pH	c	8.8	8.2	8.6	9.8	9.6	8.7 b	8.0 b	8.9	9.2	8.8	8.0	8.2	8.7
Elect. Cond. (micromhos)	b	318	290	306	340	342	368	401	408	416	422	425	437	373
Fluoride (mg/l)	b	0.1	0.4	0.1	0.2	0.3	0.3	0.1	0.2	0.2	0.2	0.2	0.2	0.2
Lead (mg/l)	b	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 (mg/l)	b	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(mg/l)	b	0.00												0.00
Arsenic (mg/l)	b d	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 (mg/l)	b	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.00	0.00	0.00	0.01
Manganese (mg/l)	b	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 (mg/l)	b	9	7	8	10	9	11	10	10	11	12	12	12	10
Copper (mg/l)	b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
Calcium (mg/l)	b	19	20	20	21	21	21	24	25	22	21	20	22	21
Zinc (mg/l)	b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00
Phenol (mg/l)	b	0.000												0.000
Color (units)	b d	5	6	6	4	6	4	5	5	6	6	4	4	5
Sampling Date		1/19	2/17	3/15	4/19	5/17	6/14	7/19	8/16	9/13	10/18	11/15	12/13	

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b - Laboratory analysis of monthly samples.
c - Field analysis of monthly samples.
d - Sampling performed twice annually.

WATER QUALITY
DEVIL CANYON AFTERBAY

1976

Constituents	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Average
Total Dissolved Solids (mg/l)	b 173	160	179	*	**	186	240	254	207	254	234	277	216
Total Hardness (mg/l)	b 81	79	93			96	103	103	100	102	102	102	96
Chlorides (mg/l)	b 34	32	35			45	51	53	56	62	62	60	49
Sulfates (mg/l)	b 27	25	30			35	37	38	35	30	33	32	32
Sodium (%)	b 43	41	39			44	45	47	47	48	49	49	45
Boron (mg/l)	b 0.1	0.1	0.1			0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1
pH	c 8.5	8.3	8.5			8.8	8.8	8.8	8.7	7.9	8.5	8.5	8.6
Elect. Cond. (micromhos)	b 315	292	323			364	401	408	405	427	425	446	381
Fluoride (mg/l)	b 0.1	0.3	0.1			0.0	0.1	0.2	0.2	0.2	0.2	0.3	0.2
Lead (mg/l)	b 0.01	0.00	0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Selenium (mg/l)	b 0.00	0.00	0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hexavalent Chromium (mg/l)	b 0.00												0.00
Arsenic (mg/l)	b 0.00	0.00	0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Iron (mg/l)	b 0.02	0.02	0.02			0.01	0.01	0.02	0.30	0.00	0.00	0.01	0.04
Manganese (mg/l)	b 0.00	0.00	0.00			0.00	0.00	0.02	0.00	0.01	0.01	0.00	0.00
Magnesium (mg/l)	b 9	8	11			10	11	11	11	12	12	12	11
Copper (mg/l)	b 0.01	0.00	0.01			0.00	0.01	0.01	0.03	0.00	0.01	0.01	0.01
Calcium (mg/l)	b 18	18	19			22	23	23	22	21	21	21	21
Zinc (mg/l)	b 0.02	0.00	0.01			0.00	0.00	0.05	0.02	0.01	0.01	0.01	0.01
Phenol (mg/l)	b 0.000												0.000
Color (units)	b 5	5	5			3	4	4	4	5	5	4	4
Sampling Date	1/21	2/18	3/17				7/21	8/18	9/13	10/20	11/17	12/14	

b - Laboratory analysis of monthly samples.

c - Field analysis of monthly samples.

d - Sampling performed twice annually.

* - No operation at this location during April.

