

State of California  
The Resources Agency

DEPARTMENT OF WATER RESOURCES  
Division of Operations and Maintenance

# **STATE WATER PROJECT ANNUAL REPORT OF OPERATIONS 1996**

July 2000

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State of California

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## Abbreviations and Units

The following abbreviations are commonly used throughout this report.

|                     |                                                    |
|---------------------|----------------------------------------------------|
| AF                  | acre-feet                                          |
| Banks               | Harvey O. Banks Delta Pumping Plant                |
| California Aqueduct | Governor Edmund G. Brown California Aqueduct       |
| CVP                 | Central Valley Project                             |
| cfs                 | cubic feet per second                              |
| D-1485              | Water Rights Decision 1485                         |
| DFG                 | Department of Fish and Game                        |
| DOI                 | Delta Outflow Index                                |
| DPR                 | Department of Parks and Recreation                 |
| DWR                 | Department of Water Resources                      |
| DO                  | dissolved oxygen                                   |
| EC                  | electrical conductivity                            |
| FRSA                | Feather River Service Area                         |
| ft                  | feet                                               |
| KCWA                | Kern County Water Agency                           |
| kv                  | kilovolt                                           |
| kW                  | kilowatt                                           |
| kWh                 | kilowatt-hour                                      |
| LADWP               | Los Angeles Department of Water and Power          |
| MAF                 | million acre-feet                                  |
| MW                  | megawatt                                           |
| MWh                 | megawatthour                                       |
| MWDSC               | Metropolitan Water District of Southern California |
| NDOI                | Net Delta Outflow Index                            |
| PG&E                | Pacific Gas and Electric Company                   |
| SCE                 | Southern California Edison                         |
| SDWA                | South Delta Water Agency                           |
| SRI                 | Sacramento River Index                             |
| SWP                 | State Water Project                                |
| SWRCB               | State Water Resources Control Board                |
| USBR                | United States Bureau of Reclamation                |

## *Introduction*

The 1996 Annual Report of Operations for the State Water Project is divided into seven parts. The first two parts, "Highlights of 1996 Operation" and "Project Status in 1996," cover conditions and events of statewide significance. The following three sections cover water conditions, water operations, and energy operations in 1996. The sixth part, "Sacramento-San Joaquin Delta Operations," gives special emphasis to Delta operations, a key aspect of the SWP. The last part, "Project Operations by Field Division," provides details on activities by field division as outlined on Map 2.

### *Highlights of 1996 Operation*

On July 5, 1996, the Department of Water Resources marked its 40<sup>th</sup> year of service to the people of California. When created by legislative mandate in 1956, DWR focused on investigating the State's water resources and planning a project that would convey water from the North, with its abundant supplies, to the arid South.

In 1957, DWR completed *The California Water Plan*. This plan, together with plans for a proposed Feather River Project, became the basis for the SWP. Although construction began on the SWP in 1957, it was not officially authorized until the passage of the Burns-Porter Act in 1959 and a \$1.75 billion bond issue in 1960. Today, the SWP is the largest state-built, multipurpose project in the nation.

Operating and maintaining the SWP, as well as administering its long-term contracts, is DWR's major focus. However, its responsibilities also include water quality improvement, water management strategies, flood control, flood forecasting, local assistance programs, environmental protection, water conservation, dam safety, and public education.

Managing available water supplies during the 1987-1992 drought required activities designed to make the most beneficial use of water available to the SWP. DWR initially structured its plan of operations according to the concept of a firm yield. Firm yield is the quantity of water that can be made available on a firm annual basis to water contractors during a drought period. In 1991, after years of discussion, DWR changed its method of determining delivery amounts and replaced the concept of firm yield with the concept of variable yield. Operating on the basis of a variable yield makes efficient use of available water supplies during a drought. DWR also developed programs to compensate for the lack of storage facilities. These programs include water transfers, exchanges, loans, storage, purchases, and carry-over entitlement for delivery at a later date.

Total original requests for entitlement water were about 2.69 MAF. The initial allocation in December

1995 provided for 75 percent of Table A entitlements or 2.24 MAF. On March 4, 1996, due to increased supplies, DWR approved 90 percent of 1996 Table A entitlements or 2.51 MAF. On March 8, due to updated Snow Survey information, DWR approved 100 percent of Table A or initial request, whichever is less. DWR made the final allocation of 2.7 MAF.

DWR and USBR declared balanced Delta water conditions three times during 1996: from May 3 to May 7, from July 1 to August 15, and from October 13 to October 30. This is the twelfth out of the last thirteen years that balanced water conditions were declared.

The SWP depends on a complex system of dams, reservoirs, power plants, pumping plants, canals, and aqueducts to deliver water. Although initial transportation facilities were essentially completed in 1973, other facilities have been constructed since then and still others are under construction or are scheduled to be built as needed. The SWP facilities now comprise 27 dams and reservoirs, 25 pumping and generating plants, and nearly 600 miles of aqueducts.

Energy resources totaled 10,493,667 MWh which included generation of 6,736,873 MWh from SWP energy resources, purchases of 1,030,761 MWh, other resources of 271,971 MWh, and 2,454,094 MWh of SCE return additional (see Figure 4). Energy loads of 10,493,667 MWh include sales of 4,558,971 MWh, project loads of 5,699,220 MWh, losses of 229,867 MWh, and 5,609 MWh of deviation (see Figure 6).

SWP facilities delivered 4,850,521 AF of water to 40 agencies, including 25 long-term water contractors, in 1996 as shown on Table 2. This amount is approximately 781 TAF more than the total State and federal water deliveries from the SWP in 1995. State contractor deliveries were 2,427,830 AF; including 2,195,550 AF of entitlement water and 232,280 AF of other water; excluding Joint Facilities and prior water right deliveries. See the "*Water Deliveries and Aqueduct Operations*" section for more details on water deliveries.

## *Project Status in 1996*

### *Project Facilities*

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

SWP facilities in operation during 1996 included: 27 water storage facilities, 3 pumping-generating plants, 5 power plants, 17 pumping plants, and nearly 600 miles of aqueduct.

The SWP begins with three small lakes on the Feather River tributaries: Lake Davis, Frenchman Lake, and Antelope Lake. The branches and forks of the Feather River flow into Lake Oroville, the SWP's principal reservoir with a capacity of about 3.5 MAF. From Oroville, water flows through a complex system of power plants, then down the Feather River into the Sacramento River before reaching the Delta. From the northern Delta, water is supplied to Napa and Solano counties through the North Bay Aqueduct.

Near Byron, in the southern Delta, the SWP diverts water into Clifton Court Forebay for delivery south of the Delta. The Banks Pumping Plant lifts water into Bethany Reservoir. It is then lifted by the South Bay Pumping Plant into the South Bay Aqueduct. Through the South Bay Aqueduct water is supplied to Alameda and Santa Clara Counties. Most of the water from the Bethany Reservoir, however, flows into the Governor Edmund G. Brown California Aqueduct. At O'Neill Forebay, part of the water is pumped through the Gianelli Pumping-Generating Plant for storage in San Luis Reservoir until needed. DWR's share of storage in the reservoir is 1,062,183 AF.

Water not stored in San Luis Reservoir continues its flow south and is raised 1,069 ft by four pumping plants: Dos Amigos, Buena Vista, Teerink, and Chrisman. In the southern San Joaquin Valley, the Coastal Branch Aqueduct serves agricultural areas west of the California Aqueduct. At the Tehachapi Mountains, Edmonston Pumping Plant raises the water 1,926 ft and the water enters 8.5 miles of tunnels and siphons. Once the water has crossed the Tehachapi Mountains, it flows through the California Aqueduct into the Antelope Valley.

The California Aqueduct then divides into two branches, the East Branch and West Branch. The East Branch carries water through the Antelope Valley into

Silverwood Lake. From Silverwood Lake, the water enters the San Bernardino Tunnel and drops 1,418 ft into Devil Canyon Powerplant, then to Lake Perris, SWP's southernmost reservoir.

Water in the West Branch flows through Warne Powerplant into Pyramid Lake. From Pyramid Lake the water flows through the Angeles Tunnel and Castaic Powerplant into Castaic Lake, terminus of the West Branch. For the location of facilities cited here, see Map 1.

Lake Oroville and San Luis Reservoir are the primary conservation facilities of the SWP's 27 dams and reservoirs. The remaining 25 dams and reservoirs are used principally to regulate the conserved supply into water delivery patterns designed to fit local needs. Of those 25, the five largest are Lake Del Valle, located in Alameda County; and Pyramid Lake, Castaic Lake, Silverwood Lake, and Lake Perris, in Southern California. Lake Del Valle is approximately four miles from the city of Livermore. The four southern reservoirs--Pyramid Lake, Castaic Lake, Silverwood Lake, and Lake Perris--are near the metropolitan areas of southern California, where water supplies are mainly imported. Information about these reservoirs, including amounts of unimpaired runoff to Lake Oroville and storage levels for SWP's conservation, and other storage facilities are summarized in this report.

### *Outages and Limitations*

Major outages, construction, and operating limitations of SWP facilities during 1996 were:

#### *January*

- Hyatt Unit 1 out of service from November 23, 1995 to January 3 for annual maintenance, stator rewedged, and turbine inspection and repair.
- Thermalito Unit 4 out of service from December 21, 1995 to January 30 for annual maintenance, modification, and repairs.
- Devil Canyon Unit 3 out of service from January 2 to February 1 for annual electrical preventive maintenance.
- Pine Flat Unit 2 out of service from January 2 to January 31 for annual maintenance.
- South Bay Unit 8 out of service from January 8 to March 8 to refurbish and replace motor.
- Gianelli No. 2 penstock and Units 3 & 4 out of service from January 9 to January 18 to inspect

penstock, preventive maintenance on Unit 3, and complete overhaul of Unit 4.

- Las Perillas Unit 3 out of service from January 10 to February 7 for annual maintenance.
- Hyatt Unit 6 out of service from January 18 to March 13 for annual maintenance.
- Las Perillas Unit 4 out of service from January 31 to February 7 to replace motor lower guide bearing oil tub high lateral gaskets.

### ***February***

- Thermalito Unit 3 out of service from February 5 to May 15 for annual maintenance, stator rewedge, and rotor/stator alignment.
- Las Perillas Unit 6 out of service from February 8 to March 7 for annual maintenance and repair of sluice gate.
- Teerink Unit No. 6 and No. 4 discharge line out of service from February 8 to November 1 for pump refurbishment and discharge valve work.
- Gianelli Units 3 & 4, and No. 3 headgate and penstock out of service from February 13 to March 14 for biannual maintenance on Unit 3, overhaul on Unit 4 and to replace bushings in the headgate.
- Chrisman Unit 6 & 7, and No. 3 discharge line out of service from February 26 to March 5 to repair Unit 7 discharge valve upstream seat "O" ring.

### ***March***

- Chrisman Unit 6 out of service from March 2 to March 8 to replace hot water bypass valve.
- Dos Amigos Unit 6 out of service from March 4 to May 31 to remove and repair exciter and repair scroll case and stay vane area.
- Pine Flat Unit 3 out of service from March 6 to March 22 to check exciter and meggar field.
- Dos Amigos Unit 2 out of service from March 8 to April 19 for biennial maintenance and install new regulator.
- Pearblossom Unit 8 & 9 out of service from March 11 to April 26 to clean and recoat inside pump bearing oil tub.
- Badger Hill Unit 6 out of service from March 14 to March 21 to replace pump unwatering valve packing.
- Banks Unit 11 out of service from March 14 to April 5 for annual mechanical and electrical maintenance.
- Gianelli Unit 4 out of service from March 14 to May 7 to overhaul pump and scroll case.

- Banks Unit 10 out of service from March 15 to April 5 for annual maintenance and change oil in motor and pump oil tubs.
- Hyatt Unit 5 out of service out of service from March 18 to April 24 for annual maintenance.
- Dos Amigos Unit 4 out of service out of service from March 27 to April 5 to remove, wire for instrumentation, and reinstall three poles for hub shaft measurements.

### ***April***

- Los Perillas Unit 4 out of service out of service from April 4 to May 3 for annual maintenance and to inspect impeller.
- Banks Unit 1 through 7 out of service out of service from April 22 to May 20 to change oil in discharge valve hydraulic system and clean accumulator and reservoir.
- Pyramid Dam spillway out of service out of service from April 22 to July 19 to perform dam spillway repairs.
- Hyatt Unit 2 out of service out of service from April 25 to May 28 for annual maintenance.
- Las Perillas Unit 5 out of service out of service from April 25 to May 17 for annual maintenance.
- Ried Gardner Unit 4 out of service out of service from April 26 to May 24 for spring inspection and maintenance.

### ***May***

- Edmonston Unit 14 out of service out of service from May 8 to July 8 to replace parts in generator induction motor.
- Banks Units 8 through 11 out of service out of service from May 14 to May 24 to change oil in discharge valve hydraulic system and clean accumulator and reservoir.
- Check 31, Gate No. 2 out of service out of service from May 17 to July 19 to remove Gate 2 for repairs, blasting, recoating and installing sacrificial anodes.
- Check 32, Gate No. 2 out of service out of service from May 17 to July 19 to remove Gate 2 for repairs, blasting, recoating and installing sacrificial anodes.
- Hyatt Unit 6 out of service out of service from May 20 to May 30 to inspect unit bearings, turbine, scroll case, and draft tube.
- Dos Amigos Unit 3 out of service out of service from May 28 to December 31 to repair hub/shaft fit and repair rotor rim.

### ***June***

- Banks Unit 6 out of service from June 2 to Dec 31 to change out impeller and work on stay vanes.
- Pearblossom Unit 7 out of service from June 3 to September 1 to visually check wear rings and swing check, and to check pump and motor for plumbness, and check diffuser clearances and gaps.
- Edmonston Units 1,2,3, & 4 out of service from June 17 to June 28 for divers to remove silt from Unit 4 intake.

### ***July***

- Oso Unit 3 out of service from July 1 to August 2 to remove rotor for inspection and repair.
- Oso Unit 4 out of service from July 1 to August 2 to remove rotor for inspection and repair.
- Buena Vista Unit 9 out of service from July 17 to August 16 for annual maintenance and to replace impeller.

### ***August***

- Gianelli Units 1 & 2 out of service from August 29 to September 3 for biennial maintenance on Units 1 & 2 and No. 1 penstock butterfly valves.

### ***September***

- South Bay Unit 6 out of service from September 3 to December 2 to remove motor and replace remote temperature device.
- Banks Unit 8 out of service from September 6 to September 13 for trip testing.
- Banks Unit 9 out of service from September 9 to September 13 to shim motor pole wedges.
- South Bay Units 5 through 9 out of service from September 9 to December 2 to replace Stage 2 bus work and Units 5 through 9 switchgear.
- Gianelli Unit 2 out of service from September 13 to October 2 to complete annual maintenance.
- Hyatt Units No. 1 penstock out of service from September 15 to December 14 for annual maintenance on Units 1, 2, & 3.
- Pine Flat Unit 1 out of service from September 17 to October 30 for annual maintenance.
- Warne Unit 2 out of service from September 16 to November 15 to remove nozzle No. 5 and repair defective water seal.

- Mojave Unit 3 out of service from September 30 to December 2 to install inlet line turbine shutoff valve.
- Oroville Dam spillway radial gate out of service from September 30 to October 11 to inspect gates and trunnion bolts.

### ***October***

- Gianelli Units 5 & 6 out of service from October 7 to October 22 for preventive maintenance, penstock inspection, and stay vane and butterfly valve repair and coating.
- Devil Canyon Unit 4 out of service from October 21 to November 15 for annual maintenance.
- Badger Hill Unit 3 out of service from October 28 to November 11 for annual maintenance.
- Mojave Unit 1 out of service from October 28 to December 31 to be inspected for corrosion and remain unwatered due to Silverwood drawdown.
- Banks Units 6 & 7 and discharge line out of service from October 29 to November 6 to replace Unit 6 discharge valve and repair Unit 7 recirculation line victaulic coupling.

### ***November***

- Mojave Check 66 bypass out of service from November 1 to December 24 to drain and isolate bypass line No. 4 to allow MWD personnel to inspect line.
- Edmonston Units 1, 2, & 3 out of service from November 4 to November 22 for divers to remove silt from Unit 1 intake.
- Check 42 Gate No. 2 out of service from November 6 to December 31 to repair gate No. 2 trunnion bearing.
- Dos Amigos Unit 4 out of service from November 18 to December 6 to replace voltage regulator with new solid state voltage regulator.
- Pearblossom Units 4, 5, & 6 out of service from November 19 to December 6 to repair Unit 6 downstream seat "O" ring and inspect "O" rings on Units 4 & 5.
- Edmonston Unit 2, 4, 6, 8, 10, 12, 14, and No. 2 discharge line out of service from November 25 to December 23 to inspect Unit 14 downstream seat and replace blowoff valve.
- Hyatt Unit 1 out of service from November 27 to December 12 for annual maintenance.

## *December*

- Banks Unit 11 out of service from December 2 to December 13 for electrical preventive maintenance.
- Hyatt Unit 6 out of service from December 2 to December 31 for annual maintenance, to rewedge the stator, and repair unit disconnect switch 611.
- South Bay Unit 6 and No. 2 discharge line out of service from December 5 to December 31 to replace unit switchgear.
- Pine Flat Unit 2 out of service from December 9 to December 31 for annual maintenance.
- Oroville Dam spillway Gate No. 3 out of service from December 26 to December 31 to remove existing strain gages, reattach new strain gages and retest the gate for repeatability of test results.
- South Bay Unit 6 out of service from December 31 to complete switchgear wiring and repair pump pit drain valve.

## *Water Supply Conditions*

The SWP meets its contractual obligations by monitoring precipitation and calculating runoff to coordinate the operation of the complex system of dams and reservoirs. Information on those activities is based on the water supply conditions of the 1996 calendar year and the 1995-96 water year.

Total runoff in the Sacramento River Basin in northern California has been as little as 5.1 MAF in 1977, and as much as 38 MAF in 1983 (the 50-year average is about 18 MAF). This runoff constitutes the primary SWP water supply.

Precipitation during water year 1995-1996 was slightly above average (23 inches) for most of California. Only the far south was drier than average. Following the extremely wet 1994-1995 and the extremely dry 1993-1994 water years, this water year was the closest to average in the last 20 years. It began extremely dry and warm in October and November, but a very strong storm in mid-December provided over one and a half times average precipitation for the month. This pace continued in January and February, with storms in mid-January and in early and late February. March and April were near average, but a strong storm system in mid-May delivered over triple the average precipitation for the month, requiring flood control releases at most major foothill reservoirs. Summer precipitation was near average, with temperatures far above average in Central California in June, July, and August.

The remainder of calendar year 1996 had below average precipitation in October and above average in November. A series of storms throughout December, several with very high snow lines, provided three and a half times average precipitation for the month and resulted in large flood releases throughout the Sacramento system. This led into the record flood flows in early January 1997.

Statewide runoff was about 85 MAF (120 percent of average) for water year 1995-1996, compared to 180 percent the previous year. After a slow start, runoff was about two thirds of average for the first three months of the water year. Runoff continued slightly below average in January and then jumped to over double the average in February due to a warm storm early in the month. From March through June, runoff was above average, with large flows in May. Summer runoff was average. Sacramento River Basin unimpaired runoff totaled 22.2 MAF for the water year, 121 percent of average. San Joaquin River system unimpaired runoff (including the Stanislaus, Tuolumne, Merced, and upper San Joaquin Rivers) was 7.2 MAF, 125 percent of average. Runoff during the snowmelt period from April through July was 125 percent of average for the Sacramento River Basin and 120 percent of average for the San Joaquin River Basin. This was due in part to the unseasonably high May precipitation, as snowpack was below average for most of the winter due to warm storms. April 1 snowpack was only 95 percent of average, compared with 175 percent in 1995 and 50 percent in 1994. Based on the 1995-96 water year forecast, the water year was classified as "wet" for fish and wildlife, and for agricultural, municipal, and industrial uses.

The 1995-1996 water year began with statewide reservoir storage at 130 percent of average. Storage dropped slightly during the water year, finishing at 118 percent of average. April and May end of month storages were the highest ever for those dates. This was due in part to the reduced need for flood control space (due in turn to the smaller snowpack). End of May storage was 92 percent of capacity, with most reservoirs filling in northern California.

## *Water Operations*

### *Reservoir Operations*

Lake Oroville and San Luis Reservoir are the two main conservation facilities for SWP water supplies. Table 8 and Table 13 summarize the operations of these reservoirs during the 1996 calendar year.

Lake Oroville began 1996 with 2,702,081 AF of storage, 1,033,837 AF more than it held at the beginning of 1995. Computed inflow peaked in February, and storage in Lake Oroville peaked on May 22, 1996 at 3,529,838 AF (100 percent of normal maximum operating capacity) and ended the year at 83 percent of normal capacity or 2,929,103 AF. The net effect of operations and water conditions at Lake Oroville resulted in an increase in storage of 227,022 AF.

At the start of 1996, Lake Del Valle held 26,207 AF (65 percent of normal maximum operating capacity). Highest end-of-month storage was in May at 40,006 AF (100 percent of normal maximum operating capacity). At year's end Lake Del Valle held 30,161 AF (76 percent of normal maximum operating capacity).

San Luis Reservoir began 1996 with a storage of 1,646,882 AF, 82 percent of its normal maximum operating capacity (2,027,835 AF). The SWP share of this storage was 911,417 AF, 86 percent of its maximum operating capacity (1,062,183 AF). SWP share of storage at the end of 1996 was 1,105,944 AF; the federal share was 797,460 AF, for a total end-of-year storage of 1,903,404 AF.

SWP southern reservoirs (Pyramid, Castaic, Silverwood, and Perris) have a combined maximum operating storage capacity of 701,320 AF. The total combined storage of these reservoirs was 577,353 AF at the beginning of 1996 and increased to 594,940 AF by the end of the year.

The following tabulation compares normal operating capacity in the principal SWP reservoirs with end-of-year storage for 1995 and 1996:

| Reservoir          | Normal Maximum Operating Capacity | End-of-year Storage 1995 | End-of-year Storage 1996 |
|--------------------|-----------------------------------|--------------------------|--------------------------|
| Lake Oroville      | 3,537,580                         | 2,702,081                | 2,929,103                |
| Lake Del Valle     | 40,000                            | 26,207                   | 30,161                   |
| San Luis Reservoir | 1,062,183                         | 911,417                  | 1,105,936                |
| Pyramid Lake       | 171,200                           | 161,670                  | 166,706                  |
| Silverwood Lake    | 74,970                            | 38,977                   | 14,977                   |
| Lake Perris        | 131,450                           | 111,883                  | 124,898                  |
| Castaic Lake       | 323,700                           | 264,823                  | 288,359                  |
| Totals             | 5,341,083                         | 4,217,090                | 4,660,140                |

### *Water Deliveries and Aqueduct Operations*

Generally, water diverted from the Sacramento-San Joaquin Delta is delivered to SWP storage facilities and to contractors through Banks Pumping Plant and Barker Slough Pumping Plant for a variety of beneficial uses. In addition to delivering entitlement water to long-term water supply contractors, SWP transports water to other public agencies through exchanges or purchases; provides water for wildlife and recreational uses; and conveys water to meet local water rights agreements. Historical information about water deliveries made to long-term contractors and other agencies through 1996 has been organized in Table 2.

For several years, DWR has offered contractors the opportunity to carry over for delivery during the next year a portion of their entitlement water approved for delivery in the current year. The carry-over program was designed to encourage the most effective use of water and to avoid obligating the contractors to use or lose the water by December 31. Because operational constraints may change from year to year, an agreement in which the conditions of the approval are listed is signed each year with participating contractors. In 1996, SWP delivered 131,959 AF of entitlement water carried over from 1995 to six contractors. DWR also approved 260,000 AF of 1996 carryover water for delivery to seven contractors in 1997.

The Monterey Agreement grew out of water allocation concerns that intensified during the 1987-1992 drought. Rather than negotiate only water allocation issues, DWR and water contractors decided on a major revision to SWP long-term contracts and their administration—in essence, to update management of the SWP. The Monterey Agreement was released to the public on December 16, 1994, in the form of 14 principles. *Bulletin 132-95, Chapter 1*, explains the Monterey Agreement in detail.

In December 1995, SWP executed Monterey Amendments with thirteen long-term contractors and in February 1996 executed Monterey Amendments with seven additional long-term contractors.

The Monterey Amendments increase the reliability of existing water supplies; provide stronger financial management of the SWP; and increase water management flexibility, providing more tools to local water agencies to maximize existing facilities. Categories of surplus, wet weather, and Article 12(d) [shortage makeup provision] water were replaced by a single category of interruptible water, which is allocated based on entitlement and delivered at the melded SWP power rate.

Contractors may transport non-project water in SWP facilities at the melded SWP power rate. Carry-over rules for SWP surface conservation reservoirs were expanded, allowing year-to-year storage by contractors when space is available.

During 1996, SWP provided water service to 40 agencies, including 25 long-term water contractors. SWP facilities were used to convey non-project water for other agencies, including the CVP. In addition, SWP facilities were used to deliver water transfers, water purchased from the Drought Water Bank, and transfers from one agency to another. Transfers were accomplished according to agreements negotiated with USBR throughout the year and with participants of existing three-party contracts for the use of the Cross Valley Canal, a water conveyance facility that connects with the California Aqueduct in Kern County.

Total Project (State and federal) deliveries for 1996 totaled 4,850,521 AF. This total includes State contract deliveries of 2,427,830 AF, federal deliveries of 1,500,954 AF, Oroville Complex diversions of 920,980 AF, 757 AF of Upper Feather River deliveries, 50 AF of non-chargeable refill water, and dredge pump out of 298 AF. State contract deliveries included a total of 2,195,550 AF of entitlement and entitlement-related water to 25 long-term contractors, plus 232,280 AF of other water. A graph showing the historical annual deliveries from SWP facilities is shown in Figure 1. Amounts of 1996 water deliveries are shown by field division on Map 2 and include entitlement water, permit water, local supply, recreation, purchases, wheeling, and water transfers. Totals by agency are shown in Table 2.

The following table is a summary of contract deliveries in 1996:

| Entitlement Water        |                  | Other Water                 |                 |
|--------------------------|------------------|-----------------------------|-----------------|
| Municipal and Industrial | 566,313          | Flexible Storage Withdrawal | 1,265           |
| Agricultural             | 1,044,812        | General Wheeling            | 667             |
| Municipal Ground Water   | 182,983          | Local Recreation (State)    | 43,141<br>3,907 |
| Bypass                   | 88,424           | Transfer Water              | 7,966           |
| Interruptible            | 28,647           | Purchase Pool A             | 71,268          |
| Carryover                | 131,959          | Purchase Pool B             | 103,641         |
| Storage                  | 136,032          | Non-chargeable Refill Water | 50              |
| Benecia                  | 10,406           | Dredge Pump Out             | 298             |
| Vallejo                  | 5,974            | Coastal Fill                | 86              |
| <b>Total</b>             | <b>2,195,550</b> | <b>Total</b>                | <b>232,280</b>  |
| <b>Total Water</b>       | <b>2,427,830</b> |                             |                 |

## Significant Operational Activities

### January

- Repairs to Pool 7, Mile 39.56 of the California Aqueduct were completed on January 7 after a 56-day outage. Banks Pumping Plant was delivering water to O'Neill Forebay and the State share of San Luis Reservoir was again full on January 29.
- The Santa Ana Pipeline inspection and repair was completed. The pipeline was flushed and put back in service and Box Springs water deliveries resumed.
- The Interruptible Water Program began again on January 19. Up to 1,000 cfs was made available. A total of 2,117 AF was delivered in January.

### February

- Flood control releases were made at Lake Oroville due to large inflows from storms in early and late February. Oroville Dam Spillway releases were made in addition to maximizing generation through Edward Hyatt Powerplant and Thermalito Power plant. Maximum Feather River flow during the month of February peaked at 44,000 CFS with 30,000 CFS of this flow from spillway releases.
- February deliveries of interruptible water totaled 22,519 AF.

### March

- March deliveries of interruptible water totaled 4,011 AF.

### April

- High salvage of winter-run sized salmon at Skinner Fish Facility necessitated decreased pumping at Banks and increased pumping at Tracy.
- A large spring storm resulted in increased inflows into Lake Oroville and a concurrent decrease in allowable storage due to increased basin wetness. Oroville was encroached into flood reservation. River releases were increased to 10,000 cfs, but lake storage continued to fill. Allowable storage increased 10,000 AF per day, so encroachment decreased rapidly.
- SWP accommodated a request by the Bonneville Power Authority to spill water at Hyatt in exchange for energy delivered to SWP at the California-Oregon border. The National Marine Fisheries Service placed a limit on dissolved nitrogen in the Columbia River due to its damaging effects on fish. To control the nitrogen gas build-up,

which is created by spilling water at high head projects on the Columbia River, BPA is seeking to expand their market for generation so that water releases can be made through the turbines instead of through the spillway gates. This exchange was during nighttime hours only and at no cost to SWP.

- As part of the Anadromous Fish Restoration Plan, USFWS proposed adjustments in CVP/SWP operations which are in addition to the various operating parameters contained in the Delta Accord. DWR and the USBR agreed to adjust operations as the USFWS proposed. The most significant adjustment was to limit CVP/SWP combined exports to 25 percent of the San Joaquin River flow between April 15 and May 15.

### *May*

- Combined exports were increased to 3,200 cfs on May 16 following a 31-day period of reduced export levels (exports limited to about 1,500 cfs to benefit juvenile salmon migrating down the San Joaquin River system). Both the SWP and the CVP increases were pumped at Banks Pumping Plant during the initial five days to comply with a ramping provision in the temporary barriers' permit. Combined exports were progressively increased at both Banks and Tracy, beginning on May 21, to 10,300 cfs (6000 SWP and 4300 CVP) on May 25. Exports were maintained at this level through the end of May.
- Silt deposited in the Aqueduct in the San Luis Field Division by the March 1995 flooding was removed from Pool 19 as a pilot-dredging program. Dredging progressed at a rate of about 400 feet per day.

### *June*

- Aerial application of Komeen to Clifton Court Forebay and Banks Pumping Plant Intake Channel was completed on June 11. Pondweed was concentrated from the intake gate to the Skinner Fish Facility inlet levee.

### *July*

- Excavation of the San Bernardino Tunnel and access shaft was completed. Final clean up and placement of the north tunnel invert concrete was completed during the week of July 15. Installation of CLAWA pumps was completed. CLAWA requested water deliveries to start on July 22, to test reliability of the system.

### *August*

- The Extra High Voltage transmission system Remedial Action Scheme (RAS) relay system activated on August 10 when the high voltage transmission lines relayed at the California-Oregon border. SWP pumping was automatically tripped off line by operation of the RAS. There were severe power disruptions to nine western states and the western power grid was separated into several islands. DWR supplied emergency service to the PG&E electrical system during this disturbance, and left SWP pumps shut off for several hours at the request of PG&E.; State water contractors curtailed their aqueduct deliveries by 75 percent during this disturbance to prevent damage to the canal lining. The SWP continued to supply emergency service electrical power to PG&E during peak electrical load hours on August 13 and 14 by shutting down aqueduct pumping and maximizing our generating resources.
- Water surface elevation at Silverwood Lake continued to be held at the 3310 to 3312 foot elevation range while Phase I construction of the San Bernardino Tunnel Intake Structure was completed. Additional lowering of the water surface elevation to 3255 feet, for completion of Phase II, will begin on October 1 and continue until the end of December. Concrete placement was complete to elevation 3324 in the north portion of the intake structure and to 3318.5 in the south portion. The intake structure piers were complete to elevation 3336. Concrete placement in the north tunnel was complete and preparation for placing arch forms in the south tunnel heading was under way. Concrete placement for the south tunnel invert was complete.
- On August 20, San Bernardino Valley Municipal Water District and San Geronio Pass Water Agency signed an agreement to participate in the East Branch Extension. DWR was responsible for the final design and construction of the Phase I facilities.
- SGPWA is the last SWP contractor to receive water from the SWP through direct deliveries or exchanges. Phase I will allow SGPWA to receive 8,650 AF per year, half of its annual entitlement. Construction of Phase I facilities is scheduled to start April 1997 and be completed March 1999. SGPWA has a planned build-up of eight to ten years before needing its full entitlement.

### *September*

- Operations at Clifton Court were curtailed for 36 hours during September 10-11 for weed spraying.

## *October*

- The SWP began pumping about 4,000 AF per day of "make-up" water for the CVP on October 13. The CVP received 130,000 AF of make-up water to offset export reductions made in April and May this year to comply with special fishery requirements.
- A fish spawning evaluation study with high flow through the low flow segment of the Feather River started on October 10. Flows through the low flow segment were increased from 600 cfs to 1600 cfs. During the study period, Environmental Services Office monitored the effects of the higher flow on the salmon spawn. The additional 1,000 cfs of flow through the low flow segment will be maintained until January 16, 1997. A corresponding reduction was made in the Thermalito Afterbay River Outlet release to maintain the Feather River flow at 2,400 cfs.
- On October 14, Pools 52 to 55 were taken out of service for scheduled repairs to the canal lining between Mile Markers 343 and 345.

## *November*

- Banks pumped just over 53,000 AF for the USBR through November 14. This was done to "make up" for pumping reductions in April and May in agreement with the USFWS to facilitate "pulse flows." The pumping of this water had no real impact on operations since the State's share of San Luis Storage was filled by December 3. Pumping at Banks also had no adverse impact on the fish species of concern during November. As part of the protection for the concerned species, the Delta Cross Channel gates, which had been closed, were opened on November 15 and closed again on November 20 under recommendations of the CALFED Operations Group.
- The high-flow fish evaluation study in the low-flow section of the Feather River, which started on October 10, continued through the end of November. Increased flows up to about 1,600 cfs were monitored by the Environmental Services Office to evaluate the effects on the salmon spawn. The study is planned to be maintained until January 16, 1997.
- Los Banos Reservoir experienced over 1,800 AF of estimated inflow in nine days as a result of November storms. A controlled release at the detention dam of 100 cfs was made from November 22 to November 27 to decrease storage.

## *December*

- Total December precipitation exceeded 28 inches, well above average, with over 12 inches falling in Northern California in the first two weeks of December. This was the second wettest December of record, exceeded only by the 30.8 inches in December 1955. Very heavy rains occurred from December 26 through January 2, amounting to about 40 percent of the annual average. Storms were warm with moist winds from the southwest blowing over the Sierra. The breadth of the storm was unprecedented, producing 3-day record flood volumes on major rivers from Shasta Dam to the southern Sierra. On the Sacramento River, overflow into the Sutter and Yolo Bypass systems occurred during the second week, but river levels were only moderate. The sheer volume of runoff exceeded the flood control capacity of Don Pedro and Millerton Reservoirs, resulting in large spills of excess water. Snow levels were relatively high, resulting in more direct rain runoff than usual which pushed most of the larger foothill reservoirs into the flood control mode causing them to discharge maximum downstream channel capacity flows. Runoff during December was about 300 percent of average. Seasonal runoff since October 1 was 220 percent of average, compared to 70 percent last year.
- Increased Lake Oroville inflows drove lake storage into flood reservation space for six days in mid-December and again at the end of the month to 2.9 MAF compared to 2.7 MAF at this time last year. Daily reservoir average inflow peaked at just over 171,000 cfs at Oroville on December 31. Daily average releases peaked at 77,000 cfs on the same day. Feather River releases for the month totaled nearly 1.1 MAF. The State's share of San Luis Reservoir storage was about 1.1 MAF, compared with 897,000 AF this time last year.
- On December 2, DWR approved 2.4 MAF of the 3 MAF of requested entitlement water for long-term SWP contractors in 1997. SWP supplies were projected to meet at least 70 percent of most SWP contractor's requests. Interruptible water was made available to SWP contractors on December 2.
- During the week of December 12-16, the SWRCB approved pumping of CVP water at Banks Pumping Plant to facilitate high exports during a juvenile salmon migration study being conducted by USFWS. SWP storage in San Luis was already slightly above its allocated share and delivery requests were less than 2,000 cfs, making capability available at Banks Pumping Plant. During the five days, 46,324 AF was pumped for the CVP most of which was used to fill the federal share of San Luis

Reservoir. SWP pumping into San Luis was suspended on December 10 when storage reached the desired goal of 1.12 MAF.

- Construction at Vaquero Recreation Area, requiring the lowering of Pyramid Lake, was completed. Restriction on Pyramid Lake was released on De-

ember 8 with the refill beginning December 9. Refill was completed on December 15. Lining repairs on Pools 52, 53, and 55 of the East Branch were completed on December 16 and returned to service during the week of December 17. The Aqueduct had been out of service since October 24.

## *Energy Operations*

### *Energy Resources*

Energy generation from SWP's eight hydroelectric plants (Hyatt, Thermalito, Gianelli, Warne, Castaic, Alamo, Mojave, and Devil Canyon) during 1996 totaled 5,308,316 MWh, as illustrated in Figure 3.

The SWP receives energy under contract from five small hydroelectric facilities (total capacity of 30 MW) owned and operated by MWDSC. In 1996, these plants furnished 151,613 MWh of energy to the SWP. DWR has exchange arrangements with SCE and LADWP to provide transmission of this energy.

The DWR-SCE Power Contract has been in effect since April 1983. Under this contract, part of the Hyatt Thermalito Powerplants' generation and all of the output of Devil Canyon Powerplant, up to 126MW, and Alamo Powerplant are delivered to SCE. The energy is generally delivered during on-peak periods, and a greater amount of energy is returned during off-peak periods. SCE combined return and additional to the SWP during 1996 was 2,454,062 MWh.

The 1979 Power Contract and the 1981 Capacity Exchange Agreement with SCE provide the largest portion of the energy used by the SWP. Service began in April 1983 under the Power Contract and in April 1987 under the CEA.

According to the terms of the CEA, each year SWP must provide 412,500 MWh of energy to SCE during on-peak periods at a maximum delivery rate of 225 MWh. SCE returns, during mid-peak and off-peak periods, approximately 110 percent of the energy SWP provides.

Long-term contracted-energy purchases, such as with Tera Corp. and MWD Hydro, are itemized separately in Table 3. Other purchases totaled 1,030,761 MWh from various utilities, such as Pacific Power and Light and Salt River Project.

Since July 1983, DWR has received energy from Reid Gardner Powerplant, a coal-fired facility near Las Vegas, Nevada. Reid Gardner consists of four units. DWR owns 67.8 percent of Unit 4 (169.5 MW based on nameplate capacity of 250 MW), while Nevada Power Company owns the remainder of Unit 4, as well as all of units 1, 2, and 3. During 1996, SWP received 636,936 MWh of energy from Reid Gardner Powerplant.

DWR purchases energy from hydroelectric generation developed by others. The output of the 165 MW Pine Flat Powerplant, owned and operated by the Kings River Conservation District, provided the SWP with 640,009 MWh of energy in 1996.

### *Energy Loads*

Energy load data (total energy used by the SWP) is summarized in Table 4, and Figures 5 and 6. For the purposes of balancing energy resources and loads, this report itemizes those amounts required to meet SWP supplies and demands separately from those amounts required to meet total DWR supplies and demands. Besides SWP energy loads of 5,699,220 MWh, total DWR energy loads include sales of 4,558,971 MWh, losses of 229,867 MWh, and deviation adjustments of 5,609 MWh, for a total of 10,493,667 MWh.

The San Joaquin Field Division, which includes the only stretch of Aqueduct with no reservoirs, accounted for over half of the total project energy load. Included in this amount is 1,888,520 MWh used at Edmonston Pumping Plant with peak pumping occurring in August.

In 1996, DWR sold power to 40 agencies, resulting in revenues of over \$62.9 million. The largest sale was 968,480 MWh to Sacramento Municipal Utility District.

## *Sacramento - San Joaquin Delta Operations*

The Sacramento-San Joaquin Delta provides an estimated one-half of the State's water supply. In addition, the Delta is an estuary, a constantly changing area where tidal and river currents meet, and where salinity is between the extremes of brackish and fresh waters. The estuary provides habitat for fish and wildlife, including waterfowl on the Pacific Flyway.

Many of the problems facing the Delta today, such as saltwater intrusion and oxidation of peat soil, have plagued the area for many years. Originally a tidal marshland covered with tules, the Delta, during dry summer months, has been subject to intrusions of salty ocean water from the San Francisco Bay.

Today, dams upstream of the Delta, including SWP's Oroville Dam and CVP's Shasta Dam, help control the intrusion of salt water by releasing fresh water into the Delta during dry periods in summertime. However, problems with salinity in the Delta still exist.

With assistance from urban, agricultural, and environmental interests, and other stakeholders concerned with Bay-Delta issues, State and federal agencies developed the Bay Delta Accord. The Accord grew out of Governor Wilson's 1992 policy to "fix the Delta." This led to events that shaped the State-Federal Framework Agreement, signed in June 1994, and the Bay-Delta Accord signed December 15, 1994. *Bulletin 132-95, Chapter 1*, explains both the State-Federal Framework Agreement and the Bay-Delta Accord in detail.

### *Net Delta Outflow Index*

Delta outflow is not measured directly due to the major tidal influence in the Delta. Instead an index of Delta outflow is calculated using measured inflows, exports, and estimated in-Delta water use. A new

method of calculating Delta outflow was introduced in the 1995 Principles for Agreement on Bay-Delta Standards. This Net Delta Outflow Index considers inflows of the Yolo Bypass system, the eastside stream system (the Mokelumne, Cosumnes, and Calaveras rivers), San Joaquin River at Vernalis, and Sacramento Regional Wastewater Treatment Plant. Major Delta exports and the estimated in-Delta water use are deducted from the cumulative inflow total to produce the index. The NDOI became effective for use in Delta standards compliance on January 1, 1995. Table 5 shows the computed daily NDOI for 1996.

The NDOI calculated flows cannot be directly compared to the prior Delta Outflow Index, as the Sacramento River bypass flows and several eastside stream flows were not included in the earlier DOI calculations. Those flows can be quite substantial during high flow periods. In 1996, the Yolo Bypass flows contributed 22 percent of total Delta inflow and, during the extremely high flow events of March, contributed over 60 percent of inflow. A comparison of Delta Inflow and NDOI is plotted on Figure 7. Gross channel depletion is the sum of evapotranspiration and net increase in soil moisture of Delta lands plus evaporation from Delta channels.

The 1996 daily NDOI averaged 39,588 cfs for the year and was 15,828 cfs less than the 1995 daily average. The greatest mean monthly NDOI occurred in February, at 128,400 cfs and the greatest mean daily was 217,322 cfs on February 24. The lowest monthly NDOI occurred in October (4,891 cfs) and the year's lowest daily NDOI was on October 29 with 3,029 cfs.

D-1485 standards set a minimum NDOI at Chipps Island for adequate water for fisheries. All NDOI and river flow standards were met in 1996.

## *Project Operations by Field Division*

### *Oroville Field Division*

#### **Water Storage**

SWP water storage facilities in the Oroville Field Division include Lake Oroville, Thermalito Forebay and Afterbay (Oroville-Thermalito Complex) and upper Feather River reservoirs consisting of Lake Davis, Frenchman Lake, and Antelope Lake. Lake Oroville operations store winter and spring runoff for later SWP use for power generation, flood control, recreation, fish and wildlife enhancement, in addition to water supply.

The Upper Feather River Reservoirs have a combined capacity of 162,000 AF. Monthly operations for the three Upper Feather River reservoirs are presented in Table 7. The table below compares storage capacity with the largest end-of-month storage for each reservoir for the last five years:

| Year | Reservoir<br>(Capacity) |                     |                 |
|------|-------------------------|---------------------|-----------------|
|      | Antelope<br>22,566      | Frenchman<br>55,477 | Davis<br>84,371 |
| 1996 | (Dec) 23,944            | (Mar) 57,881        | (May) 81,858    |
| 1995 | (Apr) 25,242            | (Apr) 58,172        | (May) 84,331    |
| 1994 | (May) 19,686            | (Mar) 32,770        | (Apr) 63,089    |
| 1993 | (Apr) 23,895            | (May) 39,814        | (Jun) 68,908    |
| 1992 | (Apr) 17,596            | (Feb) 15,580        | (Mar) 40,008    |

The total amount of unimpaired runoff to Lake Oroville for the 1995-96 water year totaled about 5.75 MAF, (124 percent of average). Lake Oroville storage at the beginning of 1996 was 2,702,081 AF (76 percent of normal maximum operating capacity). Storage peaked on May 22, 1996, at 3,529,838 AF, (100 percent of normal maximum operating capacity). Lowest storage in Lake Oroville in 1996 was 2,643,367 AF (75 percent of normal maximum operating capacity) on January 6. By December 31, 1996, storage was at 2,929,103 AF (83 percent of normal maximum operating capacity).

Lake Oroville's computed inflow is tabulated in Table 8 and plotted along with releases, diversions, and storage withdrawals on Figure 11. A 10-year historical summary of Lake Oroville's storage and inflow is illustrated on Figure 12.

Water temperatures on and below the lake's surface are monitored very closely throughout the year

at various locations around the lake. Two intakes to the power plant have shutters that control the depth from which water enters the plant. Adding or removing shutters as necessary can then control the temperature of water entering the fish hatchery. A complete illustration of water temperature and intake operation is shown on Figure 14. Further discussions on water temperature operations are detailed in "Water Deliveries and Aqueduct Operations."

#### **Water Deliveries**

Project water stored in the Upper Feather Area lakes flows into Lake Oroville through the North and Middle Forks of the Feather River. Contract deliveries totaled 11,764 AF to two agencies. Non-project deliveries (prior water rights) totaling 757 AF were made out of Lake Davis.

Water stored in Lake Oroville is released into the Thermalito Diversion Dam Pool, from which specified quantities are released into both the Feather River and the Thermalito Power Canal. The power canal supplies water first to the Thermalito Forebay and then to Thermalito Afterbay. From the Thermalito Afterbay, additional water is released to the Feather River and several local distribution systems used to deliver water to prior water right holders. These deliveries are collectively called the Feather River Service Area diversions. FRSA diversions are not considered SWP benefits as they predate the SWP construction and would have occurred in the absence of the SWP to the limit of available natural river flows. Nearly all FRSA diversions are for agricultural use and totaled 920,980 AF in 1996, 72,143 AF more than in 1995. All FRSA diversions are detailed below:

|                       |         |
|-----------------------|---------|
| Sutter Butte Canal    | 493,220 |
| Richvale Canal        | 132,420 |
| Sunset Pumps          | 7,147   |
| Western Canal Lateral | 3,421   |
| Western Canal         | 251,600 |
| Tudor Mutual          | 3,280   |
| Garden Highway        | 13,705  |
| Plumas Mutual         | 8,015   |
| Oswald Water District | 1,063   |
| Palermo Canal         | 7,109   |
| Total in AF           | 920,980 |

## Delta Field Division

### Water Storage

The Delta Field Division consists of the North Bay Aqueduct, the South Bay Aqueduct, and the California Aqueduct from Clifton Court Forebay to Check 12. Along these waterways, water storage operations take place at Clifton Court Forebay, Bethany Reservoir, Travis Tank, Napa Terminal Tank, the California Aqueduct, and Lake Del Valle. Water storage data at the South Bay Aqueduct are not reported; storage changes are assumed to be zero for operational purposes.

Pumping from Lake Del Valle into the Aqueduct usually occurs in the fall and is detailed in Table 11. Inflow and storage changes for the last 10 years at Lake Del Valle are shown on Figure 15.

Project water flows from the Delta into Clifton Court Forebay through the Clifton Court control gates. A schedule of daily gate operation is published in the *SWP Monthly Report of Operations*. Monthly inflows to Clifton Court Forebay along with corresponding storage changes are shown in Table 11.

### Water Deliveries

The Delta Field Division delivered 146,526 AF of water in 1996. These and other deliveries are summarized in Table 2.

The North Bay Aqueduct system, completed in May 1988, begins in the North Delta at the Barker Slough Facilities. Sacramento River water is conveyed through Cache, Lindsey, and Barker sloughs to the Barker Slough pumping plant. From the pumping plant, water is conveyed by pipe for 24 miles northwest to contractors in Solano County and to the Cordelia Pumping Plant. Deliveries are made to Solano County water users via turnouts along the pipe's length. From the Cordelia Pumping Plant the water is conveyed to contractors in Napa County and terminates at the Napa Terminal Tank. The Aqueduct supplied 34,892 AF to Napa and Solano counties.

A division-wide total of 117,011 AF went to SWP entitlement contractors, 28,400 AF of Local Water was conveyed to Alameda County Flood Control and Water Conservation District, Zone 7; and to the Alameda County Water District; 298 AF of Federal Wheeling to Musco Olive and the V. A. Cemetery; 667 AF of General Wheeling to Alameda County Flood Control and Water Conservation District, Zone 7; and 150 AF of Recreation water.

### Pumping Plants

Delta Field Division pumping plants include Barker Slough Pumping Plant and Cordelia Pumping Plant on the North Bay Aqueduct, Banks on the California Aqueduct, and South Bay and Del Valle Pumping Plants on the South Bay Aqueduct. Monthly pumping data is summarized for the year in Table 1.

Banks Pumping Plant was originally built to accommodate 11 units. Initially, seven pumps were constructed for a total pumping capacity of 6,400 cfs. Construction of the final four pumps was completed in 1990, each with a design capacity of 1,067 cfs and a new total capacity of 10,500 cfs. Export pumping rates are increased on weekends to take advantage of less costly off-peak electricity. This produces sharp peaks in the export rate at about 7-day intervals.

In 1996, The SWP diverted 3,241,223 AF of water at Banks Pumping Plant, including 210,121 AF of CVP water wheeled by DWR. Below is a five-year summary of federal, State, and total pumping at Banks:

| Pumping at Banks Pumping Plant<br>(in AF) |         |           |           |
|-------------------------------------------|---------|-----------|-----------|
| Year                                      | Federal | State     | Total     |
| 1996                                      | 210,121 | 3,031,102 | 3,241,223 |
| 1995                                      | 28,417  | 2,088,462 | 2,116,879 |
| 1994                                      | 44,984  | 1,621,129 | 1,666,113 |
| 1993                                      | 196,169 | 3,013,955 | 3,210,124 |
| 1992                                      | 34,816  | 1,467,844 | 1,502,660 |

## San Luis Field Division

### Water Storage

San Luis Reservoir reached its maximum end-of-month storage for 1996, 2,024,533 AF (100 percent of maximum operating storage), at the end of February. Maximum operating storage capacity in San Luis is 2,027,835 AF. Minimum end-of-month storage for the year, 753,481 AF (37 percent of maximum operating storage), occurred in August. The State's share of San Luis Reservoir end-of-month storage reached the maximum of 1,105,936 AF in December (104 percent of State's maximum operating storage), and the minimum of 626,228 AF (59 percent of State's maximum operating storage) was reached in August. Table 13 (below) and Figure 16 show San Luis Reservoir operations during 1996. Table 14 shows the monthly operation of O'Neill Forebay during 1996.

There are two different accounting procedures for calculating storage shares in O'Neill Forebay. One adjusts storage shares using actual SWP/USBR deliveries made from water out of O'Neill. The other method adjusts storage shares in O'Neill using amounts pumped for each agency derived from scheduled energy. Differences between scheduled pumping and water deliveries create a mis-match that is carried over into subsequent months. These mis-matches are used to "underschedule" or "overschedule" energy and pumping in order to bring the mis-match back into alignment or closer to zero. In 1996 the USBR's pumping surplus was reduced from 245,000 AF to 110,000 AF by underscheduling pumping requirements at Dos Amigos Pumping Plant.

### Pumping and Generating Plants

Total pumping in 1996 at Gianelli Pumping-Generating Plant was 1,956,154 AF. Water released from San Luis Reservoir to O'Neill Forebay for generation was 1,542,164 AF. Total pumping at Dos Amigos Pumping Plant in 1996 was 3,791,780 AF, about 619,145 AF more than was pumped in 1995. Table 15 summarizes joint-use plant activity on a monthly basis.

### Water Deliveries

SWP water deliveries in the San Luis Field Division during 1996 included 1,507 AF of State and federal deliveries to the DFG and the DPR from the O'Neill Forebay area and San Luis Reservoir (Reach 3). The following tabulation details the components of these recreation deliveries:

| O'Neill Forebay and San Luis Reservoir (Reach 3) |     |       |       |
|--------------------------------------------------|-----|-------|-------|
|                                                  | DPR | DFG   | Total |
| State                                            | 76  | 683   | 759   |
| Federal                                          | 62  | 559   | 621   |
| Sub-total                                        | 138 | 1,242 | 1,380 |
| Pools 16, 17, & 18 (Reach 5)                     |     |       |       |
|                                                  | DPR | DFG   | Total |
| State                                            | 0   | 70    | 70    |
| Federal                                          | 0   | 57    | 57    |
| Sub-total                                        | 0   | 127   | 127   |

Other diversions from the joint-use facilities in the San Luis Field Division during 1996 included 1,489,817 AF to federal contractors, 955 AF of Kings River Wheeling, 298 AF pumped at Arroyo Pasajero, and 50 AF of Phase 1 non-chargeable refill water.

## ***San Joaquin Field Division***

### ***Water Deliveries***

A total of 1,489,351 AF of deliveries was made in the San Joaquin Field Division in 1996. Water types include entitlement water, operational flood release, carryover entitlement, and transfer water. Kern County Water Agency (KCWA) represented 69 percent of the total SWP water delivered within the Division.

In addition to SWP deliveries, 9,206 AF of federal water was wheeled through SWP facilities to be delivered to the Kern National Wildlife Refuge.

The San Joaquin Field Division is the only field division in the SWP where there are no water storage facilities. All deliveries made from the Aqueduct are

summarized in Table 22, and are totaled by agency and water type in Map 2 and Table 2.

### ***Pumping Plants***

Pumping plants in the San Joaquin Field Division include Las Perillas and Badger Hill on the Coastal Aqueduct, and Buena Vista, Teerink, Chrisman, and Edmonston on the California Aqueduct. A complete monthly summary of amounts pumped at all of these plants is shown on Table 1. A summary of energy used to pump at each plant is shown on Table 4.

During 1996, 2,343,445 AF of State water and 9,206 AF of federal water flowed past Check 21 into the San Joaquin Field Division. Edmonston Pumping Plant pumped 836,897 AF during 1996.

## ***Southern Field Division***

### ***Water Storage***

There are four storage reservoirs in the Southern Field Division (Pyramid, Castaic, Silverwood, and Peris) with a combined storage capacity of 701,320 AF. Combined storage at the beginning of the year was 577,353 AF. End-of-year combined storage was 594,940 AF. Complete monthly operation tables for all four reservoirs plus Elderberry Forebay and Castaic Lagoon, along with historical inflow and storage data for the last ten years, is summarized in Tables 16 through 21 and Figures 17 through 20.

### ***Water Deliveries***

SWP deliveries in the Southern Field Division totaled 784,826 AF. Eleven agencies received the water, which was almost all entitlement water. Two exceptions were 2,928 AF of recreation water to the California Department of Parks and Recreation and 724 AF of local water to Crestline-Lake Arrowhead Water Agency.

### ***Pumping and Generating Plants***

Pumping plants in the Southern Field Division include Oso and Castaic on the West Branch, and Pearblossom on the East Branch. A complete monthly summary of amounts pumped is shown on Table 1. A summary of energy used to pump and station service energy at each plant is shown on Table 4.

Generating plants in the Southern Field Division include Warne and Castaic on the West Branch, and Alamo and Devil Canyon on the East Branch. Energy available from each generating plant is summarized in Table 3. Combined generation at all four plants in 1996 totaled 1,122,045 MWh.

**Table 1. Project Pumping by Plant**  
**1996**  
(in acre-feet)

| Pumping Plants       | Jan     | Feb     | Mar     | Apr     | May     | Jun     | Jul     | Aug     | Sep     | Oct     | Nov     | Dec     | Totals    |
|----------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-----------|
| Hyatt                | 45,418  | 0       | 0       | 0       | 3,937   | 21,171  | 7,171   | 5,203   | 34,171  | 0       | 5,552   | 2,859   | 125,482   |
| Thermalito           | 62,676  | 0       | 0       | 0       | 9,764   | 30,636  | 10,174  | 9,114   | 47,139  | 0       | 24,105  | 8,417   | 202,025   |
| Barker Slough        | 827     | 541     | 1,934   | 3,035   | 4,992   | 5,158   | 5,279   | 4,568   | 4,047   | 2,528   | 1,829   | 1,507   | 36,245    |
| Cordelia             | 667     | 388     | 1,186   | 2,006   | 2,533   | 2,452   | 2,478   | 2,427   | 2,983   | 1,961   | 1,569   | 1,311   | 21,961    |
| South Bay            | 3,704   | 644     | 2,014   | 7,420   | 9,554   | 12,295  | 13,123  | 11,411  | 5,243   | 4,755   | 1,846   | 5,014   | 77,023    |
| Del Valle            | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0         |
| <b>Banks</b>         |         |         |         |         |         |         |         |         |         |         |         |         |           |
| State                | 348,376 | 171,418 | 174,082 | 105,770 | 145,839 | 295,490 | 370,341 | 355,028 | 344,926 | 259,825 | 295,106 | 164,901 | 3,031,102 |
| Federal              | 0       | 0       | 0       | 0       | 10,910  | 0       | 0       | 24,971  | 0       | 76,361  | 51,555  | 46,324  | 210,121   |
| Total                | 348,376 | 171,418 | 174,082 | 105,770 | 156,749 | 295,490 | 370,341 | 379,999 | 344,926 | 336,186 | 346,661 | 211,225 | 3,241,223 |
| <b>Gianelli 1/</b>   |         |         |         |         |         |         |         |         |         |         |         |         |           |
| State                | 166,496 | 11,677  | 6,176   | 7,772   | 23,306  | 36,032  | 63,962  | 53,025  | 162,570 | 118,038 | 210,366 | 75,600  | 935,020   |
| Federal              | 131,746 | 95,351  | 23,792  | 3,441   | 20,826  | 0       | 0       | 6,521   | 74,989  | 174,527 | 231,991 | 257,950 | 1,021,134 |
| Total                | 298,242 | 107,028 | 29,968  | 11,213  | 44,132  | 36,032  | 63,962  | 59,546  | 237,559 | 292,565 | 442,357 | 333,550 | 1,956,154 |
| <b>O'Neill 2/</b>    |         |         |         |         |         |         |         |         |         |         |         |         |           |
| State                | 0       | 0       | 0       | 57,572  | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 57,572    |
| Federal              | 228,048 | 141,360 | 28,031  | 28,726  | 64,826  | 33,893  | 1,674   | 31,668  | 111,954 | 131,097 | 195,895 | 232,734 | 1,229,906 |
| Total                | 228,048 | 141,360 | 28,031  | 86,298  | 64,826  | 33,893  | 1,674   | 31,668  | 111,954 | 131,097 | 195,895 | 232,734 | 1,287,478 |
| <b>Dos Amigos 1/</b> |         |         |         |         |         |         |         |         |         |         |         |         |           |
| State                | 123,438 | 126,482 | 132,781 | 212,254 | 236,655 | 391,512 | 425,174 | 371,652 | 216,156 | 131,386 | 73,677  | 76,562  | 2,517,729 |
| Federal              | 134,693 | 90,135  | 52,787  | 87,378  | 143,026 | 187,502 | 248,366 | 198,023 | 43,068  | 32,963  | 18,320  | 37,790  | 1,274,051 |
| Total                | 258,131 | 216,617 | 185,568 | 299,632 | 379,681 | 579,014 | 673,540 | 569,675 | 259,224 | 164,349 | 91,997  | 114,352 | 3,791,780 |
| Las Perillas         | 5,003   | 2,617   | 4,031   | 11,399  | 16,458  | 23,093  | 23,602  | 19,346  | 9,647   | 7,657   | 836     | 690     | 124,379   |
| Badger Hill          | 5,320   | 2,833   | 4,180   | 12,057  | 16,844  | 24,019  | 25,214  | 20,333  | 9,955   | 7,686   | 855     | 747     | 130,043   |
| Buena Vista          | 31,185  | 56,880  | 72,167  | 120,865 | 119,297 | 125,979 | 140,006 | 129,120 | 115,168 | 57,629  | 39,338  | 31,903  | 1,039,537 |
| Devil's Den          | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 63      | 0       | 0       | 63        |
| Bluestone            | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 56      | 0       | 0       | 56        |
| Polonio              | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 62      | 2       | 0       | 64        |
| Teerink              | 24,434  | 48,620  | 62,631  | 113,342 | 106,469 | 100,573 | 111,107 | 109,782 | 112,747 | 55,261  | 38,561  | 31,351  | 914,878   |
| Chrisman             | 23,490  | 47,274  | 58,803  | 108,105 | 99,875  | 92,144  | 102,742 | 102,980 | 108,128 | 52,103  | 37,665  | 30,656  | 863,965   |
| Edmonston            | 23,258  | 46,791  | 58,070  | 105,675 | 95,273  | 87,726  | 97,990  | 99,187  | 104,876 | 50,328  | 37,365  | 30,358  | 836,897   |
| Oso                  | 11,493  | 30,758  | 41,735  | 38,804  | 29,639  | 23,962  | 22,328  | 22,424  | 28,110  | 38,526  | 34,402  | 24,508  | 346,689   |
| Castaic 3/           | 74,465  | 75,178  | 70,594  | 45,504  | 73,133  | 115,072 | 144,161 | 114,106 | 49,939  | 58,599  | 90,931  | 70,708  | 982,390   |
| Pearblossom          | 8,256   | 14,511  | 13,079  | 61,266  | 57,542  | 55,033  | 66,326  | 67,002  | 67,806  | 9,025   | 0       | 3,075   | 422,921   |

1/ Joint state-federal facility.

2/ O'Neill Pumping Plant is a federal facility

3/ Pumping at Castaic Pumping Plant is for the city of Los Angeles.