** - No operation in May

WATER QUALITY
LAKE PERRIS AT INLET

1976

Constituents		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Average
Total Dissolved Solids (mg/l)	b	260	257	229	268	250	260	301	289	279	308	283	336	277
Total Hardness (mg/l)	b	126	129	130	130	129	133	124	130	130	137	133	137	131
Chlorides (mg/l)	b	62	63	63	63	64	67	69	70	71	71	71	68	67
Sulfates (mg/l)	b	44	43	43	43	46	46	48	47	46	44	45	44	45
Sodium (%)	b	45	45	45	45	47	46	49	48	48	45	47	46	46
Boron (mg/l)	b	0.2	0.2	0.2	0.1	0.3	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2
pH	c	9.0	9.0	8.7	9.0	9.0	8.9 b	9.0	8.9	9.3	8.9	8.4	8.2	8.9
Elect. Cond. (micromhos)	b	497	494	492	498	508	514	514	527	533	528	528	549	515
Fluoride (mg/l)	b	0.2	0.4	0.2	0.3	0.4	0.3	0.1	0.3	0.3	0.2	0.2	0.2	0.3
Lead (mg/l)	b	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 (mg/l)	b	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(mg/l)	b													0.00
Arsenic (mg/l)	d b	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 (mg/l)	b	0.00	0.00	0.01	0.00	0.01	0.01	0.03	0.01	0.01	0.00	0.00	0.00	0.01
Manganese (mg/l)	b	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 (mg/l)	b	13	13	14	12	13	14	13	14	14	15	14	15	14
Copper (mg/l)	b	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
Calcium (mg/l)	b	29	30	29	32	30	30	28	29	29	30	30	30	30
Zinc (mg/l)	b	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
Phenol (mg/l)	b	0.000												0.000
Color (units)	d b	5	3	4	6	5	1	5	5	5	5	4	5	4
Sampling Date		1/20	2/18	3/16	4/20	5/18	6/15	7/20	8/17	9/14	10/19	11/16	12/14	

b - Laboratory analysis of monthly samples.

c - Field analysis of monthly samples.

d - Sampling performed twice annually.

WATER QUALITY
PESTICIDES IN CALIFORNIA AQUEDUCT
(Parts per Trillion)
1976

Station	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Delta Pumping Plant Chlorinated Hydrocarbons Organic Phosphorous Herbicides	0	0	0	0	10 0	10 30	115 5	20 0		0		
South Bay Aqueduct - Santa Clara Terminal Tank Chlorinated Hydrocarbons Organic Phosphorous	0	0	0	0	0 0	0 30	70 40	0 15		15		
Entrance to O'Neill Forebay (Check 12) Chlorinated Hydrocarbons Organic Phosphorous	0	0	0	0	30 0	40 0	80 5	55 0		0		
Discharge from O'Neill P.P. Chlorinated Hydrocarbons/other Organic Phosphorous	0	0	15	0	/55 140		0 20	0 0	0 0	0		0
Pole Line Road Chlorinated Hydrocarbons Organic Phosphorous	0	0	0	0	0 15	0 20	0 25	0 0	0 0			15
Near Kettleman City (Check 21) Chlorinated Hydrocarbons Organic Phosphorous Herbicides	0 0	0 0	0	0	0 10	5 20	260 20	0 0	0 0			30 100
Near Buena Vista P.P. (Check 29) Chlorinated Hydrocarbons Organic Phosphorous	0	200 0	0	0	5	55 0	25	0		0		
Tehachapi Afterbay Chlorinated Hydrocarbons Organic Phosphorous/Herbicides	0/0	0/15	10/	20/	0 15/	0 20/	0 15/	0 0/	0 0			
Pearblossom Pumping Plant Chlorinated Hydrocarbons Organic Phosphorous Herbicides	0 0	0 860	0	15	95 0	15 30	0 25	0 0	0 0			0
Inlet to Mojave Siphon (Check 62) Chlorinated Hydrocarbons Organic Phosphorous Herbicides	0 0	0 640	0	0	0 0	10 40	0 30	0 30	0 0	0		0