## Table 2. Water Deliveries 1962-1996

(in acre-feet)

| Agency                                    | 1962-1991         | 1992             | 1993             | 1994             | 1995             | 1996             | TOTALS             |
|-------------------------------------------|-------------------|------------------|------------------|------------------|------------------|------------------|--------------------|
| <b>Oroville Field Division</b>            |                   |                  |                  |                  |                  |                  |                    |
| Last Chance Creek W.D. (Local Supply)     | 198,616           | 4,988            | 10,879           | 8,921            | 8,919            | 11,404           | 243,727            |
| Plumas Co. F.C. & W.C.D.*                 | 8,152             | 485              | 444              | 492              | 308              | 360              | 10,241             |
| County of Butte*                          | 6,722             | 117              | 256              | 329              | 203              | 257              | 7,884              |
| Thermalito I.D. (Local Supply)            | 26,064            | 2,315            | 2,096            | 2,318            | 2,321            | 2,613            | 37,727             |
| Prior Water Rights Deliveries             | 19,009,689        | 608,692          | 811,435          | 863,831          | 849,324          | 921,737          | 23,064,708         |
| Yuba City*                                | 2,051             | 642              | 746              | 1,035            | 910              | 820              | 6,204              |
| <b>Delta Field Division</b>               |                   |                  |                  |                  |                  |                  |                    |
| Napa CO. F.C. & W.C.D. *(Local Supply)    | 135,076           | 5,510 5/         | 5,286            | 6,792            | 5,182            | 4,893            | 162,739            |
| Alameda Co. W.D.* (Local Supply)          | 563,394           | 24,250           | 14,909           | 22,911           | 23,085           | 23,850           | 672,399            |
| A.C.F.C. & W.C.D., Zone 7* (Local Supply) | 461,046           | 23,084           | 43,390           | 37,190           | 42,171           | 37,582           | 644,463            |
| Pleasanton Township W.D.                  | 674               | 0                | 0                | 0                | 0                | 0                | 674                |
| Santa Clara Valley W.D.*                  | 1,637,232         | 42,839           | 62,065           | 69,495           | 28,756           | 44,850           | 1,885,237          |
| Marin W.D.                                | 4,594             | 0                | 0                | 0                | 0                | 0                | 4,594              |
| San Francisco W.D.                        | 55,812            | 21,255           | 5,219            | 0                | 0                | 0                | 82,286             |
| Skylonda M.W.D.                           | 10                | 0                | 0                | 0                | 0                | 0                | 10                 |
| Oak Flat W.D.*                            | 130,246           | 2,239            | 2,858            | 3,831            | 5,169            | 4,904            | 149,247            |
| Mustang W.D.                              | 4,256             | 0                | 0                | 0                | 0                | 0                | 4,256              |
| Granite Construction                      | 120               | 0                | 0                | 0                | 0                | 0                | 120                |
| Lake Del Valle ( E.B.R.P.D. )             | 2,152             | 147              | 143              | 168              | 146              | 150              | 2,906              |
| Orestimba Creek                           | 100               | 0                | 0                | 0                | 0                | 0                | 100                |
| Recreation Fish and Wildlife              | 0                 | 0                | 0                | 4,397            | 0                | 0                | 4,397              |
| CVP Water                                 | 4,997             | 154              | 208              | 211              | 213              | 298              | 6,081              |
| Solano Co. F.C.W.C.D.*                    | 78,172            | 26,086           | 29,806           | 30,990           | 21,345           | 29,999           | 216,398            |
| <b>San Luis Field Division</b>            |                   |                  |                  |                  |                  |                  |                    |
| Dept. Parks & Rec. ( STATE )              | 774               | 72               | 66               | 77               | 67               | 76               | 1,132              |
| Dept. Fish & Game ( STATE )               | 6,536             | 391              | 724              | 640              | 651              | 753              | 9,695              |
| Fed. Customers ( Rec.+ Joint-Use )        | 24,666,091        | 541,473          | 943,200          | 960,626          | 1,207,876        | 1,491,450        | 29,810,716         |
| Fed. Customers (Misc.)                    | 247,872           | 95 7/            | 76 7/            | 108 7/           | 50 7/            | 348 6/           | 248,549            |
| Westlands Water District                  | 10,900            | 0                | 0                | 0                | 0                | 0                | 10,900             |
| <b>San Joaquin Field Division</b>         |                   |                  |                  |                  |                  |                  |                    |
| Tulare Lake Basin W.S.D.*                 | 2,536,133         | 78,558           | 123,290          | 85,029           | 139,869          | 238,070          | 3,200,949          |
| Empire West Side I. D.*                   | 78,903            | 1,354            | 2,741            | 1,666            | 1,631            | 1,868            | 88,163             |
| County Of Kings*                          | 51,900            | 1,806            | 4,000            | 2,116            | 4,000            | 4,000            | 67,822             |
| Hacienda W.D.                             | 75,895            | 0                | 0                | 0                | 0                | 0                | 75,895             |
| Kern County Water Agency*                 | 17,756,350        | 446,625          | 1,081,231        | 700,996          | 1,066,723        | 1,022,516        | 22,074,441         |
| Kern Water Bank                           | 7,501             | 0                | 0                | 0                | 0                | 0                | 7,501              |
| Dudley Ridge Water District*              | 1,247,452         | 13,945           | 23,418           | 32,419           | 45,485           | 53,353           | 1,416,072          |
| Devils Den Water District                 | 339,947           | 0                | 0                | 0                | 0                | 0                | 339,947            |
| J.G. Boswell                              | 117,430           | 0                | 0                | 0                | 0                | 0                | 117,430            |
| Shell Cal Prod.                           | 85,914            | 0                | 0                | 0                | 0                | 0                | 85,914             |
| Alameda County WD                         | 0                 | 0                | 0                | 0                | 0                | 6,200            | 6,200              |
| Green Valley Water District               | 11,054            | 0                | 0                | 0                | 0                | 0                | 11,054             |
| Federal Wheeling                          | 1,135,972         | 34,154           | 12,552           | 48,370           | 9,725            | 9,206            | 1,249,979          |
| Castaia Lake Water Agency                 | 0                 | 0                | 4,157            | 9,422            | 9,486            | 14,052           | 37,117             |
| M.W.D. Of S.C.                            | 92                | 0                | 50,000           | 0                | 50,000           | 95,000           | 195,092            |
| Santa Clara Valley WD                     | 0                 | 0                | 0                | 0                | 0                | 45,000           | 45,000             |
| Central Coastal Water Authority           | 0                 | 0                | 0                | 0                | 0                | 86               | 86                 |
| Department of Fish and Game               | 0                 | 0                | 0                | 0                | 42               | 0                | 42                 |
| <b>Southern Field Division</b>            |                   |                  |                  |                  |                  |                  |                    |
| A.V.E.K. W.A.*                            | 681,626           | 31,927           | 43,102           | 50,552           | 48,513           | 57,672           | 913,392            |
| M.W.D. Of S.C.*                           | 11,963,519        | 716,250          | 602,190          | 807,946          | 386,042          | 498,380          | 14,974,327         |
| Littlerock Creek I. D.*                   | 9,746             | 251              | 734              | 1,098            | 480              | 494              | 12,803             |
| Mojave Water Agency*                      | 59,847            | 9,334            | 11,734           | 16,253           | 7,495            | 6,111            | 110,774            |
| Desert Water Agency*                      | 384,830           | 17,197           | 38,100           | 23,257           | 38,100           | 102,622          | 604,106            |
| Coachilla Valley Water District*          | 240,762           | 10,427           | 23,100           | 14,102           | 23,100           | 62,219           | 373,710            |
| Crestline-Lake Arrowhead Water Agency*    | 25,422            | 264              | 946              | 1,193            | 884              | 1,209            | 29,918             |
| San Gabriel Valley M.W.D.*                | 123,830           | 11,971           | 14,397           | 15,230           | 12,922           | 15,989           | 194,339            |
| San Bernardino Valley M.W.D.*             | 249,516           | 5,113            | 6,552            | 9,135            | 696              | 6,064            | 277,076            |
| Santa Barbara                             | 1,240             | 0                | 0                | 0                | 0                | 0                | 1,240              |
| Dept. Parks & Rec., L.A. Co. Rec. Dept.   | 53,868            | 1,995            | 1,676            | 2,918            | 1,669            | 2,928            | 65,054             |
| Piru Creek Fish Enhancement               | 2,915             | 0                | 0                | 0                | 0                | 0                | 2,915              |
| Castaia Lake Water Agency*                | 150,062           | 14,812           | 13,787           | 14,919           | 17,747           | 19,704           | 231,031            |
| Palmdale Water District*                  | 33,334            | 4,035            | 7,761            | 8,418            | 6,961            | 11,434           | 71,943             |
| United Water C.D. (Local Supply)          | 998               | 0                | 0                | 0                | 0                | 0                | 998                |
| Ventura County FCD*                       | 5,824             | 0                | 0                | 0                | 0                | 0                | 5,824              |
| Los Angeles Dept. of Water and Power      | 0                 | 16               | 0                | 0                | 1,479            | 0                | 1,495              |
| Lilico Pictures                           | 10                | 0                | 0                | 0                | 0                | 0                | 10                 |
| <b>Totals</b>                             | <b>84,693,240</b> | <b>2,704,868</b> | <b>3,999,274</b> | <b>3,859,401</b> | <b>4,069,745</b> | <b>4,850,521</b> | <b>103,396,273</b> |

\* Long-term contractors

1/ Includes Thermalito Afterbay, Palermo Canal, Upper Feather lakes deliveries.

2/ Hacienda Water District was annexed by Tulare Lake Basin WSD in 1981.

3/ Repayment of preconsolidation water.

4/ Advance storage of ground water, by agreement between KCWA and DWR

5/ Includes 237 AF of Vallejo Permit water transferred to Napa.

6/ Includes 298 AF of Dredge Pump out water and 50 AF of Phase I water.

7/ Non-chargeable refill water to WWD. (Phase 1)

**Table 3. Total Energy Resources  
1996**

(in megawatt-hours)

| Resource                   | Jan     | Feb     | Mar     | Apr     | May     | Jun     | Jul     | Aug     | Sep     | Oct     | Nov     | Dec     | Totals    |
|----------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-----------|
| Hyatt-Thermalito 1/        | 233,353 | 506,606 | 347,132 | 361,981 | 384,562 | 275,606 | 382,597 | 301,526 | 113,114 | 122,280 | 131,505 | 432,231 | 3,592,493 |
| CEA Energy 2/              | 34,380  | 25,240  | 35,000  | 35,000  | 35,000  | 36,000  | 40,000  | 35,000  | 35,000  | 35,000  | 35,000  | 31,880  | 412,500   |
| Gianelli                   |         |         |         |         |         |         |         |         |         |         |         |         |           |
| State                      | 654     | 3,921   | 6,451   | 25,892  | 39,485  | 21,817  | 21,661  | 32,381  | 7,917   | 1,779   | 0       | 3,217   | 165,176   |
| Federal                    | 0       | 0       | 0       | 13,462  | 31,686  | 54,031  | 66,648  | 16,558  | 0       | 0       | 0       | 0       | 182,385   |
| Total                      | 654     | 3,921   | 6,451   | 39,354  | 71,171  | 75,848  | 88,309  | 48,939  | 7,917   | 1,779   | 0       | 3,217   | 347,561   |
| Warne 3/                   | 7,420   | 18,242  | 23,684  | 22,705  | 16,896  | 13,894  | 13,254  | 12,677  | 16,902  | 23,022  | 21,933  | 13,089  | 203,718   |
| Castaic                    | 11,208  | 30,840  | 40,440  | 36,060  | 27,240  | 24,000  | 20,808  | 22,275  | 34,845  | 35,810  | 36,120  | 17,040  | 336,686   |
| Mojave                     | 0       | 0       | 0       | 0       | 0       | 468     | 1,334   | 6,220   | 7,237   | 843     | 0       | 0       | 16,102    |
| Alamo                      | 1,237   | 1,829   | 1,911   | 8,024   | 7,982   | 7,515   | 8,903   | 8,906   | 9,025   | 1,190   | 147     | 0       | 56,669    |
| Devil Canyon               | 8,767   | 18,190  | 15,948  | 72,321  | 69,748  | 63,440  | 76,062  | 78,779  | 78,350  | 16,649  | 14,569  | 12,149  | 524,972   |
| Tera Corp.                 | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0         |
| MWD Hydro                  | 7,874   | 5,973   | 7,175   | 16,365  | 16,514  | 12,591  | 16,719  | 19,389  | 17,597  | 12,539  | 9,685   | 9,192   | 151,613   |
| Reid Gardner               | 53,825  | 58,961  | 60,064  | 56,062  | 0       | 17,006  | 0       | 0       | 59,786  | 107,935 | 103,655 | 119,641 | 636,935   |
| Pine Flat                  | 822     | 0       | 48,946  | 87,796  | 143,727 | 123,009 | 132,860 | 79,311  | 21,971  | 1,567   | 0       | 0       | 640,009   |
| Purchases 4/               | 95,420  | 48,830  | 50,950  | 59,548  | 90,819  | 116,636 | 144,788 | 130,058 | 124,272 | 92,766  | 46,400  | 30,274  | 1,030,761 |
| Other Sources/Exchanges 5/ | 40,445  | 1,391   | 24,007  | 10,982  | 11,546  | 33,624  | 30,323  | 18,756  | 26,931  | 61,362  | 7,737   | 4,867   | 271,971   |
| SCE Return Additional      | 112,287 | 0       | 134,813 | 126,300 | 37,010  | 142,080 | 240,737 | 267,765 | 375,916 | 371,123 | 335,147 | 310,884 | 2,454,062 |

1/ Includes Table Mountain and Hyatt out adjusted to Tesla.

2/ Capacity Exchange Agreement energy from SWP system to Southern California Edison.

3/ Includes station-service energy.

4/ Includes Salt River Project, City & County of San Francisco, Southern California Edison, Bonneville Power Administration, Pacific Gas and Electric, Portland General Electric, City of Colton, Pacific Power & Light, Enron Power Marketing Inc., Electric Clearing House, Inc., Metropolitan Water District, Puget Sound Power and Light, City of Azusa, L.A. Dept. of Water & Power, Catex Vitrol Energy, Northern California Power Agency, Nevada Power, Seattle City Light, and City of Vernon.

5/ Includes Southern California Edison, and Western Area Power Administration.

Total State: 10,493,667

Total Federal: 182,385

Total Energy Resources: 10,676,052

**Table 4. Total Energy Loads**

**1996**

(in megawatt hours)

| Source              | Jan     | Feb     | Mar     | Apr     | May     | Jun     | Jul     | Aug     | Sep     | Oct     | Nov     | Dec     | Totals    |
|---------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-----------|
| Hyatt-Thermalito 1/ | 43,209  | 0       | 32      | 2       | 4,511   | 23,432  | 7,416   | 5,220   | 32,299  | 142     | 7,068   | 3,037   | 126,368   |
| North Bay 2/        | 69      | 134     | 673     | 1,418   | 1,922   | 1,822   | 1,868   | 1,880   | 1,818   | 1,924   | 1,860   | 1,922   | 17,310    |
| South Bay           | 3,012   | 601     | 2,025   | 6,304   | 7,993   | 10,517  | 11,877  | 10,036  | 4,498   | 3,981   | 1,930   | 4,325   | 67,099    |
| Del Valle           | 6       | 8       | 7       | 7       | 8       | 7       | 9       | 9       | 9       | 124     | 213     | 41      | 448       |
| Banks               |         |         |         |         |         |         |         |         |         |         |         |         |           |
| State               | 100,373 | 48,711  | 49,282  | 30,030  | 41,717  | 83,640  | 106,641 | 100,173 | 98,005  | 73,003  | 82,737  | 45,922  | 860,234   |
| Federal             | 0       | 0       | 0       | 0       | 3,240   | 0       | 0       | 7,424   | 0       | 22,680  | 15,859  | 13,758  | 62,961    |
| Bottle Rock 3/      | 45      | 52      | 74      | 64      | 46      | 48      | 48      | 47      | 44      | 44      | 45      | 59      | 616       |
| Gianelli            |         |         |         |         |         |         |         |         |         |         |         |         |           |
| State               | 67,887  | 5,779   | 2,844   | 3,395   | 8,667   | 12,540  | 19,477  | 13,738  | 43,265  | 33,720  | 68,960  | 27,304  | 307,576   |
| Federal             | 52,589  | 40,052  | 8,800   | 1,350   | 7,359   | 0       | 0       | 1,755   | 19,891  | 51,702  | 75,015  | 97,302  | 355,815   |
| Dos Amigos          |         |         |         |         |         |         |         |         |         |         |         |         |           |
| State               | 22,896  | 23,692  | 24,678  | 32,503  | 31,977  | 44,887  | 52,453  | 62,373  | 29,706  | 18,502  | 10,545  | 12,003  | 366,215   |
| Federal             | 11,924  | 5,595   | 360     | 8,274   | 20,856  | 35,109  | 40,872  | 16,374  | 5,505   | 3,904   | 1,926   | 3,322   | 154,021   |
| Pine Flat 3/        | 207     | 249     | 20      | 0       | 0       | 0       | 0       | 0       | 0       | 191     | 27      | 217     | 911       |
| Las Perillas        | 370     | 200     | 299     | 837     | 1,197   | 1,695   | 1,753   | 1,424   | 707     | 561     | 83      | 76      | 9,202     |
| Badger Hill         | 945     | 488     | 769     | 2,309   | 3,239   | 4,635   | 4,837   | 3,966   | 1,948   | 1,491   | 168     | 145     | 24,940    |
| Devil's Den         | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 131     | 54      | 64      | 249       |
| Bluestone           | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 119     | 43      | 54      | 216       |
| Polonio             | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 122     | 36      | 51      | 209       |
| Buena Vista         | 7,775   | 13,947  | 17,611  | 29,440  | 29,028  | 30,556  | 34,014  | 31,486  | 28,038  | 14,042  | 9,569   | 8,037   | 253,543   |
| Teerink             | 6,978   | 13,120  | 16,593  | 29,889  | 28,119  | 26,506  | 29,180  | 28,823  | 29,644  | 14,649  | 10,374  | 8,558   | 242,433   |
| Chrisman            | 15,306  | 29,574  | 36,580  | 66,559  | 61,016  | 56,433  | 62,918  | 63,002  | 66,044  | 32,295  | 23,432  | 19,279  | 532,438   |
| Edmonston           | 53,205  | 105,478 | 131,229 | 239,219 | 215,403 | 197,955 | 221,302 | 222,479 | 235,904 | 112,850 | 84,452  | 69,044  | 1,888,520 |
| Oso                 | 3,344   | 8,304   | 11,145  | 10,365  | 7,903   | 6,428   | 6,063   | 6,134   | 7,574   | 10,335  | 9,420   | 6,730   | 93,745    |
| Mojave              | 89      | 78      | 81      | 64      | 66      | 65      | 54      | 12      | 0       | 37      | 62      | 69      | 677       |
| Pearblossom         | 6,114   | 10,174  | 9,272   | 41,303  | 38,779  | 36,966  | 44,053  | 44,835  | 45,393  | 6,523   | 426     | 2,510   | 286,348   |
| Warne 3/            | 110     | 80      | 65      | 70      | 89      | 88      | 124     | 129     | 82      | 36      | 26      | 109     | 1,008     |
| Sales               | 222,865 | 386,380 | 450,606 | 352,970 | 338,099 | 284,399 | 450,523 | 339,152 | 240,781 | 487,930 | 372,898 | 632,368 | 4,558,971 |
| Other Project       |         |         |         |         |         |         |         |         |         |         |         |         |           |
| Loads 4/            | 42,903  | 59,835  | 29,397  | 53,158  | 39,381  | 43,959  | 49,548  | 54,739  | 36,733  | 47,143  | 38,629  | 123,490 | 618,915   |
| Actual Deviation    | 2,132   | 960     | 1,041   | 2,466   | 1,042   | 1,794   | 1,390   | 941     | 0       | 2,120   | 0       | 210     | 5,609     |
| Losses              | 9,957   | 13,065  | 14,023  | 20,391  | 21,906  | 21,284  | 26,374  | 22,387  | 24,063  | 21,995  | 16,698  | 17,724  | 229,867   |

1/ Pumpback and Station Service.

Total State: 10,493,667

2/ Includes Barker Slough, Cordelia, and Cordelia Interim Pumping Plants.

Total Federal: 572,797

3/ Station Service only.

Total Loads: 11,066,464

4/ Includes Southern California Edison, City of Vernon, Bonneville Power Administration, Nevada Power Authority, LG&E Power Marketing Inc.,

Western Area Power Administration, Aquila Power Corporation, Sacramento Municipal Utility District, Pacific Gas and Electric, and Project Emergency Service.

**Table 5. Net Delta Outflow Index  
1996**

(in cfs-days except as noted)

| Date               | Jan              | Feb              | Mar              | Apr              | May              | Jun              | Jul            | Aug            | Sep            | Oct            | Nov            | Dec              |
|--------------------|------------------|------------------|------------------|------------------|------------------|------------------|----------------|----------------|----------------|----------------|----------------|------------------|
| 1                  | 26,758           | 76,023           | 139,232          | 39,832           | 33,558           | 35,317           | 12,159         | 10,145         | 11,487         | 3,980          | 14,839         | 8,385            |
| 2                  | 32,370           | 87,820           | 134,622          | 41,212           | 32,537           | 31,521           | 12,195         | 9,834          | 13,597         | 4,636          | 14,298         | 9,060            |
| 3                  | 27,841           | 81,124           | 127,539          | 47,602           | 31,113           | 28,533           | 13,256         | 9,710          | 10,722         | 4,461          | 13,633         | 8,553            |
| 4                  | 24,523           | 74,184           | 126,162          | 55,680           | 30,980           | 27,268           | 15,843         | 9,420          | 9,981          | 4,627          | 7,384          | 9,129            |
| 5                  | 16,449           | 75,279           | 121,054          | 55,922           | 32,208           | 26,685           | 11,760         | 9,617          | 10,863         | 4,827          | 5,850          | 10,161           |
| 6                  | 14,244           | 119,160          | 127,366          | 52,666           | 32,265           | 24,600           | 11,816         | 8,603          | 11,303         | 5,223          | 5,934          | 20,216           |
| 7                  | 12,529           | 160,087          | 131,897          | 48,860           | 30,912           | 25,011           | 10,649         | 9,845          | 10,580         | 4,754          | 5,004          | 38,469           |
| 8                  | 10,652           | 173,156          | 123,418          | 43,298           | 28,466           | 21,931           | 9,375          | 8,884          | 10,519         | 4,484          | 4,383          | 40,991           |
| 9                  | 10,691           | 161,320          | 116,424          | 42,319           | 26,076           | 21,676           | 9,476          | 9,136          | 9,755          | 3,303          | 4,563          | 40,515           |
| 10                 | 11,371           | 143,910          | 109,066          | 40,777           | 24,373           | 19,818           | 10,805         | 10,602         | 14,490         | 3,592          | 4,819          | 40,908           |
| 11                 | 10,170           | 116,466          | 99,866           | 38,796           | 22,842           | 25,395           | 10,244         | 12,932         | 12,031         | 4,369          | 4,865          | 52,674           |
| 12                 | 8,662            | 99,878           | 93,700           | 36,575           | 21,645           | 25,672           | 9,738          | 11,224         | 12,859         | 5,303          | 4,581          | 59,045           |
| 13                 | 11,521           | 92,362           | 97,810           | 34,449           | 21,705           | 19,748           | 9,626          | 12,076         | 8,907          | 4,909          | 5,870          | 75,655           |
| 14                 | 9,100            | 89,056           | 111,897          | 33,179           | 22,152           | 16,167           | 9,502          | 11,649         | 8,945          | 4,661          | 4,451          | 110,100          |
| 15                 | 8,159            | 87,273           | 107,759          | 40,093           | 22,485           | 15,586           | 9,054          | 11,897         | 7,951          | 4,765          | 4,677          | 127,330          |
| 16                 | 7,086            | 83,306           | 102,880          | 40,158           | 21,755           | 14,295           | 9,572          | 11,941         | 7,888          | 4,228          | 5,017          | 119,711          |
| 17                 | 8,964            | 84,655           | 97,940           | 41,955           | 39,244           | 12,412           | 9,981          | 10,970         | 8,244          | 3,808          | 8,153          | 114,016          |
| 18                 | 21,508           | 88,560           | 93,127           | 44,760           | 76,737           | 12,185           | 9,456          | 11,286         | 7,469          | 3,821          | 13,090         | 101,130          |
| 19                 | 33,608           | 92,893           | 83,156           | 48,773           | 87,245           | 13,978           | 9,781          | 10,848         | 7,113          | 3,630          | 15,931         | 87,785           |
| 20                 | 41,090           | 107,944          | 80,053           | 51,582           | 98,870           | 11,865           | 9,256          | 9,690          | 6,439          | 4,199          | 16,418         | 81,354           |
| 21                 | 46,075           | 144,227          | 75,600           | 52,577           | 93,692           | 10,459           | 10,200         | 9,395          | 6,113          | 4,662          | 17,158         | 76,280           |
| 22                 | 50,648           | 180,768          | 72,669           | 50,957           | 79,732           | 9,746            | 8,575          | 9,091          | 6,302          | 3,617          | 16,391         | 88,553           |
| 23                 | 48,519           | 216,306          | 67,620           | 48,028           | 75,241           | 9,817            | 9,099          | 9,467          | 6,095          | 5,128          | 13,314         | 102,544          |
| 24                 | 49,829           | 217,322          | 63,092           | 44,250           | 71,264           | 9,737            | 9,447          | 10,550         | 5,225          | 3,781          | 15,891         | 105,302          |
| 25                 | 47,848           | 210,556          | 61,240           | 42,355           | 67,838           | 10,394           | 9,013          | 10,780         | 4,980          | 3,693          | 15,250         | 105,557          |
| 26                 | 54,789           | 193,830          | 54,779           | 39,397           | 67,539           | 12,235           | 8,928          | 11,098         | 4,063          | 5,016          | 16,528         | 100,376          |
| 27                 | 59,954           | 178,541          | 51,757           | 36,186           | 62,819           | 9,159            | 8,878          | 12,795         | 4,192          | 6,113          | 12,431         | 87,608           |
| 28                 | 54,893           | 159,202          | 45,879           | 35,211           | 56,111           | 10,971           | 8,944          | 10,963         | 5,415          | 4,488          | 10,604         | 89,190           |
| 29                 | 64,909           | 146,675          | 44,111           | 34,549           | 49,102           | 11,669           | 9,055          | 10,860         | 5,009          | 3,029          | 9,637          | 103,936          |
| 30                 | 68,103           |                  | 42,321           | 34,014           | 44,150           | 10,543           | 9,109          | 12,813         | 4,171          | 11,122         | 9,528          | 114,484          |
| 31                 | 68,687           |                  | 41,257           |                  | 39,263           |                  | 9,410          | 10,187         |                | 13,395         |                | 189,978          |
| <b>Total</b>       | <b>961,550</b>   | <b>3,741,883</b> | <b>2,845,293</b> | <b>1,296,012</b> | <b>1,443,919</b> | <b>534,393</b>   | <b>314,202</b> | <b>328,308</b> | <b>252,708</b> | <b>151,624</b> | <b>300,492</b> | <b>2,318,995</b> |
| <b>Ave.</b>        | <b>31,018</b>    | <b>128,400</b>   | <b>91,784</b>    | <b>43,200</b>    | <b>46,578</b>    | <b>17,813</b>    | <b>10,136</b>  | <b>10,591</b>  | <b>8,424</b>   | <b>4,891</b>   | <b>10,016</b>  | <b>74,806</b>    |
| <b>Max.</b>        | <b>68,687</b>    | <b>217,322</b>   | <b>139,232</b>   | <b>55,922</b>    | <b>98,870</b>    | <b>35,317</b>    | <b>15,843</b>  | <b>12,932</b>  | <b>14,490</b>  | <b>13,395</b>  | <b>17,158</b>  | <b>189,978</b>   |
| <b>Min.</b>        | <b>7,086</b>     | <b>74,184</b>    | <b>41,257</b>    | <b>33,179</b>    | <b>21,645</b>    | <b>9,159</b>     | <b>8,575</b>   | <b>8,603</b>   | <b>4,063</b>   | <b>3,029</b>   | <b>4,383</b>   | <b>8,385</b>     |
| <b>Total In AF</b> | <b>1,907,234</b> | <b>7,422,025</b> | <b>5,643,639</b> | <b>2,570,640</b> | <b>2,864,013</b> | <b>1,059,969</b> | <b>623,220</b> | <b>651,199</b> | <b>501,246</b> | <b>300,746</b> | <b>596,026</b> | <b>4,599,727</b> |

Annual Total = 28,739,683 acre-feet

**Table 6. Sacramento Basin and Sacramento-San Joaquin Delta Operations**

**1996**

(in thousands of acre-feet except as noted)

| Month | Upstream Reservoir Releases to River |                |        | Sacramento River Accretions or Depletions<br>2/ | Delta Inflow                         |                                     |             | Consumptive | Delta Uses    |             | Delta Exports |       |            |
|-------|--------------------------------------|----------------|--------|-------------------------------------------------|--------------------------------------|-------------------------------------|-------------|-------------|---------------|-------------|---------------|-------|------------|
|       | Keswick<br>1/                        | Oroville<br>1/ | Nimbus |                                                 | Sacramento River at Sacramento<br>3/ | San Joaquin River at Vernalis<br>4/ | Total<br>5/ |             | Outflow Index |             | Total         | DWR   | USBR<br>6/ |
|       |                                      |                |        |                                                 |                                      |                                     |             |             | Total         | Average CFS |               |       |            |
| Jan   | 373                                  | 336            | 135    | 1,315                                           | 2,106                                | 163                                 | 2,269       | -56         | 1,907         | 31          | 617           | 348   | 269        |
| Feb   | 1,688                                | 1,159          | 831    | 3,124                                           | 4,510                                | 595                                 | 5,106       | -37         | 7,422         | 129         | 382           | 171   | 211        |
| Mar   | 1,045                                | 563            | 300    | 2,013                                           | 3,606                                | 897                                 | 4,503       | -10         | 5,644         | 92          | 224           | 174   | 50         |
| Apr   | 339                                  | 569            | 323    | 1,045                                           | 2,237                                | 436                                 | 2,674       | 63          | 2,571         | 43          | 255           | 164   | 91         |
| May   | 664                                  | 533            | 577    | 833                                             | 2,545                                | 512                                 | 3,057       | 121         | 2,864         | 47          | 294           | 146   | 148        |
| Jun   | 821                                  | 252            | 288    | 111                                             | 1,438                                | 242                                 | 1,680       | 191         | 1,060         | 18          | 569           | 295   | 274        |
| Jul   | 883                                  | 408            | 173    | -167                                            | 1,269                                | 153                                 | 1,422       | 268         | 623           | 10          | 656           | 370   | 286        |
| Aug   | 881                                  | 311            | 167    | -65                                             | 1,307                                | 143                                 | 1,450       | 252         | 651           | 11          | 663           | 350   | 313        |
| Sep   | 579                                  | 141            | 129    | 177                                             | 1,051                                | 145                                 | 1,196       | 174         | 501           | 8           | 612           | 345   | 267        |
| Oct   | 363                                  | 137            | 159    | 107                                             | 783                                  | 173                                 | 956         | 118         | 301           | 5           | 604           | 260   | 344        |
| Nov   | 315                                  | 142            | 204    | 272                                             | 926                                  | 167                                 | 1,093       | 55          | 596           | 10          | 601           | 295   | 306        |
| Dec   | 1,174                                | 1,077          | 974    | 1,101                                           | 3,594                                | 684                                 | 4,278       | 2           | 4,600         | 75          | 468           | 164   | 304        |
| Total | 9,126                                | 5,628          | 4,259  | 9,866                                           | 25,375                               | 4,308                               | 29,683      | 1,141       | 28,740        | ---         | 5,945         | 3,082 | 2,863      |

1/ Time lagged values (Keswick: 5 days; Oroville: 2 days).

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

3/ These values are based on a measured daily average taken from the Sacramento River at Freeport.

4/ These values are based on daily 6 a.m. readings.

5/ Includes Sacramento County Regional Waste Treatment Plant.

6/ USBR water pumped at Banks Pumping Plant plus water pumped at Tracy and Contra Costa pumping plants.

**Table 7. Upper Feather Area Lakes Monthly Operation**

**1996**

(in acre-feet except as noted)

| Month | Lake Storage                      |         |                | Outflow            |                       |                    |                         |       |                                   |               | Inflow   |
|-------|-----------------------------------|---------|----------------|--------------------|-----------------------|--------------------|-------------------------|-------|-----------------------------------|---------------|----------|
|       | Water Surface Elevation (in feet) | Storage | Storage Change | Regulated Release  |                       |                    |                         | Spill | Estimated Evaporation and Seepage | Total Outflow | Computed |
|       |                                   |         |                | Stream-Flow Maint. | Water Supply Contract | Prior Water Rights | Total Regulated Release |       |                                   |               |          |

**Antelope Lake Capacity 22,566 acre-feet**

|       |         |        |        |        |   |   |        |        |       |        |        |
|-------|---------|--------|--------|--------|---|---|--------|--------|-------|--------|--------|
| Jan   | 4999.98 | 20,727 | 911    | 1,414  | 0 | 0 | 1,414  | 0      | 61    | 1,475  | 2,386  |
| Feb   | 5002.60 | 23,125 | 2,398  | 1,323  | 0 | 0 | 1,323  | 3,838  | 112   | 5,273  | 7,671  |
| Mar   | 5002.97 | 23,475 | 350    | 1,414  | 0 | 0 | 1,414  | 6,266  | 142   | 7,822  | 8,172  |
| Apr   | 5003.32 | 23,809 | 334    | 1,369  | 0 | 0 | 1,369  | 11,972 | 191   | 13,532 | 13,866 |
| May   | 5002.87 | 23,380 | -429   | 1,414  | 0 | 0 | 1,414  | 13,654 | 306   | 15,374 | 14,945 |
| Jun   | 5002.26 | 22,806 | -574   | 1,190  | 0 | 0 | 1,190  | 2,481  | 516   | 4,187  | 3,613  |
| Jul   | 5001.48 | 22,085 | -721   | 1,230  | 0 | 0 | 1,230  | 158    | 694   | 2,082  | 1,361  |
| Aug   | 5000.08 | 20,823 | -1,262 | 1,230  | 0 | 0 | 1,230  | 0      | 630   | 1,860  | 598    |
| Sep   | 4998.69 | 19,601 | -1,222 | 1,190  | 0 | 0 | 1,190  | 0      | 506   | 1,696  | 474    |
| Oct   | 4997.56 | 18,645 | -956   | 1,230  | 0 | 0 | 1,230  | 0      | 253   | 1,483  | 527    |
| Nov   | 4997.59 | 18,670 | 25     | 1,190  | 0 | 0 | 1,190  | 0      | 133   | 1,323  | 1,348  |
| Dec   | 5003.46 | 23,943 | 5,273  | 1,230  | 0 | 0 | 1,230  | 234    | 96    | 1,560  | 6,833  |
| Total | ---     | ---    | 4,127  | 15,424 | 0 | 0 | 15,424 | 38,603 | 3,640 | 57,667 | 61,794 |

**Frenchman Lake Capacity 55,477 acre-feet**

|       |         |        |        |       |        |   |        |        |       |        |        |
|-------|---------|--------|--------|-------|--------|---|--------|--------|-------|--------|--------|
| Jan   | 5582.67 | 47,453 | 1,365  | 123   | 0      | 0 | 123    | 0      | 99    | 222    | 1,587  |
| Feb   | 5588.25 | 55,873 | 8,420  | 342   | 0      | 0 | 342    | 56     | 181   | 579    | 8,999  |
| Mar   | 5589.11 | 57,248 | 1,375  | 861   | 0      | 0 | 861    | 8,218  | 224   | 9,303  | 10,678 |
| Apr   | 5588.99 | 57,055 | -193   | 833   | 0      | 0 | 833    | 12,141 | 323   | 13,297 | 13,104 |
| May   | 5588.50 | 56,270 | -785   | 861   | 0      | 0 | 861    | 6,736  | 529   | 8,126  | 7,341  |
| Jun   | 5586.72 | 53,477 | -2,793 | 260   | 2,499  | 0 | 2,759  | 795    | 817   | 4,371  | 1,578  |
| Jul   | 5584.07 | 49,486 | -3,991 | 0     | 3,457  | 0 | 3,457  | 0      | 1,104 | 4,561  | 570    |
| Aug   | 5580.76 | 44,761 | -4,725 | 0     | 4,048  | 0 | 4,048  | 0      | 1,002 | 5,050  | 325    |
| Sep   | 5579.73 | 43,348 | -1,413 | 0     | 952    | 0 | 952    | 0      | 795   | 1,747  | 334    |
| Oct   | 5579.25 | 42,700 | -648   | 38    | 448    | 0 | 486    | 0      | 472   | 958    | 310    |
| Nov   | 5579.53 | 43,077 | 377    | 119   | 0      | 0 | 119    | 0      | 216   | 335    | 712    |
| Dec   | 5583.04 | 47,985 | 4,908  | 123   | 0      | 0 | 123    | 0      | 151   | 274    | 5,182  |
| Total | ---     | ---    | 1,897  | 3,560 | 11,404 | 0 | 14,964 | 27,946 | 5,913 | 48,823 | 50,720 |

**Lake Davis Capacity 84,371 acre-feet**

|       |         |        |        |        |     |     |        |   |        |        |        |
|-------|---------|--------|--------|--------|-----|-----|--------|---|--------|--------|--------|
| Jan   | 5772.53 | 74,744 | 2,506  | 1,230  | 1   | 0   | 1,231  | 0 | 261    | 1,492  | 3,998  |
| Feb   | 5773.49 | 78,414 | 3,670  | 6,700  | 1   | 0   | 6,701  | 0 | 462    | 7,163  | 10,833 |
| Mar   | 5773.28 | 77,603 | -811   | 9,279  | 2   | 0   | 9,281  | 0 | 443    | 9,724  | 8,913  |
| Apr   | 5774.09 | 80,754 | 3,151  | 9,410  | 3   | 0   | 9,413  | 0 | 788    | 10,201 | 13,352 |
| May   | 5774.39 | 81,937 | 1,183  | 7,117  | 30  | 0   | 7,147  | 1 | 1,266  | 8,414  | 9,597  |
| Jun   | 5773.84 | 79,774 | -2,163 | 1,091  | 65  | 99  | 1,255  | 0 | 1,966  | 3,221  | 1,058  |
| Jul   | 5772.94 | 76,300 | -3,474 | 1,027  | 92  | 203 | 1,322  | 0 | 2,891  | 4,213  | 739    |
| Aug   | 5772.02 | 72,833 | -3,467 | 996    | 82  | 175 | 1,253  | 0 | 2,632  | 3,885  | 418    |
| Sep   | 5771.24 | 69,960 | -2,873 | 918    | 53  | 272 | 1,243  | 0 | 1,836  | 3,079  | 206    |
| Oct   | 5770.68 | 67,937 | -2,023 | 1,222  | 29  | 8   | 1,259  | 0 | 976    | 2,235  | 212    |
| Nov   | 5770.51 | 67,329 | -608   | 1,359  | 2   | 0   | 1,361  | 0 | 572    | 1,933  | 1,325  |
| Dec   | 5771.95 | 72,572 | 5,243  | 5,873  | 0   | 0   | 5,873  | 0 | 396    | 6,269  | 11,512 |
| Total | ---     | ---    | 334    | 46,222 | 360 | 757 | 47,339 | 1 | 14,489 | 61,829 | 62,163 |

**Table 8. Lake Oroville Monthly Operation  
1996**

(in acre-feet except as noted)

Capacity 3,537,577 acre-feet

| Month | Water Surface Elevation (in feet) | Storage   | Storage Change | Outflow                |               |                        |             |         |               | Hyatt Pumpback | Computed Inflow |
|-------|-----------------------------------|-----------|----------------|------------------------|---------------|------------------------|-------------|---------|---------------|----------------|-----------------|
|       |                                   |           |                | Hyatt Generation<br>1/ | Palermo Canal | Spillway Leakage<br>2/ | Evaporation | Spill   | Total Outflow |                |                 |
| Jan   | 845.62                            | 2,750,028 | 47,947         | 377,939                | 155           | 1,236                  | 710         | 0       | 380,040       | 45,418         | 382,569         |
| Feb   | 844.06                            | 2,729,463 | -20,565        | 811,206                | 102           | 599                    | 1,144       | 411,030 | 1,224,081     | 0              | 1,203,516       |
| Mar   | 862.89                            | 2,985,016 | 255,553        | 558,351                | 301           | 1,472                  | 2,841       | 26      | 562,991       | 0              | 818,544         |
| Apr   | 880.79                            | 3,243,172 | 258,156        | 563,340                | 285           | 2,041                  | 4,067       | 7,777   | 577,510       | 0              | 835,666         |
| May   | 897.89                            | 3,504,341 | 261,169        | 579,826                | 745           | 2,404                  | 5,699       | 84,821  | 673,495       | 3,937          | 930,727         |
| Jun   | 893.83                            | 3,441,019 | -63,322        | 415,009                | 1,030         | 3,586                  | 8,136       | 0       | 427,761       | 21,171         | 343,268         |
| Jul   | 867.65                            | 3,052,191 | -388,828       | 598,217                | 1,100         | 2,869                  | 10,508      | 0       | 612,694       | 7,171          | 216,695         |
| Aug   | 845.15                            | 2,743,821 | -308,370       | 480,684                | 1,120         | 1,697                  | 9,888       | 0       | 493,389       | 5,203          | 179,816         |
| Sep   | 844.52                            | 2,735,516 | -8,305         | 185,474                | 1,130         | 1,167                  | 7,290       | 0       | 195,061       | 34,171         | 152,585         |
| Oct   | 840.55                            | 2,683,587 | -51,929        | 206,965                | 797           | 941                    | 5,139       | 0       | 213,842       | 0              | 161,913         |
| Nov   | 842.96                            | 2,715,028 | 31,441         | 222,775                | 188           | 117                    | 1,614       | 0       | 224,694       | 5,552          | 250,583         |
| Dec   | 858.87                            | 2,929,103 | 214,075        | 686,744                | 158           | 1,255                  | 1,167       | 479,959 | 1,169,283     | 2,859          | 1,380,499       |
| Total | ---                               | ---       | 227,022        | 5,686,530              | 7,109         | 19,384                 | 58,203      | 983,613 | 6,754,839     | 125,482        | 6,856,379       |

1/ Includes bypass flows.

2/ Only occurs when lake water elevation is greater than or equal to 813.00 and there is no spill.

3/ Does not include pumpback.

**Table 9. Thermalito Forebay Monthly Operation  
1996**

Including Diversion Pool and Power Canal  
(end of month storage in acre-feet)

| Month | Storage<br>1/ | Storage<br>Change | Inflow                             |                              |                        | Outflow                        |                 |                                      |                               |                   | Losses (-)<br>And<br>Gains (+) |
|-------|---------------|-------------------|------------------------------------|------------------------------|------------------------|--------------------------------|-----------------|--------------------------------------|-------------------------------|-------------------|--------------------------------|
|       |               |                   | Lake<br>Oroville<br>Releases<br>2/ | Kelly<br>Ridge<br>Generation | Thermalito<br>Pumpback | Thermalito<br>Generation<br>3/ | Butte<br>County | Thermalito<br>Irrigation<br>District | Releases<br>To<br>River<br>4/ | Hyatt<br>Pumpback |                                |
| Jan   | 23,325        | -706              | 379,175                            | 15,260                       | 62,676                 | 354,820                        | 11              | 100                                  | 67,564                        | 45,418            | 10,096                         |
| Feb   | 23,231        | -94               | 1,222,835                          | 14,660                       | 0                      | 801,487                        | 50              | 93                                   | 416,250                       | 0                 | -19,709                        |
| Mar   | 23,854        | 623               | 559,849                            | 15,650                       | 0                      | 543,882                        | 0               | 94                                   | 37,950                        | 0                 | 7,050                          |
| Apr   | 23,419        | -435              | 573,158                            | 15,040                       | 0                      | 557,269                        | 3               | 131                                  | 37,260                        | 0                 | 6,031                          |
| May   | 22,525        | -894              | 667,051                            | 15,180                       | 9,764                  | 573,898                        | 26              | 231                                  | 115,710                       | 3,937             | 913                            |
| Jun   | 23,563        | 1,038             | 418,595                            | 14,900                       | 30,636                 | 409,041                        | 0               | 349                                  | 36,870                        | 21,171            | 4,338                          |
| Jul   | 23,488        | -75               | 601,086                            | 15,460                       | 10,174                 | 583,214                        | 0               | 441                                  | 38,780                        | 7,171             | 2,811                          |
| Aug   | 23,695        | 207               | 482,381                            | 15,470                       | 9,114                  | 465,054                        | 36              | 420                                  | 39,269                        | 5,203             | 3,224                          |
| Sep   | 21,480        | -2,215            | 186,641                            | 9,620                        | 47,139                 | 174,134                        | 4               | 316                                  | 37,060                        | 34,171            | 70                             |
| Oct   | 23,321        | 1,841             | 207,906                            | 2,450                        | 0                      | 136,912                        | 11              | 219                                  | 70,972                        | 0                 | -401                           |
| Nov   | 23,267        | -54               | 222,892                            | 4,640                        | 24,105                 | 149,404                        | 34              | 111                                  | 96,630                        | 11,104            | 5,592                          |
| Dec   | 22,983        | -284              | 1,167,958                          | 14,210                       | 8,417                  | 706,636                        | 110             | 108                                  | 475,270                       | 5,718             | -3,027                         |
| Total | - - -         | -1,048            | 6,689,527                          | 152,538                      | 202,025                | 5,455,751                      | 285             | 2,613                                | 1,469,584                     | 133,893           | 16,988                         |

1/ Sum of Thermalito Forebay and Diversion Pool.

2/ Sum of releases from Lake Oroville through Hyatt plant, spill, and spillway leakage.

3/ Includes bypass flows.

4/ Sum of Diversion Dam generation plus Hatchery.

**Table 10. Thermalito Afterbay Monthly Operation  
1996**

(end of month storage in acre-feet)

| Month  | Water Surface Elevation (in feet) | Storage | Storage Change | Inflow                   | Outflow            |                       |                |               |              |                     | Losses (-) And Gains (+) |
|--------|-----------------------------------|---------|----------------|--------------------------|--------------------|-----------------------|----------------|---------------|--------------|---------------------|--------------------------|
|        |                                   |         |                | Thermalito Generation 1/ | Sutter Butte Canal | Western Canal Lateral | Richvale Canal | Western Canal | River Outlet | Thermalito Pumpback |                          |
| Jan    | 129.49                            | 30,478  | -13,511        | 354,820                  | 13,310             | 25                    | 5,180          | 1,360         | 270,000      | 62,676              | -15,780                  |
| Feb    | 133.38                            | 44,298  | 13,820         | 801,487                  | 0                  | 0                     | 0              | 0             | 750,900      | 0                   | -36,767                  |
| Mar    | 130.81                            | 34,896  | -9,402         | 543,882                  | 0                  | 0                     | 0              | 0             | 529,000      | 0                   | -24,284                  |
| Apr    | 130.83                            | 34,966  | 70             | 557,269                  | 2,220              | 81                    | 2,180          | 2,270         | 537,200      | 0                   | -13,248                  |
| May    | 130.69                            | 34,483  | -483           | 573,898                  | 75,190             | 641                   | 18,120         | 36,180        | 420,400      | 9,764               | -14,087                  |
| Jun    | 129.15                            | 29,385  | -5,098         | 409,041                  | 88,580             | 742                   | 19,150         | 46,240        | 216,300      | 30,636              | -12,491                  |
| Jul    | 131.33                            | 36,714  | 7,329          | 583,214                  | 97,890             | 936                   | 23,180         | 58,620        | 371,780      | 10,174              | -13,306                  |
| Aug    | 135.09                            | 51,108  | 14,394         | 465,054                  | 90,190             | 667                   | 20,270         | 46,020        | 274,220      | 9,114               | -10,179                  |
| Sep    | 124.26                            | 15,771  | -35,337        | 174,134                  | 44,410             | 0                     | 3,250          | 9,470         | 104,500      | 47,139              | -702                     |
| Oct    | 124.32                            | 15,914  | 143            | 136,912                  | 31,670             | 213                   | 9,970          | 27,570        | 67,270       | 0                   | -76                      |
| Nov    | 130.16                            | 32,685  | 16,771         | 149,404                  | 27,180             | 67                    | 15,950         | 18,760        | 46,120       | 24,105              | -451                     |
| Dec    | 130.54                            | 33,970  | 1,285          | 706,636                  | 22,580             | 49                    | 15,170         | 5,110         | 609,000      | 8,417               | -45,025                  |
| Totals |                                   |         | -10,019        | 5,455,751                | 493,220            | 3,421                 | 132,419        | 251,601       | 4,196,690    | 202,025             | -186,395                 |

1/ Includes bypass flows.

**Table 11. Lake Del Valle Monthly Operation**

**1996**

(in acre-feet except as noted)

| Month | Water Surface Elevation (in feet) | Storage | Storage Change | Inflow  |                    | Outflow            |               |              |             |        | Precipitation (inches) |
|-------|-----------------------------------|---------|----------------|---------|--------------------|--------------------|---------------|--------------|-------------|--------|------------------------|
|       |                                   |         |                | Natural | South Bay Aqueduct | South Bay Aqueduct | Recreation 1/ | Arroyo Valle | Evaporation | Total  |                        |
| Jan   | 699.34                            | 37,377  | 11,138         | 11,361  | 0                  | 0                  | 2             | 175          | 46          | 223    | 4.86                   |
| Feb   | 702.10                            | 39,281  | 1,904          | 22,065  | 0                  | 2,980              | 2             | 17,110       | 69          | 20,161 | 4.83                   |
| Mar   | 702.57                            | 39,611  | 330            | 12,675  | 0                  | 6,082              | 8             | 6,104        | 151         | 12,345 | 2.66                   |
| Apr   | 703.12                            | 39,999  | 388            | 2,309   | 0                  | 1,701              | 6             | 0            | 214         | 1,921  | 1.52                   |
| May   | 703.14                            | 40,013  | 14             | 1,020   | 0                  | 670                | 19            | 0            | 317         | 1,006  | 0.93                   |
| Jun   | 702.64                            | 39,660  | -353           | 246     | 0                  | 186                | 20            | 0            | 393         | 599    | 0.00                   |
| Jul   | 702.00                            | 39,211  | -449           | 94      | 0                  | 3                  | 26            | 0            | 514         | 543    | 0.00                   |
| Aug   | 701.20                            | 38,654  | -557           | -21     | 0                  | 8                  | 31            | 0            | 497         | 536    | 0.00                   |
| Sep   | 692.73                            | 33,061  | -5,593         | -134    | 0                  | 5,101              | 24            | 0            | 334         | 5,459  | 0.00                   |
| Oct   | 679.66                            | 25,610  | -7,451         | -264    | 0                  | 6,952              | 12            | 0            | 223         | 7,187  | 0.94                   |
| Nov   | 667.58                            | 20,076  | -5,534         | 711     | 0                  | 6,171              | 4             | 0            | 70          | 6,245  | 3.63                   |
| Dec   | 687.95                            | 30,161  | 10,085         | 12,563  | 0                  | 2,442              | 1             | 0            | 35          | 2,478  | 4.54                   |
| Total | ---                               | ---     | 3,922          | 62,625  | 0                  | 32,296             | 155           | 23,389       | 2,863       | 58,703 | 23.91                  |

1/ To East Bay Regional Park District.

**Table 12. Clifton Court Forebay Monthly Operation****1996**

(elevation in feet, storage in acre-feet)

| Month | Water Surface Elevation | Storage | Storage Change | Inflow    |
|-------|-------------------------|---------|----------------|-----------|
| Jan   | 2.63                    | 23,941  | 2,508          | 350,884   |
| Feb   | 2.52                    | 23,703  | -238           | 171,045   |
| Mar   | -0.15                   | 17,940  | -5,763         | 168,141   |
| Apr   | -0.09                   | 18,069  | 129            | 107,189   |
| May   | -0.34                   | 17,531  | -538           | 160,930   |
| Jun   | 0.98                    | 20,375  | 2,844          | 304,547   |
| Jul   | 0.03                    | 18,328  | -2,047         | 374,147   |
| Aug   | -0.82                   | 16,499  | -1,829         | 384,558   |
| Sep   | -0.61                   | 16,950  | 451            | 349,285   |
| Oct   | -0.03                   | 18,199  | 1,249          | 339,055   |
| Nov   | -0.65                   | 16,864  | -1,335         | 347,166   |
| Dec   | 3.37                    | 25,544  | 8,680          | 219,926   |
| Total | ---                     | ---     | 4,111          | 3,276,873 |

**Table 13. San Luis Reservoir Monthly Operation  
1996**

(in acre-feet except as noted)

| Month | Water Surface Elevation (in feet) | Storage   | Storage Change | Inflow                     | Outflow                       |                |       | Gain (+)<br>Loss (-) | Evaporation | Precipitation (in inches) |
|-------|-----------------------------------|-----------|----------------|----------------------------|-------------------------------|----------------|-------|----------------------|-------------|---------------------------|
|       |                                   |           |                | Gianelli P-G Plant Pumping | Gianelli P-G Plant Generation | Pacheco Tunnel | Spill |                      |             |                           |
| Jan   | 535.59                            | 1,934,442 | 287,560        | 298,242                    | 2,340                         | 9,800          | 0     | 1,458                | 1,269       | 2.37                      |
| Feb   | 542.74                            | 2,024,533 | 90,091         | 107,028                    | 14,199                        | 8,429          | 0     | 5,691                | 1,359       | 3.44                      |
| Mar   | 542.67                            | 2,023,644 | -889           | 29,968                     | 23,164                        | 5,417          | 0     | -2,276               | 4,276       | 1.13                      |
| Apr   | 531.68                            | 1,885,781 | -137,863       | 11,213                     | 142,415                       | 5,321          | 0     | -1,340               | 7,049       | 0.39                      |
| May   | 511.66                            | 1,643,454 | -242,327       | 44,132                     | 273,616                       | 10,190         | 0     | -2,653               | 10,588      | 0.74                      |
| Jun   | 486.01                            | 1,350,109 | -293,345       | 36,032                     | 321,413                       | 7,787          | 0     | -177                 | 12,107      | 0.00                      |
| Jul   | 450.71                            | 979,318   | -370,791       | 63,962                     | 432,904                       | 10,343         | 0     | 8,494                | 13,414      | 0.00                      |
| Aug   | 427.00                            | 753,481   | -225,837       | 59,546                     | 265,921                       | 17,865         | 0     | -1,597               | 10,770      | 0.00                      |
| Sep   | 444.14                            | 914,750   | 161,269        | 237,559                    | 44,004                        | 18,723         | 0     | -13,563              | 7,313       | 0.00                      |
| Oct   | 469.84                            | 1,175,411 | 260,661        | 292,565                    | 9,341                         | 12,236         | 0     | -10,327              | 5,431       | 1.78                      |
| Nov   | 507.64                            | 1,596,193 | 420,782        | 442,357                    | 0                             | 12,128         | 0     | -9,447               | 1,730       | 2.32                      |
| Dec   | 533.10                            | 1,903,404 | 307,211        | 333,550                    | 12,847                        | 9,255          | 12    | -4,225               | 1,032       | 3.92                      |
| Total | ---                               | ---       | 256,522        | 1,956,154                  | 1,542,164                     | 127,494        | 12    | -29,962              | 76,338      | 16.09                     |

**Table 14. O'Neill Forebay Monthly Operation**

**1996**

(in acre-feet except as noted)

| Month | Water Surface Elevation (in feet) | Storage | Monthly Storage Change | Inflow     |                           |                               |                              | Outflow                      |                            |                    |            | Gain (+)<br>Loss (-) |
|-------|-----------------------------------|---------|------------------------|------------|---------------------------|-------------------------------|------------------------------|------------------------------|----------------------------|--------------------|------------|----------------------|
|       |                                   |         |                        | Pump In 1/ | O'Neill P-G Plant Pumping | Gianelli P-G Plant Generation | California Aqueduct Check 12 | O'Neill P-G Plant Generation | Gianelli P-G Plant Pumping | Dos Amigos Pumping | Deliveries |                      |
| Jan   | 221.26                            | 46,442  | 209                    | 0          | 228,048                   | 2,340                         | 336,696                      | 0                            | 298,242                    | 258,131            | 1,084      | -9,418               |
| Feb   | 219.94                            | 42,997  | -3,445                 | 0          | 141,360                   | 14,199                        | 167,963                      | 316                          | 107,028                    | 216,617            | 1,107      | -1,899               |
| Mar   | 219.46                            | 41,759  | -1,238                 | 0          | 28,031                    | 23,164                        | 168,164                      | 5,466                        | 29,968                     | 185,568            | 902        | 1,307                |
| Apr   | 220.34                            | 44,036  | 2,277                  | 28,726     | 57,572                    | 142,415                       | 95,390                       | 6,262                        | 11,213                     | 299,632            | 1,952      | -2,767               |
| May   | 222.10                            | 48,650  | 4,614                  | 0          | 64,826                    | 273,616                       | 140,214                      | 37,941                       | 44,132                     | 379,681            | 1,574      | -10,714              |
| Jun   | 219.57                            | 42,042  | -6,608                 | 0          | 33,893                    | 321,413                       | 271,573                      | 1,073                        | 36,032                     | 579,014            | 3,681      | -13,687              |
| Jul   | 222.13                            | 48,730  | 6,688                  | 0          | 1,674                     | 432,904                       | 349,258                      | 16,739                       | 63,962                     | 673,540            | 5,008      | -17,899              |
| Aug   | 222.49                            | 49,687  | 957                    | 0          | 31,668                    | 265,921                       | 357,345                      | 11,580                       | 59,546                     | 569,675            | 4,912      | -8,264               |
| Sep   | 219.50                            | 41,862  | -7,825                 | 0          | 111,954                   | 44,004                        | 331,871                      | 0                            | 237,559                    | 259,224            | 1,201      | 2,330                |
| Oct   | 222.08                            | 48,597  | 6,735                  | 0          | 131,097                   | 9,341                         | 325,529                      | 0                            | 292,565                    | 164,349            | 713        | -1,605               |
| Nov   | 221.32                            | 46,600  | -1,997                 | 0          | 195,895                   | 0                             | 338,938                      | 0                            | 442,357                    | 91,997             | 260        | -2,216               |
| Dec   | 221.39                            | 46,784  | 184                    | 0          | 232,734                   | 12,847                        | 201,701                      | 0                            | 333,550                    | 114,352            | 206        | 1,010                |
| Total | ---                               | ---     | 551                    | 28,726     | 1,258,752                 | 1,542,164                     | 3,084,642                    | 79,377                       | 1,956,154                  | 3,791,780          | 22,600     | -63,822              |

1/ Pump-in located at Mile 79.67R. Includes 927 AF of B. F. Sisk spill from March 10 through March 25, 1995.

**Table 15. Monthly Operations Summary, State-Federal San Luis Joint-Use Facilities  
1996**

(In acre-feet except as noted)

|                          | Jan       | Feb       | Mar       | Apr       | May       | Jun       | Jul      | Aug      | Sep      | Oct       | Nov       | Dec       | Total     |
|--------------------------|-----------|-----------|-----------|-----------|-----------|-----------|----------|----------|----------|-----------|-----------|-----------|-----------|
| Flows Past Check 12      |           |           |           |           |           |           |          |          |          |           |           |           |           |
| State                    | 336,696   | 167,963   | 168,164   | 95,390    | 129,304   | 271,573   | 349,258  | 357,345  | 331,871  | 249,168   | 285,543   | 155,377   | 2,897,652 |
| Federal                  | 0         | 0         | 0         | 0         | 10,910    | 0         | 0        | 0        | 0        | 76,361    | 53,395    | 46,324    | 186,990   |
| Total                    | 336,696   | 167,963   | 168,164   | 95,390    | 140,214   | 271,573   | 349,258  | 357,345  | 331,871  | 325,529   | 338,938   | 201,701   | 3,084,642 |
| O'Neill P-G Plant        |           |           |           |           |           |           |          |          |          |           |           |           |           |
| Amount Pumped            |           |           |           |           |           |           |          |          |          |           |           |           |           |
| State                    | 0         | 0         | 0         | 57,572    | 0         | 0         | 0        | 0        | 0        | 0         | 0         | 0         | 57,572    |
| Federal                  | 228,048   | 141,360   | 28,031    | 28,726    | 64,826    | 33,893    | 1,674    | 31,668   | 111,954  | 131,097   | 195,895   | 232,734   | 1,229,906 |
| Total                    | 228,048   | 141,360   | 28,031    | 86,298    | 64,826    | 33,893    | 1,674    | 31,668   | 111,954  | 131,097   | 195,895   | 232,734   | 1,287,478 |
| Generation               |           |           |           |           |           |           |          |          |          |           |           |           |           |
| Federal                  | 0         | 316       | 5,466     | 6,262     | 37,941    | 1,073     | 16,739   | 11,580   | 0        | 0         | 0         | 0         | 79,377    |
| O'Neill Forebay          |           |           |           |           |           |           |          |          |          |           |           |           |           |
| End-of-Month Storage     |           |           |           |           |           |           |          |          |          |           |           |           |           |
| State *                  | -236,676  | -193,722  | -140,694  | -115,704  | -101,670  | -173,488  | -217,747 | -113,233 | -114,893 | -106,780  | -106,557  | -89,957   | ---       |
| Federal                  | 283,118   | 236,719   | 182,453   | 159,740   | 150,320   | 215,530   | 266,477  | 162,920  | 156,755  | 155,377   | 153,157   | 136,741   | ---       |
| Total                    | 46,442    | 42,997    | 41,759    | 44,036    | 48,650    | 42,042    | 48,730   | 49,687   | 41,862   | 48,597    | 46,600    | 46,784    | ---       |
| San Luis Reservoir       |           |           |           |           |           |           |          |          |          |           |           |           |           |
| End-of-Month Storage     |           |           |           |           |           |           |          |          |          |           |           |           |           |
| State                    | 1,076,304 | 1,076,912 | 1,058,672 | 972,075   | 843,282   | 787,482   | 750,599  | 626,228  | 737,334  | 840,351   | 1,045,521 | 1,105,944 | ---       |
| Federal                  | 858,138   | 947,621   | 964,972   | 913,706   | 800,172   | 562,627   | 228,719  | 127,253  | 177,416  | 335,060   | 550,672   | 797,460   | ---       |
| Total                    | 1,934,442 | 2,024,533 | 2,023,644 | 1,885,781 | 1,643,454 | 1,350,109 | 979,318  | 753,481  | 914,750  | 1,175,411 | 1,596,193 | 1,903,404 | ---       |
| Gianelli P-G Plant       |           |           |           |           |           |           |          |          |          |           |           |           |           |
| Amount Pumped            |           |           |           |           |           |           |          |          |          |           |           |           |           |
| State                    | 166,496   | 11,677    | 6,176     | 7,772     | 23,306    | 36,032    | 63,962   | 53,025   | 162,570  | 118,038   | 210,366   | 75,600    | 935,020   |
| Federal                  | 131,746   | 95,351    | 23,792    | 3,441     | 20,826    | 0         | 0        | 6,521    | 74,989   | 174,527   | 231,991   | 257,950   | 1,021,134 |
| Total                    | 298,242   | 107,028   | 29,968    | 11,213    | 44,132    | 36,032    | 63,962   | 59,546   | 237,559  | 292,565   | 442,357   | 333,550   | 1,956,154 |
| Generation               |           |           |           |           |           |           |          |          |          |           |           |           |           |
| State                    | 2,340     | 14,199    | 23,164    | 93,632    | 150,640   | 91,735    | 105,517  | 176,518  | 44,004   | 9,341     | 0         | 12,847    | 723,937   |
| Federal                  | 0         | 0         | 0         | 48,783    | 122,976   | 229,678   | 327,387  | 89,403   | 0        | 0         | 0         | 0         | 818,227   |
| Total                    | 2,340     | 14,199    | 23,164    | 142,415   | 273,616   | 321,413   | 432,904  | 265,921  | 44,004   | 9,341     | 0         | 12,847    | 1,542,164 |
| Pacheco Tunnel Diversion |           |           |           |           |           |           |          |          |          |           |           |           |           |
| Federal                  | 9,800     | 8,429     | 5,417     | 5,321     | 10,190    | 7,787     | 10,343   | 17,865   | 18,723   | 12,236    | 12,128    | 9,255     | 127,494   |
| Dos Amigos P.P.          |           |           |           |           |           |           |          |          |          |           |           |           |           |
| State                    | 123,438   | 126,482   | 132,781   | 212,254   | 236,655   | 391,512   | 425,174  | 371,652  | 216,156  | 131,386   | 73,677    | 76,562    | 2,517,729 |
| Federal                  | 134,693   | 90,135    | 52,787    | 87,378    | 143,026   | 187,502   | 248,366  | 198,023  | 43,068   | 32,963    | 18,320    | 37,790    | 1,274,051 |
| Total                    | 258,131   | 216,617   | 185,568   | 299,632   | 379,681   | 579,014   | 673,540  | 569,675  | 259,224  | 164,349   | 91,997    | 114,352   | 3,791,780 |

\* Negative storage values indicate a deficit in storage withdrawals versus amounts stored and positive values larger than the reservoir capacity indicate a surplus of amounts stored versus storage withdrawals.

**Table 16. Pyramid Lake Monthly Operation**

**1996**

(in acre-feet except as noted)

| Month | Water Surface Elevation (in feet) | Total Storage | Natural Inflow Storage Shares | Storage Change | Inflow                            |                  |         | Outflow                       |            |                           | Computed Losses (-) Gains (+) |
|-------|-----------------------------------|---------------|-------------------------------|----------------|-----------------------------------|------------------|---------|-------------------------------|------------|---------------------------|-------------------------------|
|       |                                   |               |                               |                | Project                           |                  | Natural | Project                       |            | Natural                   |                               |
|       |                                   |               |                               |                | Castaic Powerplant Pumpback<br>1/ | Warne Powerplant |         | Castaic Powerplant Generation | Deliveries | Stream Flow Release<br>2/ |                               |
| Jan   | 2,569.32                          | 158,936       | -280                          | -2,734         | 74,465                            | 12,182           | 1,383   | 83,702                        | 0          | 4,561                     | -2,501                        |
| Feb   | 2,573.86                          | 164,611       | 959                           | 5,675          | 75,178                            | 30,509           | 5,325   | 99,554                        | 0          | 4,086                     | -1,697                        |
| Mar   | 2,574.90                          | 165,930       | 298                           | 1,319          | 70,594                            | 39,979           | 2,462   | 105,586                       | 0          | 3,123                     | -3,007                        |
| Apr   | 2,575.52                          | 166,719       | 766                           | 789            | 45,504                            | 37,971           | 1,944   | 81,283                        | 0          | 1,476                     | -1,871                        |
| May   | 2,570.49                          | 160,386       | 153                           | -6,333         | 73,133                            | 28,185           | 894     | 104,173                       | 0          | 1,507                     | -2,865                        |
| Jun   | 2,571.88                          | 162,120       | -778                          | 1,734          | 115,072                           | 22,772           | 543     | 132,370                       | 1          | 1,474                     | -2,808                        |
| Jul   | 2,572.53                          | 162,935       | -1,919                        | 815            | 144,161                           | 22,427           | 379     | 159,246                       | 0          | 1,520                     | -5,386                        |
| Aug   | 2,572.30                          | 162,647       | -3,073                        | -288           | 114,106                           | 21,936           | 364     | 128,372                       | 0          | 1,518                     | -6,804                        |
| Sep   | 2,568.32                          | 157,704       | -4,073                        | -4,943         | 49,939                            | 27,614           | 391     | 82,188                        | 0          | 1,391                     | 692                           |
| Oct   | 2,559.00                          | 146,503       | -3,363                        | -11,201        | 58,599                            | 36,484           | 1,017   | 106,604                       | 0          | 307                       | -390                          |
| Nov   | 2,562.37                          | 150,494       | -2,673                        | 3,991          | 90,931                            | 36,364           | 977     | 123,048                       | 0          | 287                       | -946                          |
| Dec   | 2,575.51                          | 166,706       | 174                           | 16,212         | 70,708                            | 21,301           | 3,673   | 79,415                        | 0          | 826                       | 771                           |
| Total | ---                               | ---           | ---                           | 5,036          | 982,390                           | 337,724          | 19,352  | 1,285,541                     | 1          | 22,076                    | -26,812                       |

1/ Pumpback by Los Angeles Department of Water and Power (LADWP) from Elderberry Forebay through Castaic powerplant.

2/ Portions of these amounts are used to satisfy fishery enhancement agreement.

**Table 17. Elderberry Forebay Monthly Operation  
1996**

(in acre-feet except as noted)

| Month | Water Surface Elevation (in feet) | Storage | Storage Change | Inflow                        |                       | Outflow                        |                 |         | Computed Losses (-) Gains (+) |
|-------|-----------------------------------|---------|----------------|-------------------------------|-----------------------|--------------------------------|-----------------|---------|-------------------------------|
|       |                                   |         |                | Castaic Powerplant Generation | Natural Stream Inflow | Castaic Powerplant Pumpback 1/ | To Castaic Lake |         |                               |
|       |                                   |         |                |                               |                       |                                | Natural         | Project |                               |
| Jan   | 1522.52                           | 24,326  | 4,163          | 83,702                        | 241                   | 74,465                         | 241             | 6,217   | 1,143                         |
| Feb   | 1511.50                           | 19,766  | -4,560         | 99,554                        | 1,348                 | 75,178                         | 1,348           | 28,328  | -608                          |
| Mar   | 1513.51                           | 20,560  | 794            | 105,586                       | 665                   | 70,594                         | 665             | 35,197  | 999                           |
| Apr   | 1515.25                           | 21,263  | 703            | 81,283                        | 238                   | 45,504                         | 238             | 34,765  | -311                          |
| May   | 1520.65                           | 23,520  | 2,257          | 104,173                       | 15                    | 73,133                         | 15              | 29,089  | 306                           |
| Jun   | 1519.99                           | 23,236  | -284           | 132,370                       | 0                     | 115,072                        | 0               | 18,657  | 1,075                         |
| Jul   | 1518.82                           | 22,740  | -496           | 159,246                       | 0                     | 144,161                        | 0               | 17,678  | 2,097                         |
| Aug   | 1518.80                           | 22,732  | -8             | 128,372                       | 0                     | 114,106                        | 0               | 18,093  | 3,819                         |
| Sep   | 1516.89                           | 21,934  | -798           | 82,188                        | 0                     | 49,939                         | 0               | 32,527  | -520                          |
| Oct   | 1520.51                           | 23,458  | 1,524          | 106,604                       | 41                    | 58,599                         | 41              | 45,973  | -508                          |
| Nov   | 1528.08                           | 26,800  | 3,342          | 123,048                       | 126                   | 90,931                         | 126             | 28,173  | -602                          |
| Dec   | 1509.30                           | 18,916  | -7,884         | 79,415                        | 1,065                 | 70,708                         | 1,065           | 15,797  | -794                          |
| Total | ---                               | ---     | -1,247         | 1,285,541                     | 3,739                 | 982,390                        | 3,739           | 310,494 | 6,096                         |

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

**Table 18. Castaic Lake Monthly Operation  
1996**

(in acre-feet except as noted)

| Month | Water Surface Elevation (in feet) | Storage | Natural Inflow Storage Shares | Storage Change | Inflow                  |         | Outflow |                    | Computed Losses (-) Gains (+) |                                  |
|-------|-----------------------------------|---------|-------------------------------|----------------|-------------------------|---------|---------|--------------------|-------------------------------|----------------------------------|
|       |                                   |         |                               |                | From Elderberry Forebay |         | Natural | Project Deliveries |                               | Released to Castaic Lagoon<br>1/ |
|       |                                   |         |                               |                | Natural                 | Project |         |                    |                               |                                  |
| Jan   | 1,482.41                          | 255,576 | 936                           | -9,247         | 241                     | 6,217   | 288     | 16,644             | 0                             | 651                              |
| Feb   | 1,493.17                          | 277,050 | 3,951                         | 21,474         | 1,348                   | 28,328  | 1,667   | 11,343             | 0                             | 1,474                            |
| Mar   | 1,505.19                          | 302,207 | 5,766                         | 25,157         | 665                     | 35,197  | 1,150   | 12,059             | 0                             | 204                              |
| Apr   | 1,508.60                          | 309,579 | 842                           | 7,372          | 238                     | 34,765  | 536     | 21,117             | 5,698                         | -1,352                           |
| May   | 1,512.25                          | 317,587 | 317                           | 8,008          | 15                      | 29,089  | 181     | 20,665             | 721                           | 109                              |
| Jun   | 1,510.48                          | 313,689 | 210                           | -3,898         | 0                       | 18,657  | 56      | 21,667             | 163                           | -781                             |
| Jul   | 1,507.70                          | 307,623 | 0                             | -6,066         | 0                       | 17,678  | 6       | 24,114             | 289                           | 653                              |
| Aug   | 1,498.45                          | 287,942 | 0                             | -19,681        | 0                       | 18,093  | 0       | 37,347             | 515                           | 88                               |
| Sep   | 1,496.72                          | 284,346 | 0                             | -3,596         | 0                       | 32,527  | 0       | 34,117             | 300                           | -1,706                           |
| Oct   | 1,497.76                          | 286,504 | 52                            | 2,158          | 41                      | 45,973  | 12      | 41,918             | 1                             | -1,949                           |
| Nov   | 1,498.04                          | 287,087 | 311                           | 583            | 126                     | 28,173  | 133     | 28,679             | 0                             | 830                              |
| Dec   | 1,498.65                          | 288,359 | 2,542                         | 1,272          | 1,065                   | 15,797  | 1,166   | 17,925             | 0                             | 1,169                            |
| Total | ---                               | ---     | ---                           | 23,536         | 3,739                   | 310,494 | 5,195   | 287,595            | 7,687                         | -610                             |

1/ Jul 96; 73 AF delivered to recreation entitlement. Aug 96; 515 AF delivered to recreation entitlement. Sept 96; 391 AF delivered to recreation entitlement.

**Table 19. Castaic Lagoon Monthly Operation  
1996**

(in acre-feet except as noted)

| Month | Water Surface Elevation (in feet) | Storage | Storage Change | Inflow<br>1/ | Natural Outflow               |             | Deliveries to Recreation | Computed Losses (-) Gains (+) |
|-------|-----------------------------------|---------|----------------|--------------|-------------------------------|-------------|--------------------------|-------------------------------|
|       |                                   |         |                |              | Release From Castaic Afterbay |             |                          |                               |
|       |                                   |         |                |              | Surface                       | Sub-Surface |                          |                               |
| Jan   | 1134.20                           | 5,312   | -143           | 0            | 118                           | 0           | 25                       | 0                             |
| Feb   | 1134.06                           | 5,285   | -27            | 0            | 0                             | 0           | 44                       | 17                            |
| Mar   | 1133.30                           | 5,139   | -146           | 0            | 0                             | 78          | 68                       | 0                             |
| Apr   | 1136.44                           | 5,748   | 609            | 5,698        | 4,841                         | 120         | 128                      | 0                             |
| May   | 1135.46                           | 5,556   | -192           | 721          | 671                           | 124         | 118                      | 0                             |
| Jun   | 1135.05                           | 5,476   | -80            | 163          | 0                             | 118         | 125                      | 0                             |
| Jul   | 1135.18                           | 5,501   | 25             | 289          | 0                             | 109         | 155                      | 0                             |
| Aug   | 1135.70                           | 5,603   | 102            | 515          | 0                             | 256         | 157                      | 0                             |
| Sep   | 1135.84                           | 5,630   | 27             | 300          | 0                             | 148         | 125                      | 0                             |
| Oct   | 1134.43                           | 5,356   | -274           | 1            | 0                             | 161         | 114                      | 0                             |
| Nov   | 1133.55                           | 5,187   | -169           | 0            | 0                             | 98          | 71                       | 0                             |
| Dec   | 1133.47                           | 5,172   | -15            | 0            | 0                             | 62          | 71                       | 118                           |
| Total | ---                               | ---     | -283           | 7,687        | 5,630                         | 1,274       | 1,201                    | 135                           |

1/ Includes 888 AF of recreation inflow from Castaic Lake.

**Table 20. Silverwood Lake Monthly Operation  
1996**

(in acre-feet except as noted)

| Month        | Water Surface Elevation (in feet) | Storage | Natural Inflow Storage Shares | Storage Change | Inflow  |                    |         | Outflow               |            |       |                                | Computed Losses (-) Gains (+) | Total Natural Inflow Released 1/ | Appropriated Water From Houston Crk. To CLAWA |
|--------------|-----------------------------------|---------|-------------------------------|----------------|---------|--------------------|---------|-----------------------|------------|-------|--------------------------------|-------------------------------|----------------------------------|-----------------------------------------------|
|              |                                   |         |                               |                | Natural | Mojave Power Plant | Project | San Bernardino Tunnel | Deliveries |       | Natural Inflow to Mojave River |                               |                                  |                                               |
|              |                                   |         |                               |                |         |                    |         |                       | Recreation | CLAWA |                                |                               |                                  |                                               |
| Jan          | 3,311.74                          | 39,032  | 208                           | 55             | 224     | 0                  | 7,400   | 7,877                 | 2          | 59    | 12                             | 381                           | 247                              | 18                                            |
| Feb          | 3,311.57                          | 38,915  | 590                           | -117           | 5,158   | 0                  | 12,640  | 16,049                | 2          | 45    | 3,676                          | 1,857                         | 4,326                            | 450                                           |
| Mar          | 3,311.73                          | 39,025  | 1,439                         | 110            | 3,273   | 0                  | 10,354  | 13,577                | 2          | 58    | 1,092                          | 1,212                         | 2,146                            | 278                                           |
| Apr          | 3,311.55                          | 38,901  | 774                           | -124           | 712     | 0                  | 60,091  | 60,696                | 6          | 63    | 489                            | 327                           | 1,366                            | 11                                            |
| May          | 3,310.79                          | 38,380  | 295                           | -521           | 246     | 0                  | 56,279  | 57,906                | 8          | 78    | 278                            | 1,224                         | 725                              | 0                                             |
| Jun          | 3,311.06                          | 38,565  | 202                           | 185            | 74      | 4,434              | 47,470  | 53,113                | 8          | 111   | 6                              | 1,445                         | 167                              | 0                                             |
| Jul          | 3,311.44                          | 38,825  | 185                           | 260            | 3       | 11,471             | 50,071  | 63,917                | 11         | 161   | 6                              | 2,810                         | 36                               | 0                                             |
| Aug          | 3,311.47                          | 38,846  | 180                           | 21             | 0       | 55,577             | 7,775   | 64,720                | 11         | 188   | 5                              | 1,593                         | 5                                | 0                                             |
| Sep          | 3,312.74                          | 39,724  | 175                           | 878            | 0       | 64,456             | 184     | 65,449                | 10         | 141   | 5                              | 1,843                         | 5                                | 0                                             |
| Oct          | 3,308.04                          | 36,525  | 170                           | -3,199         | 8       | 9,451              | 539     | 14,043                | 8          | 135   | 5                              | 994                           | 5                                | 0                                             |
| Nov          | 3,287.45                          | 24,169  | 339                           | -12,356        | 269     | 0                  | 0       | 12,530                | 1          | 88    | 53                             | 47                            | 53                               | 39                                            |
| Dec          | 3,268.14                          | 14,977  | 979                           | -9,192         | 1,747   | 0                  | 58      | 10,784                | 2          | 82    | 1,469                          | 1,340                         | 1,484                            | 196                                           |
| <b>Total</b> | ---                               | ---     | ---                           | -24,000        | 11,714  | 145,389            | 252,861 | 440,661               | 71         | 1,209 | 7,096                          | 15,073                        | 10,565                           | 992                                           |

1/ Total releases made from Mojave Siphon to Las Flores Ranch Co., in exchange for natural inflow stored in lake, and from Silverwood Lake to Mojave River from outlet for Mojave W.A. The difference between this total column and the natural inflow released to Mojave River equals the Las Flores Ranch.

**Table 21. Lake Perris Monthly Operation  
1996**

(in acre-feet except as noted)

| Month | Water Surface Elevation (in feet) | Storage | Storage Change | Inflow | Outflow | Computed Losses (-) Gains (+) |
|-------|-----------------------------------|---------|----------------|--------|---------|-------------------------------|
| Jan   | 1580.91                           | 110,988 | -895           | 926    | 1,349   | -472                          |
| Feb   | 1585.12                           | 120,305 | 9,317          | 10,492 | 311     | -864                          |
| Mar   | 1586.74                           | 123,964 | 3,659          | 4,637  | 346     | -632                          |
| Apr   | 1586.69                           | 123,851 | -113           | 2,216  | 362     | -1,967                        |
| May   | 1585.76                           | 121,745 | -2,106         | 558    | 2,389   | -275                          |
| Jun   | 1585.50                           | 121,159 | -586           | 950    | 1,114   | -422                          |
| Jul   | 1584.96                           | 119,945 | -1,214         | 1,882  | 451     | -2,645                        |
| Aug   | 1583.92                           | 117,621 | -2,324         | 2,128  | 5,141   | 689                           |
| Sep   | 1587.79                           | 126,361 | 8,740          | 9,995  | 369     | -886                          |
| Oct   | 1586.86                           | 124,237 | -2,124         | 690    | 388     | -2,426                        |
| Nov   | 1587.37                           | 125,400 | 1,163          | 1,835  | 347     | -325                          |
| Dec   | 1587.15                           | 124,898 | -502           | 0      | 345     | -157                          |
| Total | ---                               | ---     | 13,015         | 36,309 | 12,912  | -10,382                       |

Table 22a. Summary of California Aqueduct Operation

1996  
(in acre-feet)

| Description                                                                                                                                                    | Jan       | Feb       | Mar       | Apr       | May       | Jun       | Jul      | Aug      | Sep     | Oct       | Nov       | Dec       | Total     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|----------|----------|---------|-----------|-----------|-----------|-----------|
| <b>DELTA FIELD DIVISION</b>                                                                                                                                    |           |           |           |           |           |           |          |          |         |           |           |           |           |
| Note: North Bay Aqueduct, South Bay Aqueduct, and Lake Del Valle are not within the Edmond G. Brown California Aqueduct, they are shown here for completeness. |           |           |           |           |           |           |          |          |         |           |           |           |           |
| <b>North Bay Aqueduct</b>                                                                                                                                      |           |           |           |           |           |           |          |          |         |           |           |           |           |
| Pumped at Barker Slough Pumping Plant                                                                                                                          | 827       | 541       | 1,934     | 3,035     | 4,992     | 5,158     | 5,279    | 4,568    | 4,047   | 2,528     | 1,829     | 1,507     | 36,245    |
| Deliveries (Travis & Fairfield/Vacaville)                                                                                                                      | 137       | 68        | 652       | 1,013     | 2,272     | 2,519     | 2,580    | 1,972    | 923     | 467       | 185       | 142       | 12,930    |
| Pumped at Cordelia Pumping Plant                                                                                                                               | 667       | 388       | 1,186     | 2,006     | 2,533     | 2,452     | 2,478    | 2,427    | 2,983   | 1,961     | 1,569     | 1,311     | 21,961    |
| Deliveries (Benicia, Vallejo, A.C. 1&2, & Napa)                                                                                                                | 667       | 388       | 1,186     | 2,006     | 2,533     | 2,452     | 2,478    | 2,427    | 2,983   | 1,962     | 1,569     | 1,311     | 21,962    |
| Cordelia Spillway                                                                                                                                              | 0         | 0         | 0         | 0         | 0         | 0         | 0        | 0        | 0       | 0         | 0         | 0         | 0         |
| Computed Losses (-), Gains (+)                                                                                                                                 | -23       | -85       | -96       | -16       | -187      | -187      | -221     | -169     | -141    | -100      | -75       | -54       | -1,354    |
| <b>California Aqueduct</b>                                                                                                                                     |           |           |           |           |           |           |          |          |         |           |           |           |           |
| Pumping at Banks Pumping Plant                                                                                                                                 | 348,376   | 171,418   | 174,082   | 105,770   | 156,749   | 295,490   | 370,341  | 379,999  | 344,926 | 336,186   | 346,661   | 211,225   | 3,241,223 |
| Pumped at South Bay Pumping Plant                                                                                                                              | 3,704     | 644       | 2,014     | 7,420     | 9,554     | 12,295    | 13,123   | 11,411   | 5,243   | 4,755     | 1,846     | 5,014     | 77,023    |
| Delivered to Contracting Agencies                                                                                                                              | 22        | 22        | 54        | 574       | 792       | 1,109     | 1,236    | 803      | 368     | 160       | 36        | 26        | 5,202     |
| Inflow Into Aqueduct                                                                                                                                           | 0         | 0         | 0         | 0         | 0         | 0         | 0        | 0        | 0       | 0         | 0         | 0         | 0         |
| Change in Storage                                                                                                                                              | -2,162    | -656      | -177      | -901      | 1,482     | -188      | 656      | -176     | 440     | -835      | -72       | -589      | -3,178    |
| Outflow at Check 12                                                                                                                                            | 336,696   | 167,963   | 168,164   | 95,390    | 140,215   | 271,573   | 349,258  | 357,345  | 331,871 | 325,529   | 338,938   | 201,701   | 3,084,643 |
| Computed Losses (-), Gains (+)                                                                                                                                 | -10,116   | -3,445    | -4,027    | -3,287    | -4,706    | -10,701   | -6,068   | -10,616  | -7,004  | -6,577    | -5,913    | -5,073    | -77,533   |
| <b>South Bay Aqueduct</b>                                                                                                                                      |           |           |           |           |           |           |          |          |         |           |           |           |           |
| Inflow from Lake Del Valle (Flood)                                                                                                                             | 0         | 977       | 2,053     | 0         | 0         | 0         | 0        | 0        | 0       | 0         | 0         | 0         | 3,030     |
| Pumped at South Bay Pumping Plant                                                                                                                              | 3,704     | 644       | 2,014     | 7,420     | 9,554     | 12,295    | 13,123   | 11,411   | 5,243   | 4,755     | 1,846     | 5,014     | 77,023    |
| Inflow from Lake Del Valle (Natural)                                                                                                                           | 175       | 2,003     | 4,029     | 1,701     | 670       | 186       | 3        | 8        | 5,101   | 6,952     | 6,171     | 2,442     | 29,441    |
| Outflow, Flood Release                                                                                                                                         | 0         | 977       | 2,053     | 0         | 0         | 0         | 0        | 0        | 0       | 0         | 0         | 0         | 3,030     |
| Outflow, Deliveries 1/                                                                                                                                         | 3,869     | 2,590     | 6,033     | 9,111     | 10,214    | 12,471    | 13,116   | 11,394   | 10,334  | 11,697    | 8,007     | 7,446     | 106,282   |
| Computed Losses (-), Gains (+) 2/                                                                                                                              | -10       | -57       | -10       | -10       | -10       | -10       | -10      | -25      | -10     | -10       | -10       | -10       | -182      |
| <b>Lake Del Valle Operation:</b>                                                                                                                               |           |           |           |           |           |           |          |          |         |           |           |           |           |
| Natural inflow                                                                                                                                                 | 9,553     | 22,064    | 12,665    | 2,309     | 1,020     | 246       | 94       | -21      | -134    | -264      | 711       | 12,563    | 60,806    |
| Inflow from South Bay Aqueduct                                                                                                                                 | 0         | 0         | 0         | 0         | 0         | 0         | 0        | 0        | 0       | 0         | 0         | 0         | 0         |
| Releases to South Bay Aqueduct                                                                                                                                 | 175       | 2,980     | 6,082     | 1,701     | 670       | 186       | 3        | 8        | 5,101   | 6,952     | 6,171     | 2,442     | 32,471    |
| Releases to Arroyo Valle (Flood)                                                                                                                               | 0         | 17,110    | 6,104     | 0         | 0         | 0         | 0        | 0        | 0       | 0         | 0         | 0         | 23,214    |
| Delivered to EBRP District                                                                                                                                     | 2         | 3         | 2         | 6         | 19        | 20        | 26       | 31       | 24      | 12        | 4         | 1         | 150       |
| End-of-Month Storage (State)                                                                                                                                   | 37,377    | 39,281    | 39,611    | 39,999    | 40,013    | 39,660    | 39,211   | 38,654   | 33,061  | 25,610    | 20,076    | 30,161    | ---       |
| Change in Storage                                                                                                                                              | 9,331     | 1,904     | 330       | 388       | 14        | -353      | -449     | -557     | -5,593  | -7,451    | -5,534    | 10,085    | 2,115     |
| Evaporation Losses                                                                                                                                             | -45       | -67       | -147      | -214      | -317      | -393      | -514     | -497     | -334    | -223      | -70       | -35       | -2,856    |
| <b>SAN LUIS FIELD DIVISION</b>                                                                                                                                 |           |           |           |           |           |           |          |          |         |           |           |           |           |
| <b>O'Neill Forebay Operation</b>                                                                                                                               |           |           |           |           |           |           |          |          |         |           |           |           |           |
| End-of-Month Storage                                                                                                                                           | 46,442    | 42,997    | 41,759    | 44,036    | 48,650    | 42,042    | 48,730   | 49,687   | 41,862  | 48,597    | 46,600    | 46,784    | ---       |
| Inflow, California Aqueduct                                                                                                                                    | 336,696   | 167,963   | 168,164   | 95,390    | 140,214   | 271,573   | 349,258  | 357,345  | 331,871 | 325,529   | 338,938   | 201,701   | 3,084,642 |
| Inflow, O'Neill P. - G. Plant                                                                                                                                  | 228,048   | 141,360   | 185,632   | 86,298    | 64,826    | 33,893    | 1,674    | 31,668   | 111,954 | 131,097   | 195,895   | 232,734   | 1,287,478 |
| Inflow, Gianelli P. - G. Plant                                                                                                                                 | 2,340     | 14,199    | 23,164    | 142,415   | 273,616   | 321,413   | 432,904  | 265,921  | 44,004  | 9,341     | 0         | 12,847    | 1,542,164 |
| Pump in/Sisk Dam spill                                                                                                                                         | 0         | 0         | 0         | 0         | 0         | 0         | 0        | 0        | 0       | 0         | 0         | 0         | 0         |
| Delivered to Dept. of Fish and Game (State)                                                                                                                    | 17        | 3         | 61        | 57        | 56        | 54        | 53       | 127      | 91      | 89        | 58        | 17        | 683       |
| Delivered to Dept. of Fish and Game (Fed.)                                                                                                                     | 14        | 3         | 52        | 46        | 55        | 55        | 68       | 106      | 77      | 81        | 48        | 16        | 621       |
| Delivered to Dept. of Parks & Rec. (Fed.)                                                                                                                      | 0         | 0         | 0         | 0         | 0         | 0         | 0        | 0        | 0       | 0         | 0         | 0         | 0         |
| Delivered to Dept. of Parks & Rec. (State)                                                                                                                     | 0         | 0         | 0         | 0         | 10        | 11        | 30       | 1        | 4       | 6         | 1         | 1         | 64        |
| Delivered to Fed. Customers                                                                                                                                    | 1,054     | 1,101     | 790       | 1,850     | 1,472     | 3,582     | 4,911    | 4,682    | 1,036   | 550       | 156       | 48        | 21,232    |
| Outflow, O'Neill P. - G. Plant                                                                                                                                 | 0         | 316       | 5,466     | 6,262     | 37,941    | 1,073     | 16,739   | 11,580   | 0       | 0         | 0         | 0         | 79,377    |
| Outflow, Gianelli P. - G. Plant                                                                                                                                | 298,242   | 107,028   | 29,968    | 11,213    | 44,132    | 36,032    | 63,962   | 59,546   | 237,559 | 292,565   | 442,357   | 333,550   | 1,956,154 |
| Outflow, Dos Amigos P.P.                                                                                                                                       | 258,131   | 216,617   | 185,568   | 299,632   | 379,681   | 579,014   | 673,540  | 569,675  | 259,224 | 164,349   | 91,997    | 114,352   | 3,791,780 |
| Change in Storage                                                                                                                                              | 209       | -3,445    | -1,238    | 2,277     | 4,614     | -6,608    | 6,688    | 957      | -7,825  | 6,735     | -1,997    | 184       | 551       |
| Computed Losses (-), Gains (+)                                                                                                                                 | -9,417    | -1,899    | 1,308     | -2,766    | -10,695   | -13,666   | -17,845  | -8,260   | 2,337   | -1,592    | -2,213    | 886       | -63,822   |
| <b>San Luis Reservoir Operation</b>                                                                                                                            |           |           |           |           |           |           |          |          |         |           |           |           |           |
| State End-of-Month Storage                                                                                                                                     | 1,076,304 | 1,076,912 | 1,058,672 | 972,075   | 843,282   | 787,482   | 750,599  | 626,228  | 737,334 | 840,351   | 1,045,521 | 1,105,944 | ---       |
| Total End-of-Month Storage                                                                                                                                     | 1,934,442 | 2,024,533 | 2,023,644 | 1,885,781 | 1,643,454 | 1,350,109 | 979,318  | 753,481  | 914,750 | 1,175,411 | 1,596,193 | 1,903,404 | ---       |
| Inflow, Gianelli P. - G. Plant                                                                                                                                 | 298,242   | 107,028   | 29,968    | 11,213    | 44,132    | 36,032    | 63,962   | 59,546   | 237,559 | 292,565   | 442,357   | 333,550   | 1,956,154 |
| Outflow, Gianelli P. - G. Plant                                                                                                                                | 2,340     | 14,199    | 23,164    | 142,415   | 273,616   | 321,413   | 432,904  | 265,921  | 44,004  | 9,341     | 0         | 12,847    | 1,542,164 |
| Delivered to Dept. of Parks & Rec. (Fed.)                                                                                                                      | 0         | 0         | 0         | 0         | 0         | 0         | 0        | 0        | 0       | 0         | 0         | 5         | 5         |
| Delivered to Dept. of Parks & Rec. (State)                                                                                                                     | 0         | 0         | 0         | 0         | 0         | 0         | 0        | 0        | 0       | 0         | 0         | 7         | 7         |
| Pacheco Tunnel Diversion                                                                                                                                       | 9,800     | 8,429     | 5,417     | 5,321     | 10,190    | 7,787     | 10,343   | 17,865   | 18,723  | 12,236    | 12,128    | 9,255     | 127,494   |
| Sisk Dam Spill                                                                                                                                                 | 0         | 0         | 0         | 0         | 0         | 0         | 0        | 0        | 0       | 0         | 0         | 0         | 0         |
| Change in Storage (Total)                                                                                                                                      | 287,560   | 90,091    | -889      | -137,863  | -242,327  | -293,345  | -370,791 | -225,837 | 161,269 | 260,661   | 420,782   | 307,211   | 256,522   |
| Computed Losses (-), Gains (+)                                                                                                                                 | 1,458     | 5,691     | -2,276    | -1,340    | -2,653    | -177      | 8,494    | -1,597   | -13,563 | -10,327   | -9,447    | -4,225    | -29,962   |

1/ Does not include 51,200 AF of Stored Entitlement water that did not leave our system.

2/ Pipeline drainage caused losses of 47 AF in Feb. and 15 AF in Aug.

Table 22b. Summary of California Aqueduct Operation (cont.)

1996  
(in acre-feet)

| Description                                                            | Jan     | Feb     | Mar     | Apr     | May     | Jun     | Jul     | Aug     | Sep     | Oct     | Nov    | Dec     | Total     |
|------------------------------------------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------|---------|-----------|
| SAN LUIS FIELD DIVISION (Cont.)                                        |         |         |         |         |         |         |         |         |         |         |        |         |           |
| California Aqueduct (Pools 14 thru 21)                                 |         |         |         |         |         |         |         |         |         |         |        |         |           |
| Inflow, Dos Amigos P.P.(State)                                         | 123,438 | 126,482 | 132,781 | 212,254 | 236,655 | 391,512 | 425,174 | 371,652 | 216,156 | 131,386 | 73,677 | 76,562  | 2,517,729 |
| Inflow, Dos Amigos P.P.(Fed.)                                          | 134,693 | 90,135  | 52,787  | 87,378  | 143,026 | 187,502 | 248,366 | 198,023 | 43,068  | 32,963  | 18,320 | 37,790  | 1,274,051 |
| Total Inflow, Dos Amigos P.P.                                          | 258,131 | 216,617 | 185,568 | 299,632 | 379,681 | 579,014 | 673,540 | 569,675 | 259,224 | 164,349 | 91,997 | 114,352 | 3,791,780 |
| Flow into Aqueduct                                                     | 0       | 211     | 152     | 0       | 975     | 0       | 0       | 0       | 0       | 126     | 9      | 0       | 1,473     |
| Delivered to Dept. of Fish and Game (State)                            | 70      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0      | 0       | 70        |
| Delivered to Dept. of Fish and Game (Fed.)                             | 57      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0      | 0       | 57        |
| Miscellaneous Outflow /1                                               | 0       | 0       | 6       | 0       | 242     | 62      | 5       | 5       | 15      | 5       | 5      | 3       | 348       |
| Delivered to Fed. Customers (State Transfers)                          | 0       | 0       | 0       | 14,133  | 16,000  | 82,482  | 38,676  | 25,000  | 3,297   | 5,959   | 4,500  | 2,500   | 192,547   |
| Delivered to Fed. Customers                                            | 130,159 | 90,849  | 52,263  | 84,225  | 145,943 | 190,608 | 254,010 | 204,023 | 40,727  | 28,666  | 16,980 | 38,540  | 1,276,993 |
| Outflow, Check 21 (State)                                              | 122,139 | 127,449 | 130,481 | 195,577 | 223,745 | 312,210 | 393,129 | 355,896 | 211,945 | 123,313 | 69,549 | 78,012  | 2,343,445 |
| Outflow, Check 21 (Fed.)                                               | 2,188   | 0       | 0       | 384     | 656     | 0       | 0       | 1,046   | 1,901   | 2,609   | 323    | 99      | 9,206     |
| Change in Storage                                                      | -1,413  | -94     | 1,641   | -840    | 86      | 623     | 273     | -626    | 394     | 56      | -1,619 | -2,908  | -4,427    |
| Computed Losses (-), Gains (+)                                         | -4,931  | 1,376   | -1,329  | -6,153  | 6,016   | 6,971   | 12,553  | 15,669  | -945    | -3,867  | -2,268 | 1,894   | 24,986    |
| SAN JOAQUIN FIELD DIVISION                                             |         |         |         |         |         |         |         |         |         |         |        |         |           |
| California Aqueduct, Check 21 to Buena Vista Pumping Plant             |         |         |         |         |         |         |         |         |         |         |        |         |           |
| Inflow, Check 21 (State)                                               | 122,139 | 127,449 | 130,481 | 195,577 | 223,745 | 312,210 | 393,129 | 355,896 | 211,945 | 123,313 | 69,549 | 78,012  | 2,343,445 |
| Inflow, Check 21 (Fed.)                                                | 2,188   | 0       | 0       | 384     | 656     | 0       | 0       | 1,046   | 1,901   | 2,609   | 323    | 99      | 9,206     |
| Total Inflow, Check 21                                                 | 124,327 | 127,449 | 130,481 | 195,961 | 224,401 | 312,210 | 393,129 | 356,942 | 213,846 | 125,922 | 69,872 | 78,111  | 2,352,651 |
| Kern River Intertie                                                    | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0      | 0       | 0         |
| Delivered to Contracting State Agencies                                | 83,616  | 66,890  | 49,379  | 62,539  | 83,531  | 164,729 | 226,098 | 202,517 | 83,837  | 58,229  | 28,877 | 46,493  | 1,156,735 |
| Delivered to Fed. Customers                                            | 2,188   | 0       | 0       | 384     | 656     | 0       | 0       | 1,046   | 1,901   | 2,609   | 323    | 99      | 9,206     |
| Kern Water Bank Preconsol. Return                                      | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0      | 0       | 0         |
| Outflow, Buena Vista P.P.                                              | 31,185  | 56,880  | 72,167  | 120,865 | 119,297 | 125,979 | 140,006 | 129,120 | 115,168 | 57,629  | 39,338 | 31,903  | 1,039,537 |
| Coastal Br. Diversion                                                  | 5,003   | 2,617   | 4,031   | 11,399  | 16,458  | 23,093  | 23,602  | 19,346  | 9,647   | 7,657   | 836    | 690     | 124,379   |
| Change in Storage                                                      | -550    | 594     | -763    | 178     | -3      | 247     | 89      | 464     | -338    | -69     | -488   | -712    | -1,351    |
| Computed Losses (-), Gains (+)                                         | -2,885  | -468    | -5,667  | -596    | -4,462  | 1,838   | -3,334  | -4,449  | -3,631  | 133     | -986   | 362     | -24,145   |
| California Aqueduct, Buena Vista P.P. to Teerink Pumping Plant         |         |         |         |         |         |         |         |         |         |         |        |         |           |
| Inflow, Buena Vista P.P.                                               | 31,185  | 56,880  | 72,167  | 120,865 | 119,297 | 125,979 | 140,006 | 129,120 | 115,168 | 57,629  | 39,338 | 31,903  | 1,039,537 |
| Delivered to Contracting State Agencies                                | 6,405   | 9,228   | 11,378  | 10,850  | 16,054  | 28,560  | 32,323  | 23,749  | 5,997   | 4,058   | 1,242  | 1,949   | 151,793   |
| W.R.M.W.S.D. Pumpback                                                  | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0      | 0       | 0         |
| Outflow, Teerink Pumping Plant                                         | 24,434  | 48,620  | 62,631  | 113,342 | 106,469 | 100,573 | 111,107 | 109,782 | 112,747 | 55,261  | 38,561 | 31,351  | 914,878   |
| Change in Storage                                                      | 99      | 124     | 55      | -104    | 146     | -84     | -19     | -73     | 103     | 73      | 140    | -503    | -42       |
| Computed Losses (-), Gains (+)                                         | -247    | 1,092   | 1,897   | 3,224   | 3,372   | 3,071   | 3,405   | 4,338   | 3,679   | 1,763   | 605    | 894     | 27,092    |
| California Aqueduct, Teerink Pumping Plant to Chrisman Pumping Plant   |         |         |         |         |         |         |         |         |         |         |        |         |           |
| Inflow, Teerink Pumping Plant                                          | 24,434  | 48,620  | 62,631  | 113,342 | 106,469 | 100,573 | 111,107 | 109,782 | 112,747 | 55,261  | 38,561 | 31,351  | 914,878   |
| Delivered to Contracting State Agencies                                | 534     | 487     | 2,388   | 3,492   | 5,630   | 6,882   | 6,329   | 4,865   | 2,912   | 2,051   | 392    | 224     | 36,186    |
| Outflow, Chrisman Pumping Plant                                        | 23,490  | 47,274  | 58,803  | 108,105 | 99,875  | 92,144  | 102,742 | 102,980 | 108,128 | 52,103  | 37,665 | 30,656  | 863,965   |
| Change in Storage                                                      | 27      | -48     | 40      | -35     | -8      | -15     | 20      | 10      | -3      | 5       | 24     | -16     | 3         |
| Computed Losses (-), Gains (+)                                         | -383    | -907    | -1,400  | -1,780  | -972    | -1,562  | -2,016  | -1,927  | -1,710  | -1,102  | -480   | -487    | -14,724   |
| California Aqueduct, Chrisman Pumping Plant to Edmonston Pumping Plant |         |         |         |         |         |         |         |         |         |         |        |         |           |
| Inflow, Chrisman Pumping Plant                                         | 23,490  | 47,274  | 58,803  | 108,105 | 99,875  | 92,144  | 102,742 | 102,980 | 108,128 | 52,103  | 37,665 | 30,656  | 863,965   |
| Delivered to Contracting State Agencies                                | 687     | 709     | 625     | 1,217   | 2,774   | 3,187   | 3,678   | 2,963   | 2,290   | 2,037   | 348    | 200     | 20,715    |
| Outflow, Edmonston Pumping Plant                                       | 23,258  | 46,791  | 58,070  | 105,675 | 95,273  | 87,726  | 97,990  | 99,187  | 104,876 | 50,328  | 37,365 | 30,358  | 836,897   |
| Change in Storage                                                      | -20     | -28     | -68     | 91      | -26     | 40      | -90     | 42      | -21     | 47      | 41     | -80     | -71       |
| Computed Losses (-), Gains (+)                                         | 435     | 198     | -176    | -1,122  | -1,854  | -1,191  | -1,164  | -788    | -983    | 309     | 89     | -178    | -6,424    |
| Coastal Branch, California Aqueduct                                    |         |         |         |         |         |         |         |         |         |         |        |         |           |
| Inflow, Las Perillas P.P.                                              | 5,003   | 2,617   | 4,031   | 11,399  | 16,458  | 23,093  | 23,602  | 19,346  | 9,647   | 7,657   | 836    | 690     | 124,379   |
| B.M.W.S.D. Pumpback                                                    | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0      | 0       | 0         |
| Delivered to Contracting State Agencies                                | 4,641   | 2,610   | 3,592   | 10,546  | 15,367  | 20,498  | 21,687  | 18,113  | 8,954   | 7,335   | 772    | 601     | 114,716   |
| Delivered to Fed. Customers                                            | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0       | 0      | 0       | 0         |
| Change in Storage                                                      | -9      | 20      | -10     | -3      | 0       | 11      | 0       | -5      | -5      | 0       | 7      | -6      | 0         |
| Computed Losses (-), Gains (+)                                         | -371    | 13      | -449    | -856    | -1,091  | -2,584  | -1,915  | -1,238  | -698    | -322    | -57    | -95     | -9,663    |

1/ Includes 298 AF of Dredge Pump out water and 50 AF of Phase I water.

Table 22c. Summary of California Aqueduct Operation (cont.)

1996

(in acre-feet)

| Description                                                        | Jan    | Feb    | Mar    | Apr     | May    | Jun    | Jul    | Aug    | Sep     | Oct    | Nov     | Dec    | Total   |
|--------------------------------------------------------------------|--------|--------|--------|---------|--------|--------|--------|--------|---------|--------|---------|--------|---------|
| <b>SOUTHERN FIELD DIVISION</b>                                     |        |        |        |         |        |        |        |        |         |        |         |        |         |
| <b>Tehachapi Afterbay Operation</b>                                |        |        |        |         |        |        |        |        |         |        |         |        |         |
| Inflow from Edmonston P.P.                                         | 23,258 | 46,791 | 58,070 | 105,675 | 95,273 | 87,726 | 97,990 | 99,187 | 104,876 | 50,328 | 37,365  | 30,358 | 836,897 |
| Outflow to West Branch                                             | 11,502 | 30,756 | 41,681 | 38,816  | 29,630 | 23,974 | 22,284 | 22,441 | 28,127  | 38,533 | 34,424  | 24,486 | 346,654 |
| Outflow to East Branch                                             | 11,754 | 16,036 | 16,407 | 66,855  | 65,646 | 63,748 | 75,720 | 76,740 | 76,743  | 11,792 | 2,934   | 5,879  | 490,254 |
| Change in Storage                                                  | -2     | 11     | -10    | 1       | -2     | 5      | 1      | 1      | 3       | -8     | 1       | -1     | 0       |
| Computed Losses (-), Gains (+)                                     | -4     | 12     | 8      | -3      | 1      | 1      | 15     | -5     | -3      | -11    | -6      | 6      | 11      |
| <b>California Aqueduct, Tehachapi Afterbay to Pearblossom P.P.</b> |        |        |        |         |        |        |        |        |         |        |         |        |         |
| Inflow (Aqueduct)                                                  | 11,754 | 16,036 | 16,407 | 66,855  | 65,646 | 63,748 | 75,720 | 76,740 | 76,743  | 11,792 | 2,934   | 5,879  | 490,254 |
| Inflow (L.A.D.W.P.)                                                | 0      | 0      | 0      | 0       | 0      | 0      | 0      | 0      | 0       | 0      | 0       | 0      | 0       |
| Delivered to Contracting Agencies                                  | 3,169  | 2,362  | 3,841  | 5,974   | 7,668  | 8,908  | 10,696 | 9,706  | 7,771   | 4,367  | 2,553   | 2,585  | 69,600  |
| Outflow, Pearblossom P.P.                                          | 8,256  | 14,511 | 13,079 | 61,266  | 57,542 | 55,033 | 66,326 | 67,002 | 67,806  | 9,025  | 0       | 3,075  | 422,921 |
| Change in Storage                                                  | -4     | 16     | 54     | -619    | 544    | -187   | -162   | -326   | 960     | -2,393 | -47     | 692    | -1,472  |
| Computed Losses (-), Gains (+)                                     | -333   | 853    | 567    | -234    | 108    | 6      | 1,140  | -358   | -206    | -793   | -428    | 473    | 795     |
| <b>California Aqueduct, Pearblossom P.P. to Silverwood Lake</b>    |        |        |        |         |        |        |        |        |         |        |         |        |         |
| Inflow, Pearblossom P.P.                                           | 8,256  | 14,511 | 13,079 | 61,266  | 57,542 | 55,033 | 66,326 | 67,002 | 67,806  | 9,025  | 0       | 3,075  | 422,921 |
| Deliveries (Exchange of Natural Inflow)                            | 1,045  | 543    | 565    | 508     | 11     | 441    | 535    | 535    | 450     | 507    | 284     | 687    | 6,111   |
| Exchange of Natural Inflow (Los Flores T.O.)                       | 235    | 650    | 1,054  | 877     | 447    | 161    | 30     | 0      | 0       | 0      | 0       | 15     | 3,469   |
| Outflow to Silverwood Lake                                         | 7,400  | 12,640 | 10,354 | 60,091  | 56,279 | 51,904 | 61,542 | 63,352 | 64,640  | 9,990  | 0       | 58     | 398,250 |
| Change in Storage                                                  | -294   | -96    | 305    | -276    | -213   | 471    | -362   | -510   | 864     | -1,840 | -1,310  | 2,218  | -1,043  |
| Computed Losses (-), Gains (+)                                     | 130    | -774   | -801   | -66     | -1,018 | -2,056 | -4,581 | -3,625 | -1,852  | -368   | -1,026  | -97    | -16,134 |
| <b>Silverwood Lake Operation</b>                                   |        |        |        |         |        |        |        |        |         |        |         |        |         |
| Inflow, Project                                                    | 7,400  | 12,640 | 10,354 | 60,091  | 56,279 | 51,904 | 61,542 | 63,352 | 64,640  | 9,990  | 0       | 58     | 398,250 |
| Inflow, Natural                                                    | 224    | 5,158  | 3,273  | 712     | 246    | 74     | 3      | 0      | 0       | 8      | 269     | 1,747  | 11,714  |
| Delivered to Contracting Agencies                                  | 59     | 45     | 58     | 63      | 78     | 111    | 161    | 188    | 141     | 135    | 88      | 82     | 1,209   |
| Recreation Deliveries                                              | 2      | 2      | 2      | 6       | 8      | 8      | 11     | 11     | 10      | 8      | 1       | 2      | 71      |
| Outflow, Natural Inflow Released                                   | 12     | 3,676  | 1,092  | 489     | 278    | 6      | 6      | 5      | 5       | 5      | 53      | 1,469  | 7,096   |
| Outflow, Project Water at San Bernardino Tunnel                    | 7,877  | 16,049 | 13,577 | 60,696  | 57,906 | 53,113 | 63,917 | 64,720 | 65,449  | 14,043 | 12,530  | 10,784 | 440,661 |
| Change in storage                                                  | 55     | -117   | 110    | -124    | -521   | 185    | 260    | 21     | 878     | -3,199 | -12,356 | -9,192 | -24,000 |
| Computed Losses (-), Gains (+)                                     | 381    | 1,857  | 1,212  | 327     | 1,224  | 1,445  | 2,810  | 1,593  | 1,843   | 994    | 47      | 1,340  | 15,073  |
| <b>California Aqueduct, Silverwood Lake to Lake Perris</b>         |        |        |        |         |        |        |        |        |         |        |         |        |         |
| Inflow, San Bernardino Tunnel                                      | 7,877  | 16,049 | 13,577 | 60,696  | 57,906 | 53,113 | 63,917 | 64,720 | 65,449  | 14,043 | 12,530  | 10,784 | 440,661 |
| Inflow, SBVMWD Pump-in at DC Afterbay                              | 0      | 0      | 0      | 0       | 0      | 0      | 0      | 0      | 0       | 0      | 0       | 0      | 0       |
| Delivered to Contracting Agencies                                  | 6,934  | 6,291  | 8,430  | 58,438  | 57,283 | 52,172 | 62,088 | 62,360 | 55,787  | 13,986 | 10,737  | 10,732 | 405,238 |
| Outflow to Lake Perris                                             | 926    | 10,492 | 4,637  | 2,216   | 558    | 950    | 1,882  | 2,128  | 9,995   | 690    | 1,835   | 0      | 36,309  |
| Change in Storage                                                  | 6      | -740   | 501    | 32      | 54     | -19    | -64    | 221    | -344    | -643   | -52     | 41     | -1,007  |
| Operational Losses (-), Gains (+)                                  | -11    | -6     | -9     | -10     | -11    | -10    | -11    | -11    | -11     | -10    | -10     | -11    | -121    |
| <b>Lake Perris Operation</b>                                       |        |        |        |         |        |        |        |        |         |        |         |        |         |
| Inflow                                                             | 926    | 10,492 | 4,637  | 2,216   | 558    | 950    | 1,882  | 2,128  | 9,995   | 690    | 1,835   | 0      | 36,309  |
| Delivered to Contracting Agencies                                  | 1,271  | 302    | 339    | 323     | 2,338  | 1,054  | 381    | 5,074  | 320     | 345    | 334     | 337    | 12,418  |
| Recreation Deliveries                                              | 78     | 9      | 7      | 39      | 51     | 60     | 70     | 67     | 49      | 43     | 13      | 8      | 494     |
| Outflow (Pumpback)                                                 | 0      | 0      | 0      | 0       | 0      | 0      | 0      | 0      | 0       | 0      | 0       | 0      | 0       |
| Change in Storage                                                  | -895   | 9,317  | 3,659  | -113    | -2,106 | -586   | -1,214 | -2,324 | 8,740   | -2,124 | 1,163   | -502   | 13,015  |
| Computed Losses (-), Gains (+)                                     | -472   | -864   | -632   | -1,967  | -275   | -422   | -2,645 | 689    | -886    | -2,426 | -325    | -157   | -10,382 |

Table 22d. Summary of California Aqueduct Operation (cont.)

1996  
(in acre-feet)

| Description                                                               | Jan    | Feb    | Mar     | Apr    | May     | Jun     | Jul     | Aug     | Sep    | Oct     | Nov     | Dec    | Total     |
|---------------------------------------------------------------------------|--------|--------|---------|--------|---------|---------|---------|---------|--------|---------|---------|--------|-----------|
| SOUTHERN FIELD DIVISION (Cont.)                                           |        |        |         |        |         |         |         |         |        |         |         |        |           |
| West Branch California Aqueduct<br>Tehachapi Afterbay to Oso P.P.         |        |        |         |        |         |         |         |         |        |         |         |        |           |
| Inflow                                                                    | 11,502 | 30,756 | 41,681  | 38,816 | 29,630  | 23,974  | 22,284  | 22,441  | 28,127 | 38,533  | 34,424  | 24,486 | 346,654   |
| Outflow, Oso Pumping Plant                                                | 11,493 | 30,758 | 41,735  | 38,804 | 29,639  | 23,962  | 22,328  | 22,424  | 28,110 | 38,526  | 34,402  | 24,508 | 346,689   |
| Change in Storage                                                         | -4     | 33     | -30     | 2      | -5      | 14      | 3       | 2       | 9      | -26     | 4       | -2     | 0         |
| Computed Losses (-), Gains (+)                                            | -13    | 35     | 24      | -10    | 4       | 2       | 47      | -15     | -8     | -33     | -18     | 20     | 35        |
| West Branch California Aqueduct<br>Oso P.P. to Pyramid Lake               |        |        |         |        |         |         |         |         |        |         |         |        |           |
| Inflow, Oso P.P.                                                          | 11,493 | 30,758 | 41,735  | 38,804 | 29,639  | 23,962  | 22,328  | 22,424  | 28,110 | 38,526  | 34,402  | 24,508 | 346,689   |
| Outflow through Warne Pumping Plant<br>to Pyramid Lake                    | 12,182 | 30,509 | 39,979  | 37,971 | 28,185  | 22,772  | 22,427  | 21,936  | 27,614 | 36,484  | 36,364  | 21,301 | 337,724   |
| Change in Storage                                                         | -1,011 | -565   | 750     | -54    | 463     | 352     | -165    | -125    | -495   | 974     | -2,254  | 2,432  | 302       |
| Operational Losses (-), Gains (+)                                         | -322   | -814   | -1,006  | -887   | -991    | -838    | -66     | -613    | -991   | -1,068  | -292    | -775   | -8,663    |
| Pyramid Lake Operation                                                    |        |        |         |        |         |         |         |         |        |         |         |        |           |
| Inflow, Project                                                           | 12,182 | 30,509 | 39,979  | 37,971 | 28,185  | 22,772  | 22,427  | 21,936  | 27,614 | 36,484  | 36,364  | 21,301 | 337,724   |
| Inflow, Natural                                                           | 1,383  | 5,325  | 2,462   | 1,944  | 894     | 543     | 379     | 364     | 391    | 1,017   | 977     | 3,673  | 19,352    |
| Inflow, Pumpback from Elderberry Forebay<br>Deliveries (Fish Enhancement) | 74,465 | 75,178 | 70,594  | 45,504 | 73,133  | 115,072 | 144,161 | 114,106 | 49,939 | 58,599  | 90,931  | 70,708 | 982,390   |
| Deliveries                                                                | 0      | 0      | 0       | 0      | 0       | 0       | 0       | 0       | 0      | 0       | 0       | 0      | 0         |
| Delivered to Dept. of Parks and Rec. (State)                              | 0      | 0      | 0       | 0      | 0       | 1       | 0       | 0       | 0      | 0       | 0       | 0      | 1         |
| Outflow, Pyramid Diversion                                                | 4,561  | 4,086  | 3,123   | 1,476  | 1,507   | 1,474   | 1,520   | 1,518   | 1,391  | 307     | 287     | 826    | 22,076    |
| Outflow, Angeles Tunnel                                                   | 83,702 | 99,554 | 105,586 | 81,283 | 104,173 | 132,370 | 159,246 | 128,372 | 82,188 | 106,604 | 123,048 | 79,415 | 1,285,541 |
| Change in Storage                                                         | -2,734 | 5,675  | 1,319   | 789    | -6,333  | 1,734   | 815     | -288    | -4,943 | -11,201 | 3,991   | 16,212 | 5,036     |
| Computed Losses (-), Gains (+)                                            | -2,501 | -1,697 | -3,007  | -1,871 | -2,865  | -2,808  | -5,386  | -6,804  | 692    | -390    | -946    | 771    | -26,812   |
| Elderberry Forebay Operation                                              |        |        |         |        |         |         |         |         |        |         |         |        |           |
| Inflow, Project through Castaic P-G Plant                                 | 83,702 | 99,554 | 105,586 | 81,283 | 104,173 | 132,370 | 159,246 | 128,372 | 82,188 | 106,604 | 123,048 | 79,415 | 1,285,541 |
| Inflow, Natural                                                           | 241    | 1,348  | 665     | 238    | 15      | 0       | 0       | 0       | 0      | 41      | 126     | 1,065  | 3,739     |
| Outflow, Pumpback to Pyramid Lake                                         | 74,465 | 75,178 | 70,594  | 45,504 | 73,133  | 115,072 | 144,161 | 114,106 | 49,939 | 58,599  | 90,931  | 70,708 | 982,390   |
| Outflow, Project Water Released to<br>Castaic Lake                        | 6,458  | 29,676 | 35,862  | 35,003 | 29,104  | 18,657  | 17,678  | 18,093  | 32,527 | 46,014  | 28,299  | 16,862 | 314,233   |
| Change in Storage                                                         | 4,163  | -4,560 | 794     | 703    | 2,257   | -284    | -496    | -8      | -798   | 1,524   | 3,342   | -7,884 | -1,247    |
| Computed Losses (-), Gains (+)                                            | 1,143  | -608   | 999     | -311   | 306     | 1,075   | 2,097   | 3,819   | -520   | -508    | -602    | -794   | 6,096     |
| Castaic Lake Operation                                                    |        |        |         |        |         |         |         |         |        |         |         |        |           |
| Inflow, Project                                                           | 6,458  | 29,676 | 35,862  | 35,003 | 29,104  | 18,657  | 17,678  | 18,093  | 32,527 | 46,014  | 28,299  | 16,862 | 314,233   |
| Inflow, Natural                                                           | 288    | 1,667  | 1,150   | 536    | 181     | 56      | 6       | 0       | 0      | 12      | 133     | 1,166  | 5,195     |
| Delivered to Contracting Agencies                                         | 16,628 | 11,340 | 12,051  | 21,106 | 20,655  | 21,630  | 24,074  | 37,308  | 34,070 | 41,881  | 28,663  | 17,916 | 287,322   |
| Deliveries to Recreation (State)                                          | 16     | 3      | 8       | 11     | 10      | 37      | 40      | 39      | 47     | 37      | 16      | 9      | 273       |
| Outflow, Castaic Lagoon                                                   | 0      | 0      | 0       | 5,698  | 721     | 163     | 289     | 515     | 300    | 1       | 0       | 0      | 7,687     |
| Change in Storage                                                         | -9,247 | 21,474 | 25,157  | 7,372  | 8,008   | -3,898  | -6,066  | -19,681 | -3,596 | 2,158   | 583     | 1,272  | 23,536    |
| Computed Losses (-), Gains (+)                                            | 651    | 1,474  | 204     | -1,352 | 109     | -781    | 653     | 88      | -1,706 | -1,949  | 830     | 1,169  | -610      |
| Castaic Lagoon Operation                                                  |        |        |         |        |         |         |         |         |        |         |         |        |           |
| Inflow (Recreation Deliveries)                                            | 0      | 0      | 0       | 0      | 0       | 0       | 73      | 515     | 300    | 0       | 0       | 0      | 888       |
| Inflow                                                                    | 0      | 0      | 0       | 5,698  | 721     | 163     | 216     | 0       | 0      | 1       | 0       | 0      | 6,799     |
| Inflow, Non-project                                                       | 0      | 0      | 0       | 0      | 0       | 0       | 0       | 0       | 0      | 0       | 0       | 0      | 0         |
| Outflow                                                                   | 118    | 0      | 78      | 4,961  | 795     | 118     | 109     | 256     | 148    | 161     | 98      | 62     | 6,904     |
| Deliveries to Recreation (State)                                          | 25     | 44     | 68      | 128    | 118     | 125     | 155     | 157     | 125    | 114     | 71      | 71     | 1,201     |
| Change in Storage                                                         | -143   | -27    | -146    | 609    | -192    | -80     | 25      | 102     | 27     | -274    | -169    | -15    | -283      |
| Computed Losses (-), Gains (+)                                            | 0      | 17     | 0       | 0      | 0       | 0       | 0       | 0       | 0      | 0       | 0       | 118    | 135       |

**Figure 1. Total Deliveries from SWP Facilities**  
Annual Totals

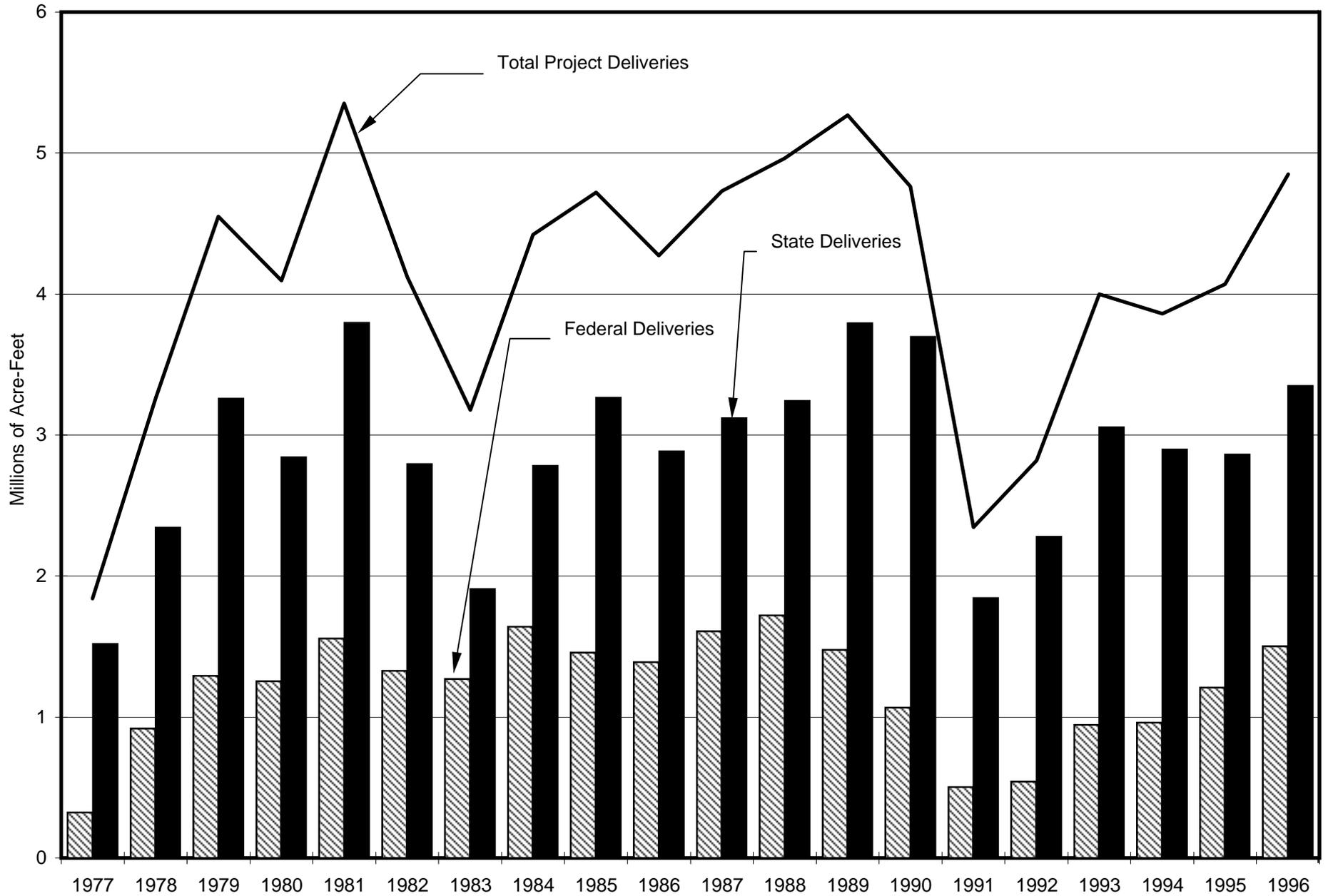
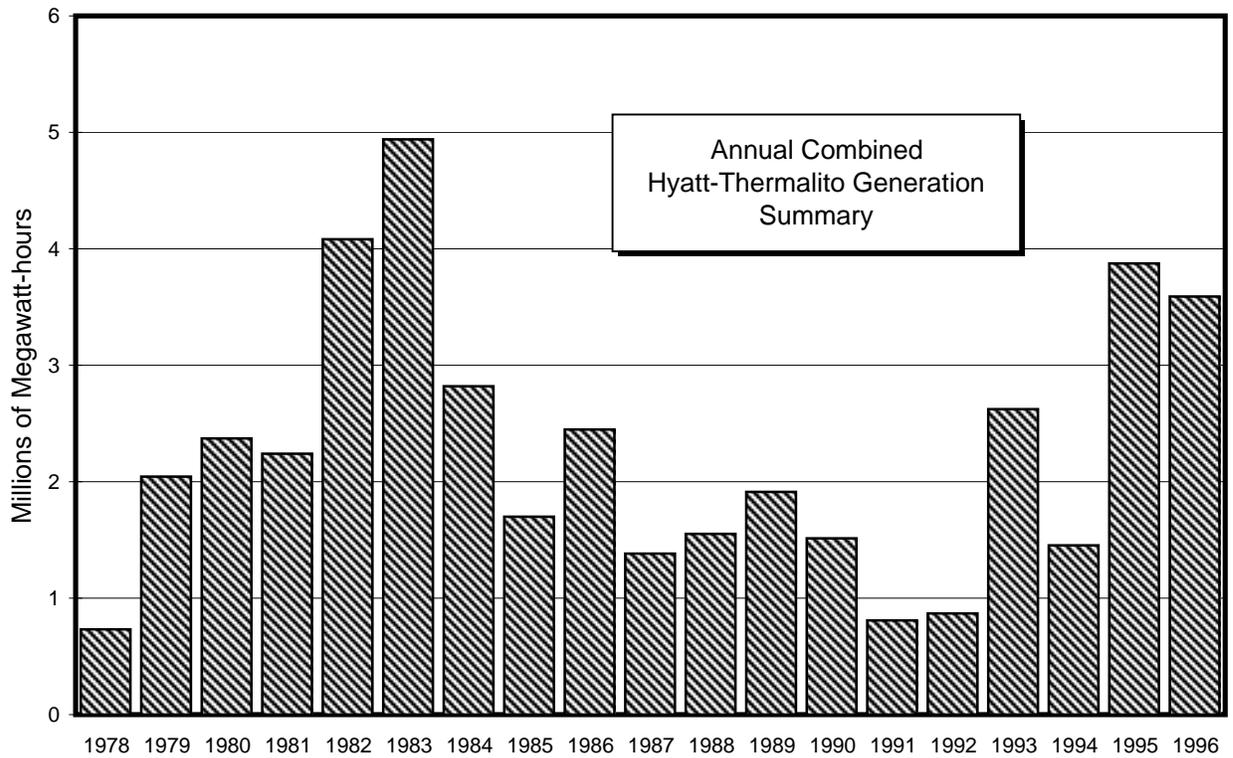
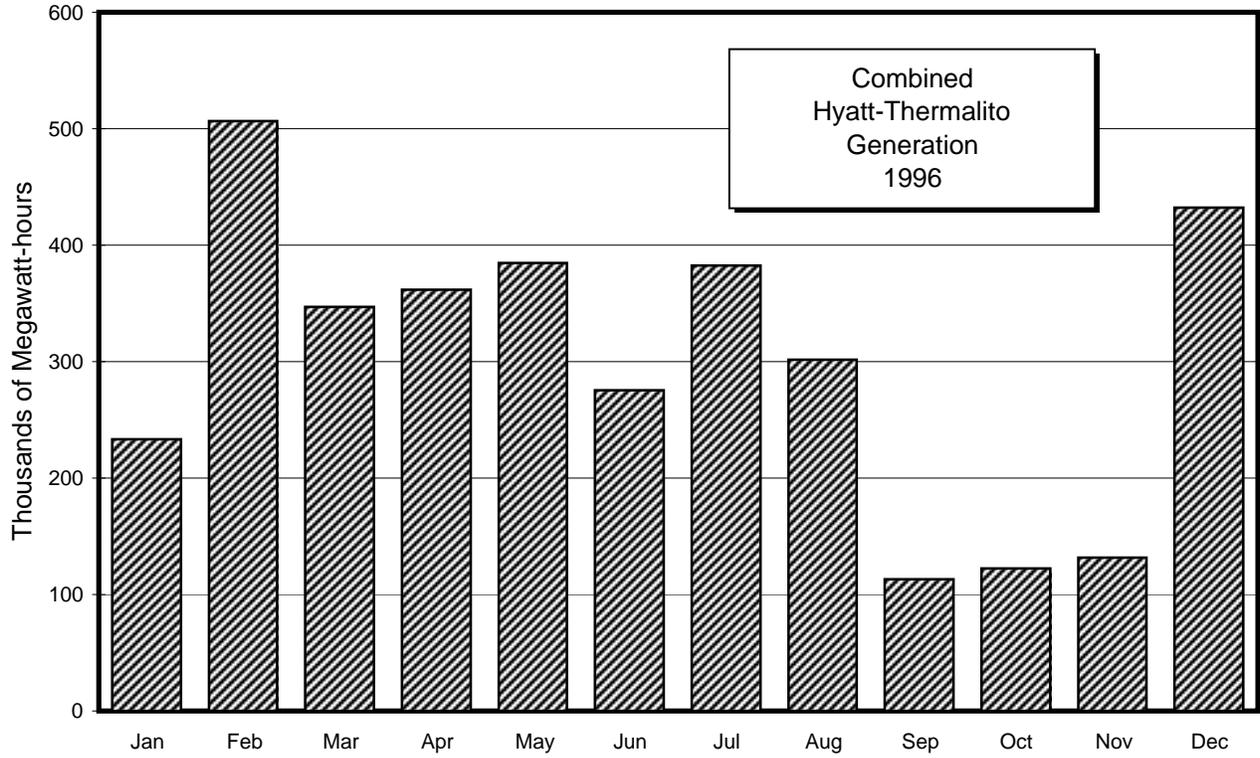
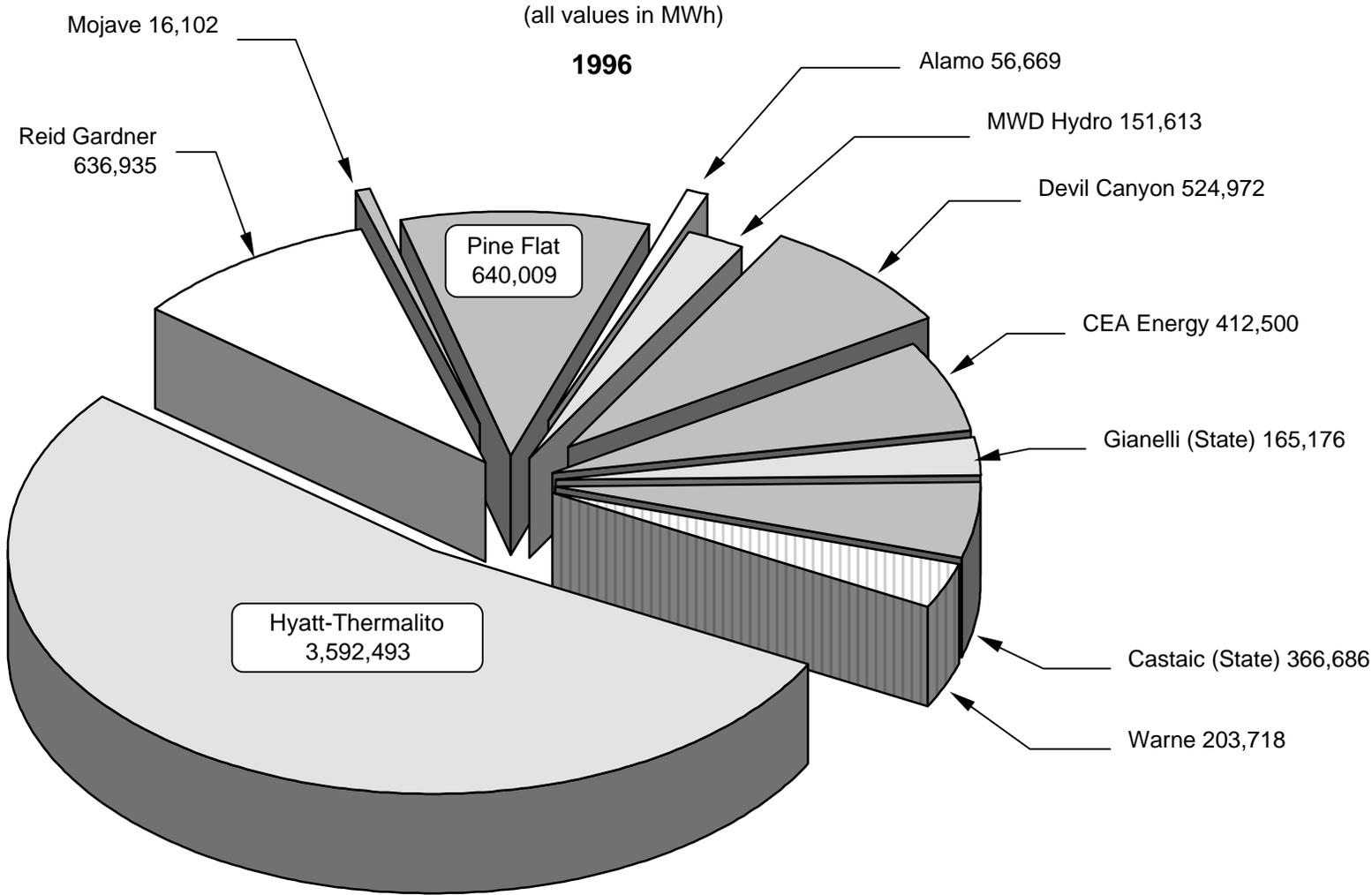


Figure 2. Operation of Hyatt and Thermalito Powerplants



**Figure 3. SWP Energy Resources**



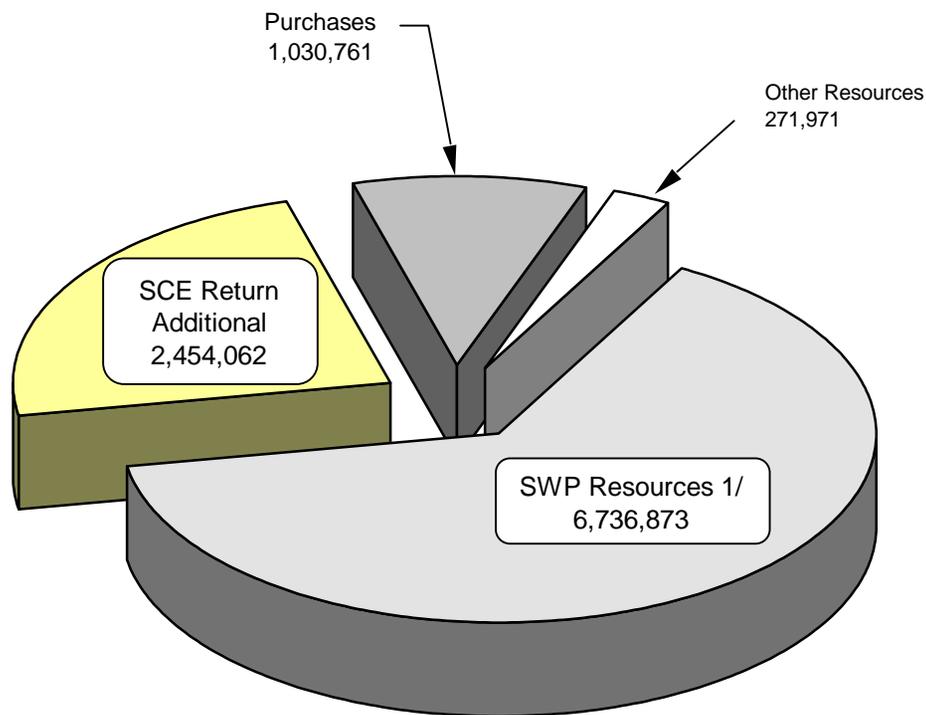
**Total: 6,736,873**

Note: Purchases, Other Sources, and SCE Return Additional are not shown here. All values are metered readings at plants and are not adjusted for transmission losses.

**Figure 4. Total State Energy Resources**

(all values in MWh)

**1996**

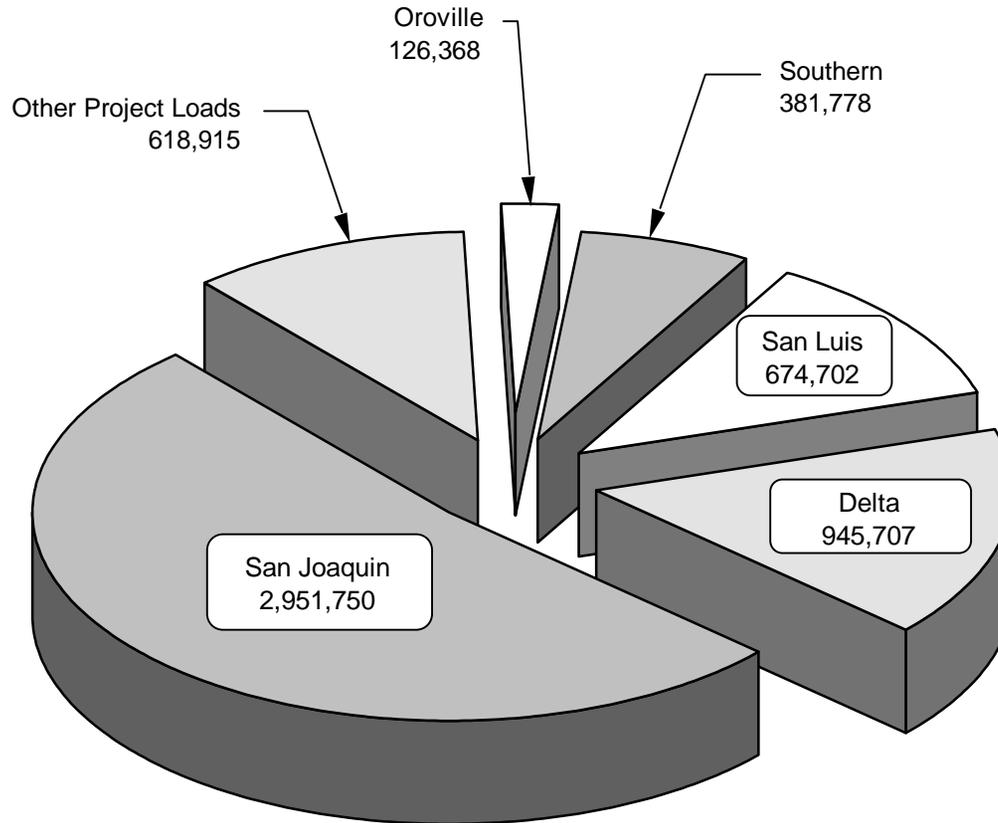


**Total: 10,493,667**

1/ See Figure 3 for a breakdown of SWP energy resources.

| <u>Purchases</u>                      |            |
|---------------------------------------|------------|
| Pacific Power and Light               | 636,475    |
| Bonneville Power Administration       | 144,209    |
| City of Vernon                        | 125,822    |
| Catex Vitol Energy                    | 51,657     |
| City of Azusa                         | 28,048     |
| Metropolitan Water District           | 19,570     |
| Electric Clearing House, Inc.         | 7,232      |
| Pacific Gas and Electric              | 5,800      |
| Puget Sound Power and Light C..       | 3,200      |
| Portland General Electric             | 2,335      |
| Seattle City Light                    | 1,525      |
| Nevada Power                          | 955        |
| L. A. Dept. of Water and Power        | 779        |
| City and County of San Francisco      | 765        |
| Salt River Project                    | 720        |
| City of Colton                        | 704        |
| Northern California Power Agency      | 510        |
| Enron Power Marketing Inc.            | 400        |
| Southern California Edison            | 55         |
|                                       | <hr/>      |
|                                       | 1,030,761  |
| <u>Other Resources</u>                |            |
| Southern California Edison            | 133,527    |
| Bonneville Power Administration       | 34,825     |
| Aquila Power Corporation              | 32,400     |
| L G & E Power Marketing, Inc.         | 26,784     |
| Sacramento Municipal Utility District | 24,550     |
| Western Area Power Administration     | 19,615     |
| L.A. Dept. of Water and Power         | 270        |
|                                       | <hr/>      |
|                                       | 271,971    |
| <u>SCE Return Additional</u>          |            |
| Total Received from SCE               | 5,065,704  |
| SCE Hyatt-Thermalito Entitlement      | -1,465,905 |
| CEA Energy                            | -412,500   |
| SCE Devil Canyon Entitlement          | -524,984   |
| SCE Alamo Entitlement                 | -56,637    |
| MWD Hydro Entitlement                 | -151,616   |
|                                       | <hr/>      |
|                                       | 2,454,062  |

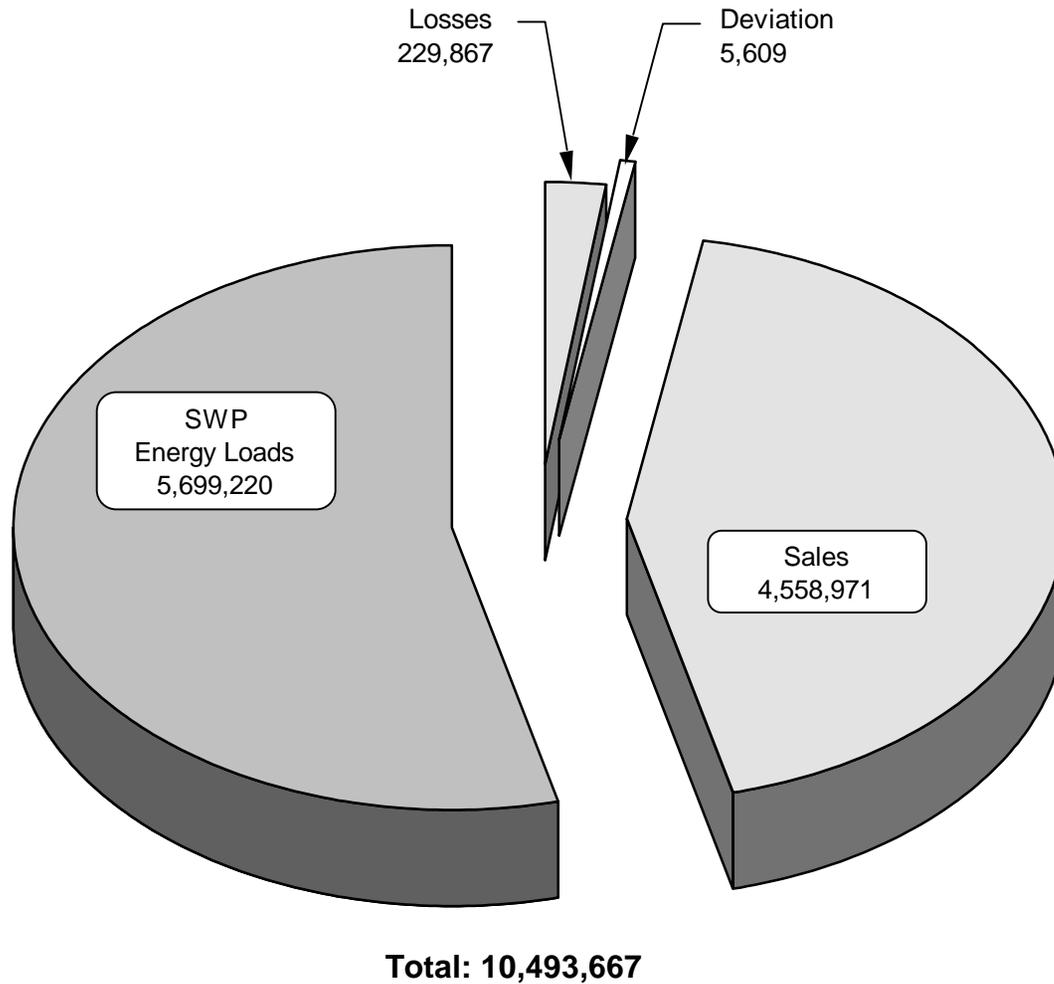
**Figure 5. SWP Energy Loads**  
**1996**  
 (all values in MWh)



**Total: 5,699,220**

|                                                            |           |
|------------------------------------------------------------|-----------|
| <u>Oroville Field Division</u>                             |           |
| Hyatt-Thermalito Complex<br>(Pumpback and Station Service) | 126,368   |
| <u>Delta Field Division</u>                                |           |
| North Bay                                                  | 17,310    |
| South Bay                                                  | 67,099    |
| Del Valle                                                  | 448       |
| Banks                                                      | 860,234   |
| Bottle Rock (Station Service)                              | 616       |
|                                                            | 945,707   |
| <u>San Luis Field Division</u>                             |           |
| Gianelli                                                   | 307,576   |
| Dos Amigos                                                 | 366,215   |
| Pine Flat (Station Service)                                | 911       |
|                                                            | 674,702   |
| <u>San Joaquin Field Division</u>                          |           |
| Las Perillas                                               | 9,202     |
| Badger Hill                                                | 24,940    |
| Devil's Den                                                | 249       |
| Bluestone                                                  | 216       |
| Polonio                                                    | 209       |
| Buena Vista                                                | 253,543   |
| Teerink                                                    | 242,433   |
| Chrisman                                                   | 532,438   |
| Edmonston                                                  | 1,888,520 |
|                                                            | 2,951,750 |
| <u>Southern Field Division</u>                             |           |
| Oso                                                        | 93,745    |
| Mojave                                                     | 677       |
| Pearblossom                                                | 286,348   |
| Warne (Station Service)                                    | 1,008     |
|                                                            | 381,778   |
| <u>Other SWP Energy Loads</u>                              |           |
| Southern California Edison                                 | 455,138   |
| LG&E Power Marketing Inc.                                  | 34,400    |
| Aquila Power Corporation                                   | 30,000    |
| Bonneville Power Administration                            | 23,000    |
| Sacramento Municipal Utility District                      | 24,550    |
| Nevada Power Authority                                     | 21,198    |
| Western Area Power Administration                          | 17,157    |
| Pacific Gas and Electric                                   | 8,381     |
| South Bay Emergency Service                                | 5,091     |
|                                                            | 618,915   |

**Figure 6. Total State Energy Loads**  
**1996**  
 (all values in MWh)

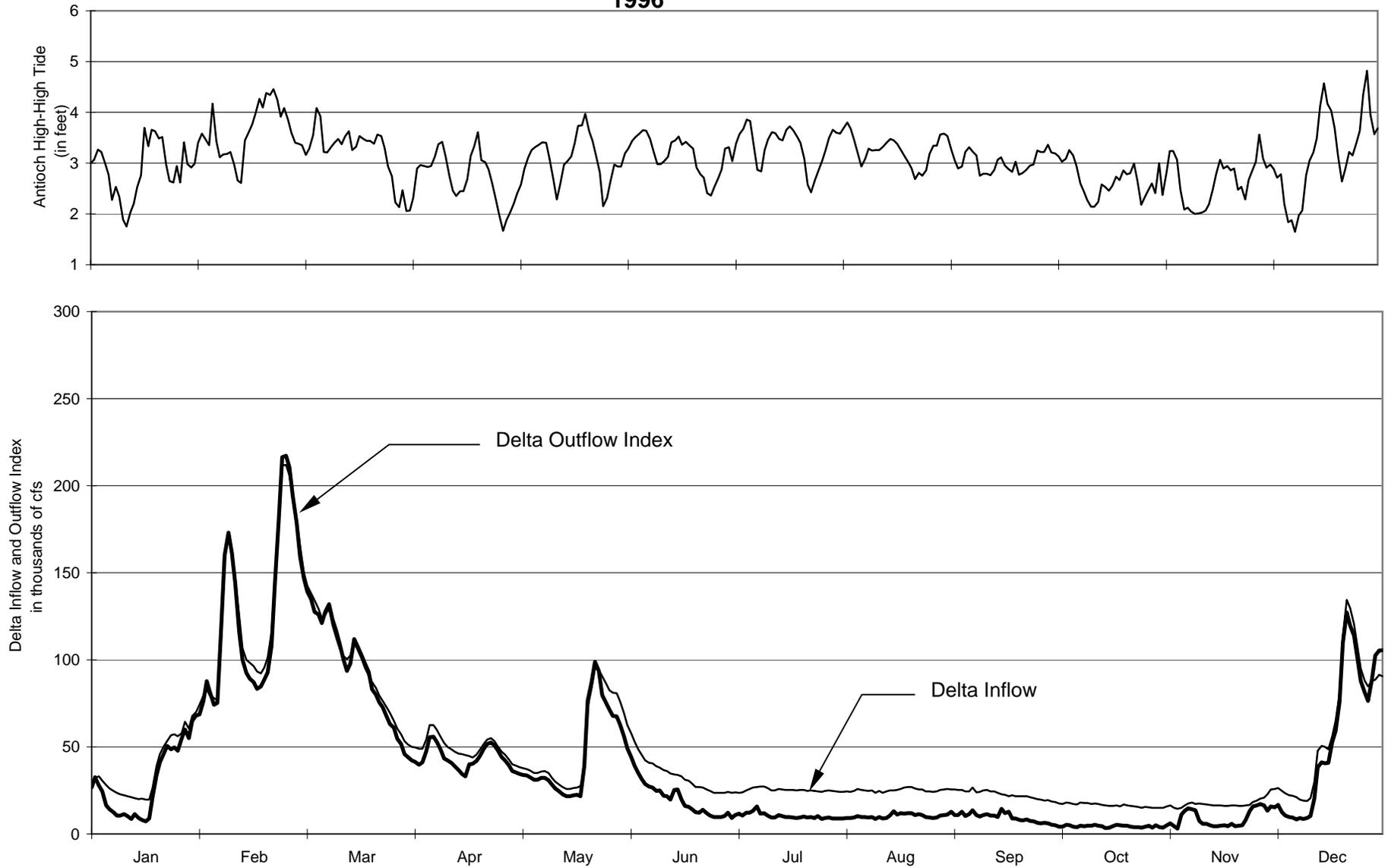


Note: See Figure 5 for breakdown of SWP Energy Loads.

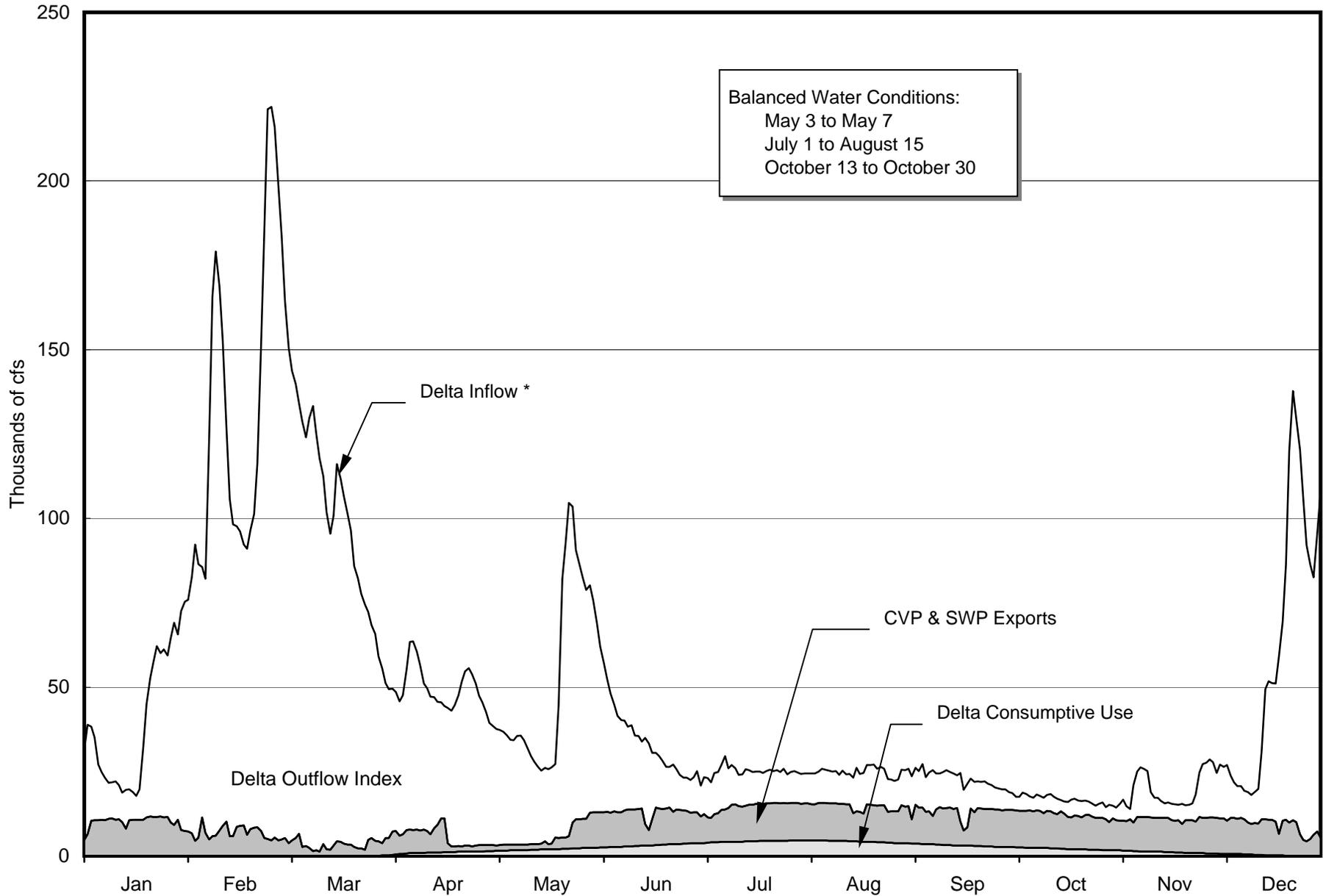
Sales

|                                       |                  |
|---------------------------------------|------------------|
| Sacramento Municipal Utility District | 968,480          |
| City of Vernon                        | 436,548          |
| Salt River Project                    | 609,290          |
| City of Riverside                     | 173,543          |
| Pacific Gas and Electric              | 451,433          |
| Pacific Power and Light               | 417,830          |
| Southern California Edison            | 318,752          |
| Modesto Irrigation District           | 127,687          |
| Metropolitan Water District           | 196,072          |
| Northern California Power Agency      | 156,612          |
| Catex Vitol Electric L.L.C.           | 47,090           |
| Nevada Power                          | 130,757          |
| City and County of San Francisco      | 83,570           |
| City of Azusa                         | 32,558           |
| L.A.Dept. of Water and Power          | 75,626           |
| Portland General Electric             | 73,987           |
| Enron Power Marketing, Inc.           | 38,592           |
| Calpine Power Services Co.            | 34,550           |
| City of Pasadena                      | 31,399           |
| City of Anaheim                       | 23,829           |
| City of Santa Clara                   | 19,037           |
| City of Colton                        | 18,161           |
| Electric Clearing House               | 15,323           |
| Bonneville Power Admin.               | 13,875           |
| City of Glendale                      | 11,838           |
| Turlock Irrigation District           | 9,737            |
| Puget Sound Power and Light           | 8,982            |
| Sierra Pacific                        | 6,210            |
| San Diego Gas and Electric            | 6,016            |
| City of Burbank                       | 4,870            |
| Destec Power Services Inc.            | 4,325            |
| City of Redding                       | 4,020            |
| Western Area Power Administration     | 1,965            |
| Citizen's Lehman Power Sales          | 1,750            |
| Aquila Power Corporation              | 1,600            |
| Lassen Municipal Utility District     | 1,447            |
| K. N. Mardeting, Inc.                 | 800              |
| Koch Power Services, Inc.             | 400              |
| Arizona Public Service Co.            | 210              |
| Sonat Power Marketing                 | 200              |
| <b>Total</b>                          | <b>4,558,971</b> |

**Figure 7. Delta Tide, Inflow, and Outflow Index  
1996**

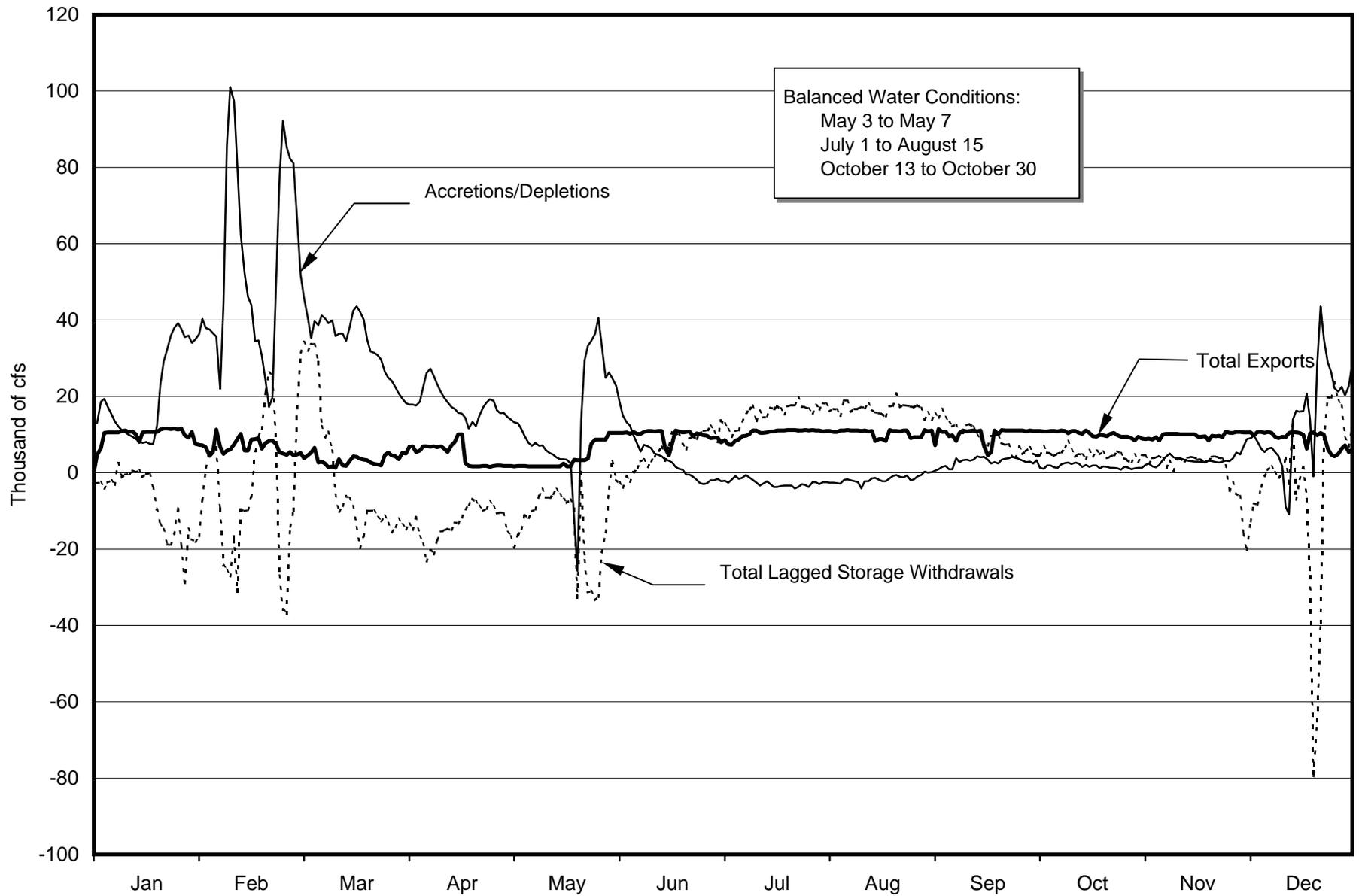


**Figure 8. Coordinated Delta Operations  
1996**

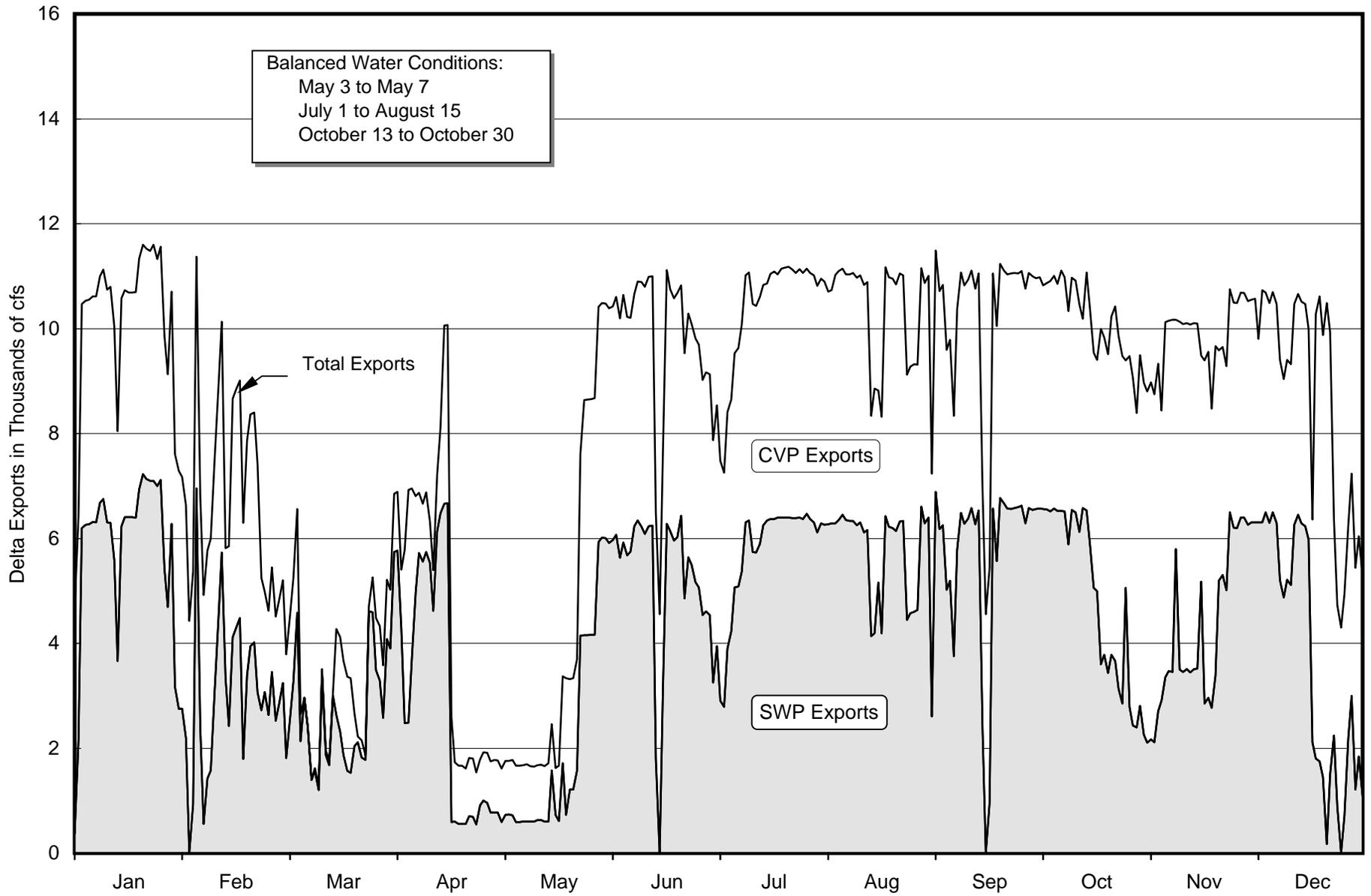


\* Delta inflow = Exports + Outflow + Consumptive Use.

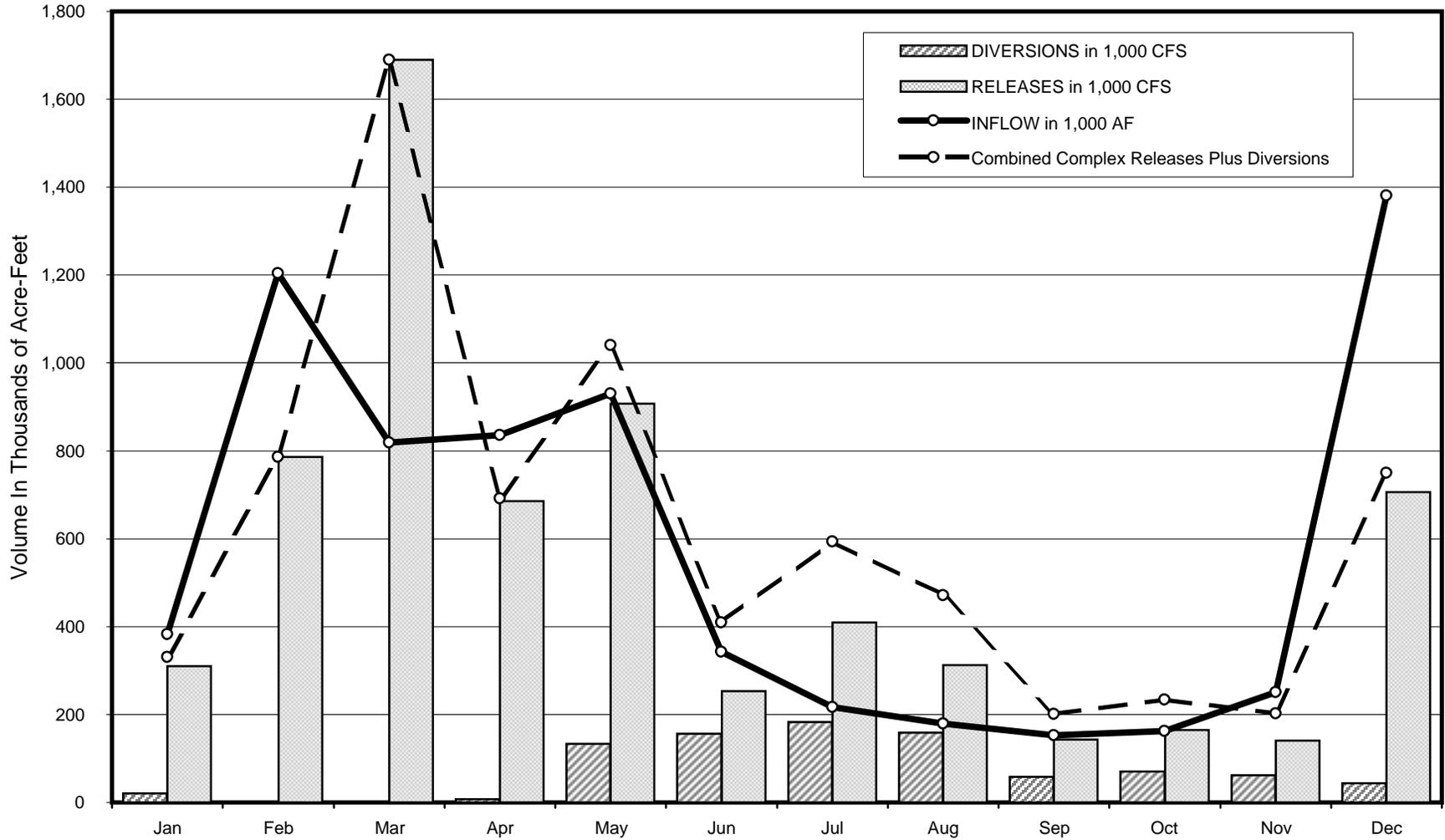
**Figure 9. Coordinated Delta Operations  
Lagged Storage Withdrawals  
1996**



**Figure 10. Coordinated Delta Operations**  
**Delta Exports**  
**1996**

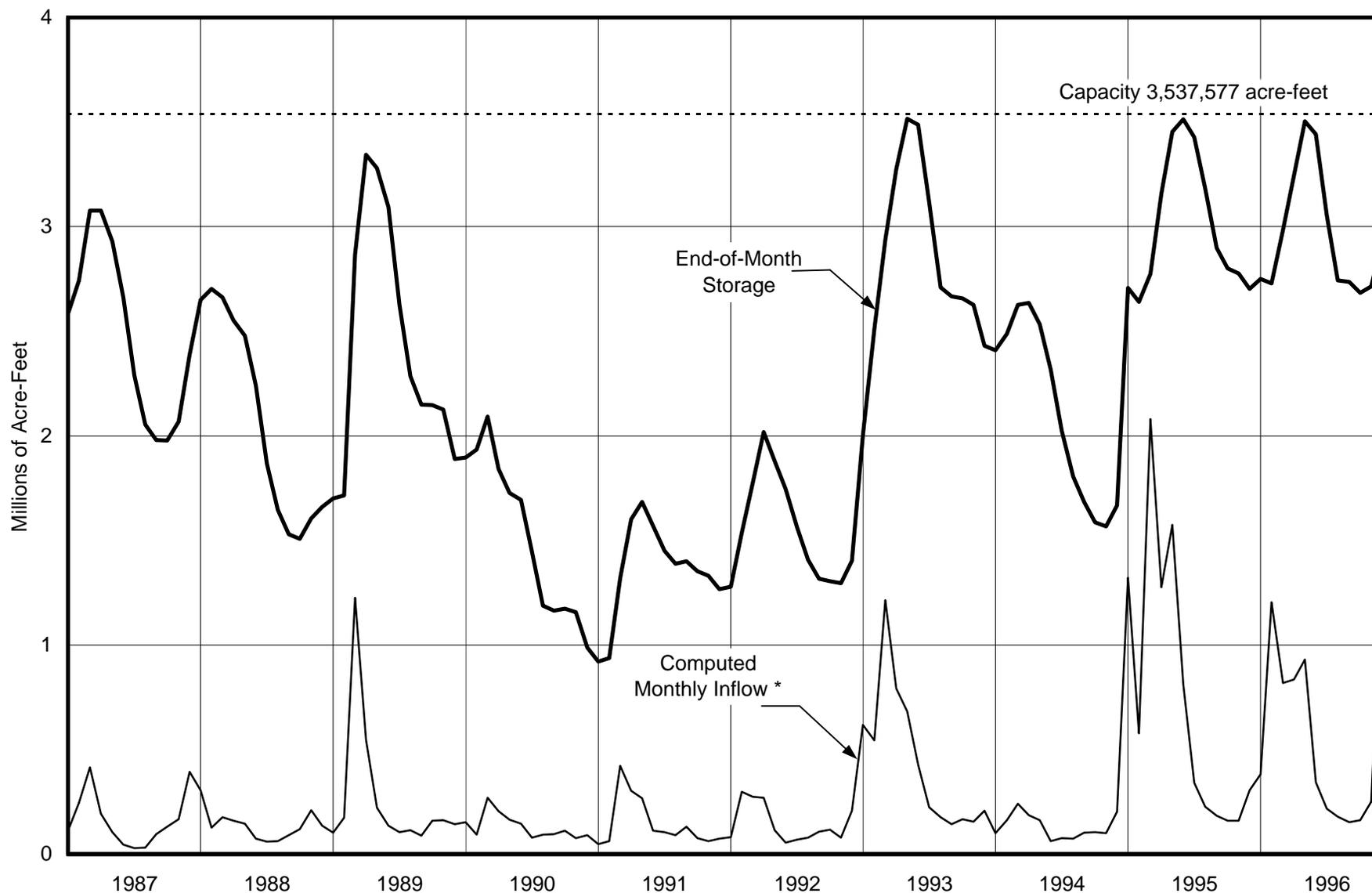


**Figure 11. Oroville-Thermalito Complex**  
 Inflow, Releases, and Diversions  
**1996**



Note: Releases include flows at fish barrier dam, fish hatchery, and afterbay river outlet. Diversions include Butte County, Thermalito Irrigation District, Sutter Butte Canal, Western Lateral, Richvale Canal, Sunset Pumps, and Western Canal. The area between the plotted lines above the Inflow line represents amounts derived from storage.

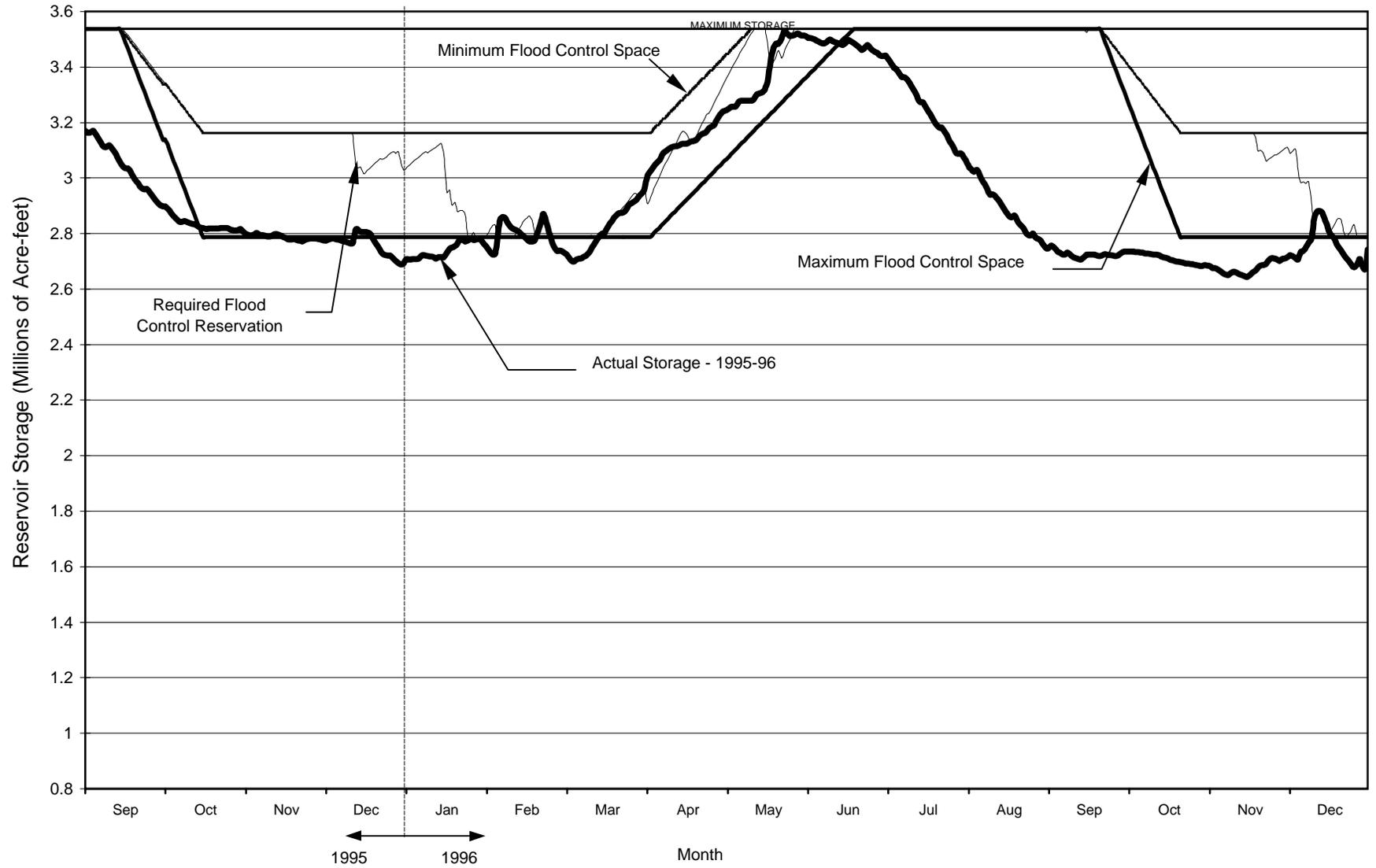
Figure 12. Historical Lake Oroville Operation



\* Excludes pumpback.

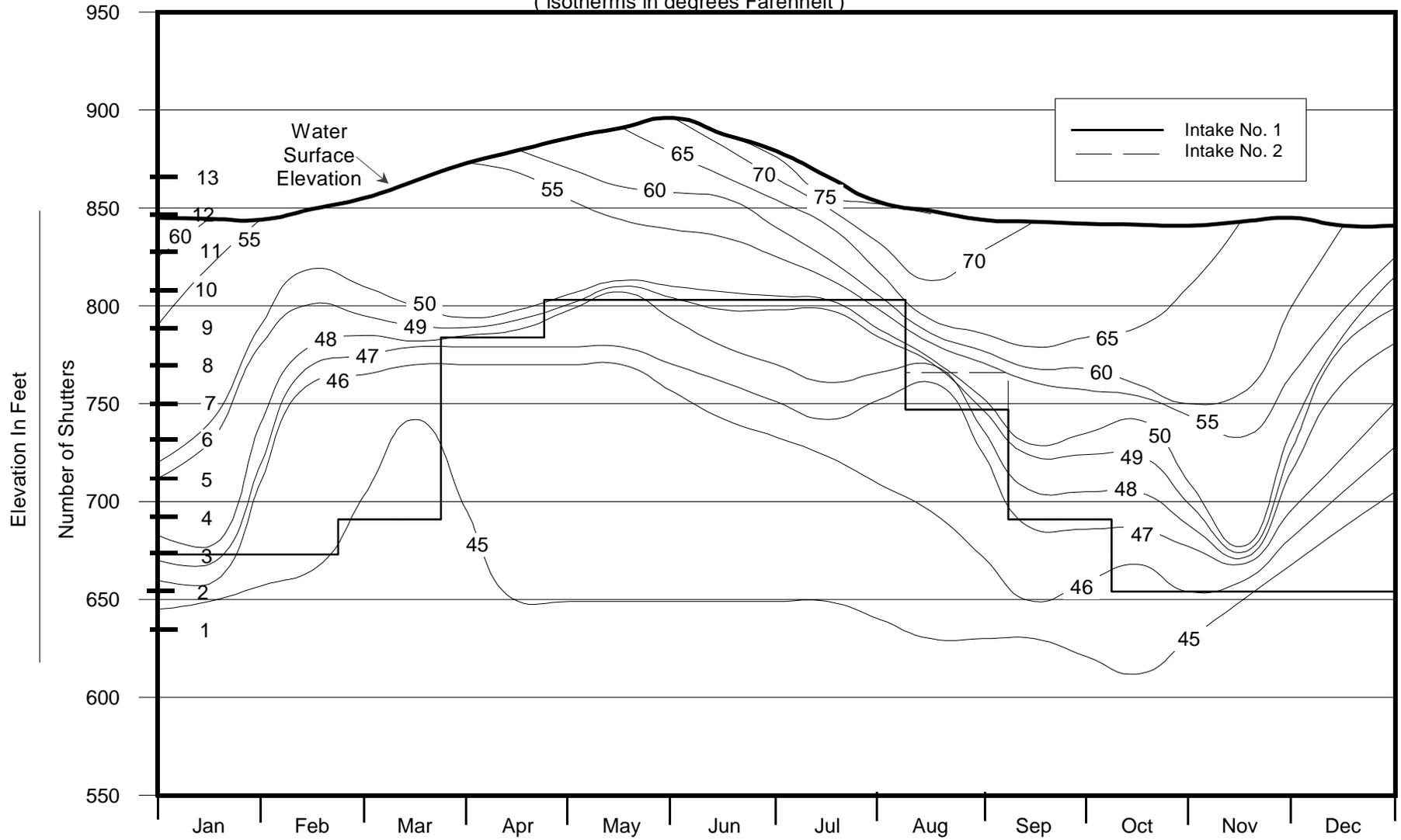
Figure 13. Operation of Lake Oroville for Flood Control

1995-96



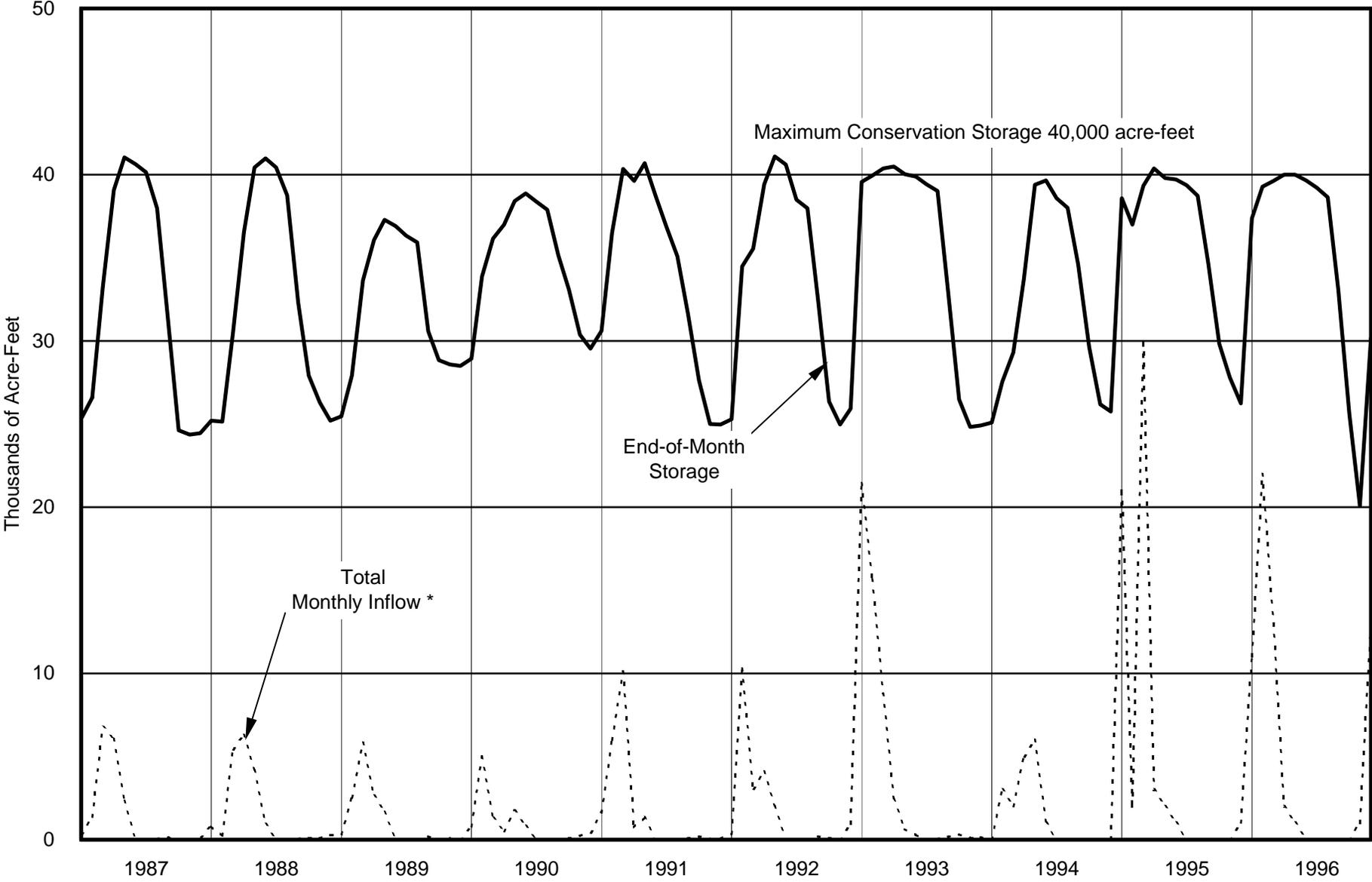
**Figure 14. Lake Oroville Temperatures  
1996**

( isotherms in degrees Farenheit )



Note: Temperature data is taken once per month and averaged for the rest of the year.

Figure 15. Historical Lake Del Valle Operation



\* Natural and pumped inflows.

Figure 16. Historical San Luis Reservoir Operation

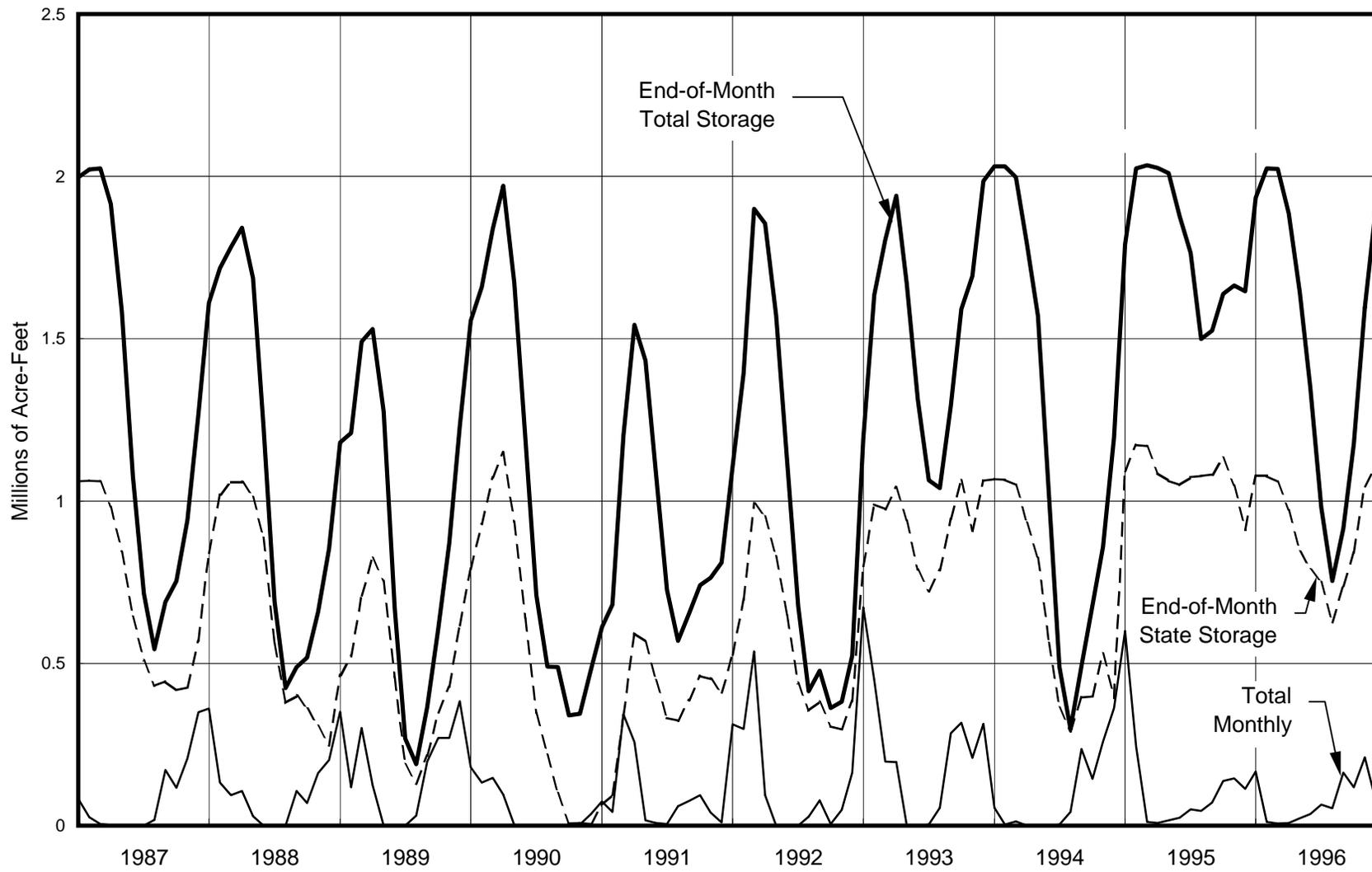
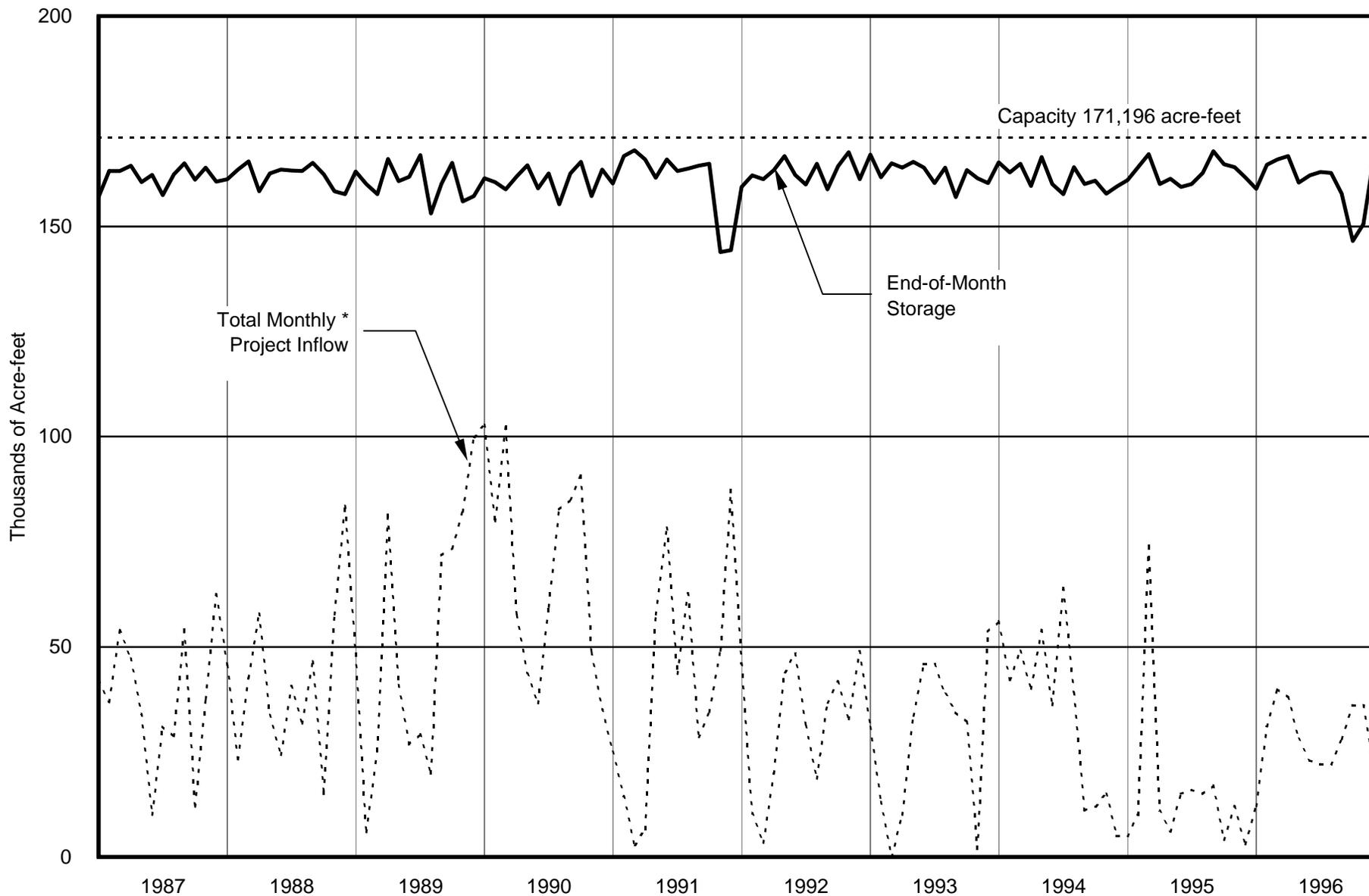


Figure 17. Historical Pyramid Lake Operation



\* Excludes pumpback by LADWP through Castaic Powerplant.

Figure 18. Historical Castaic Lake Operation

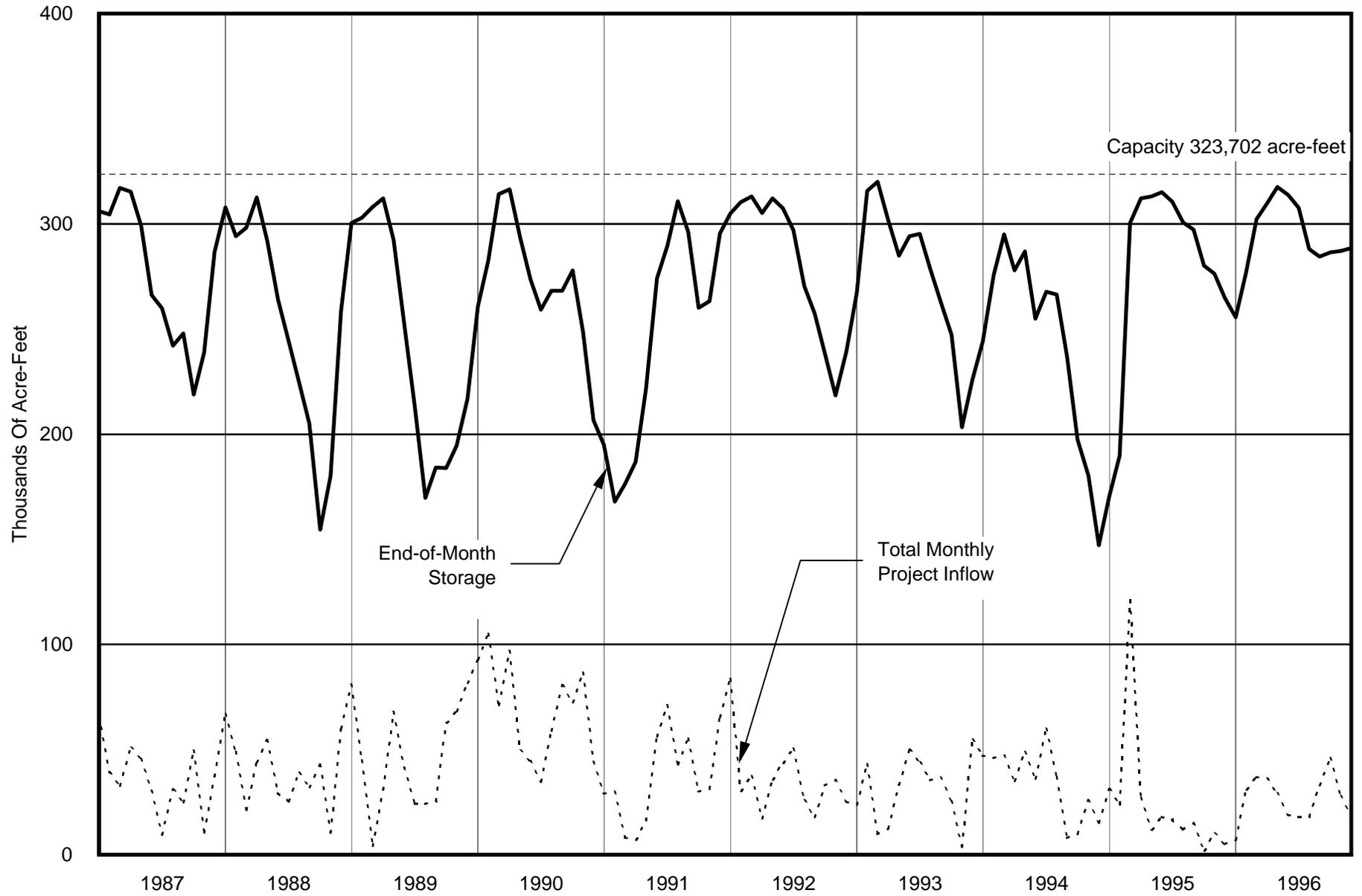


Figure 19. Historical Silverwood Lake Operation

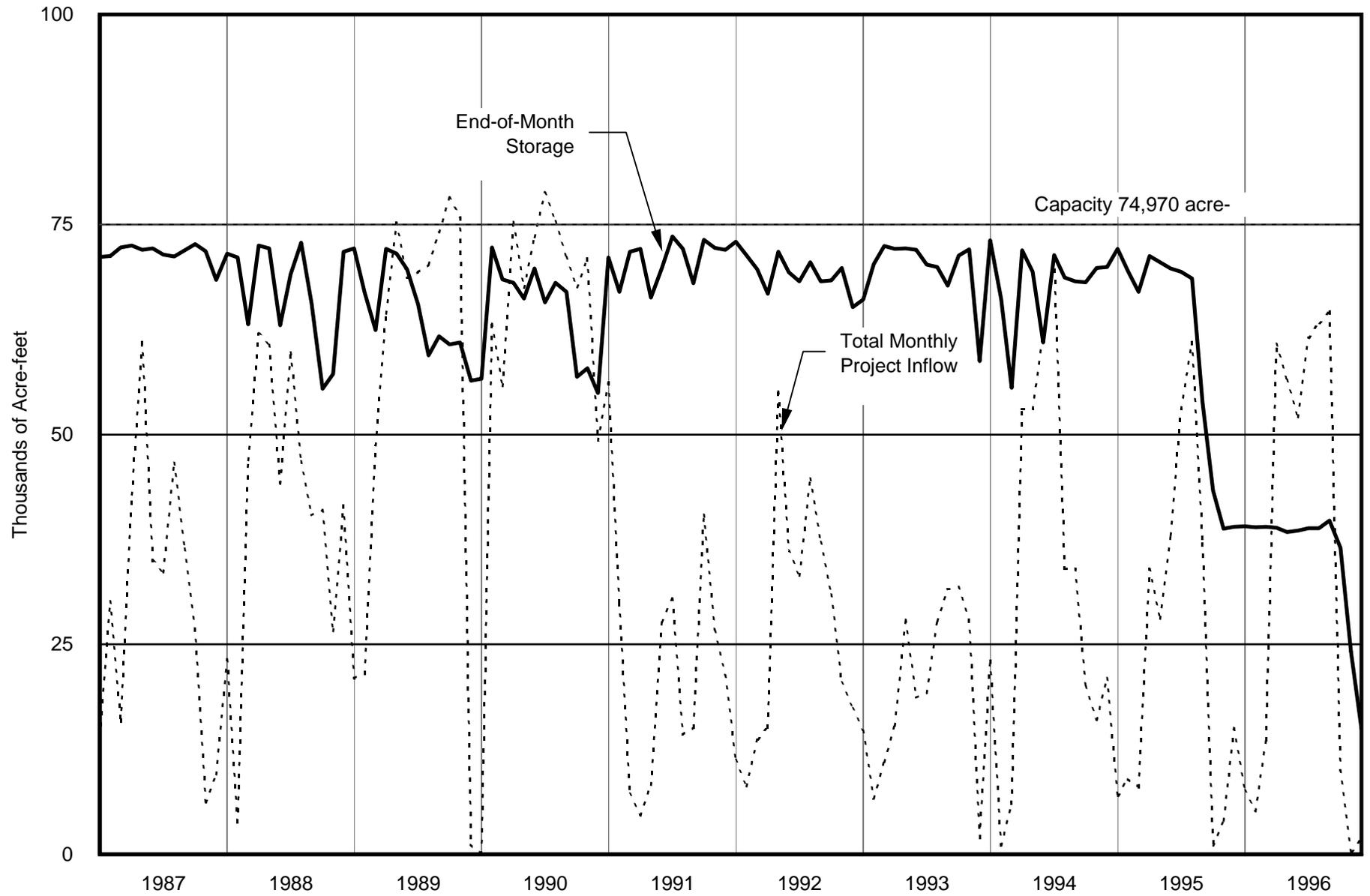
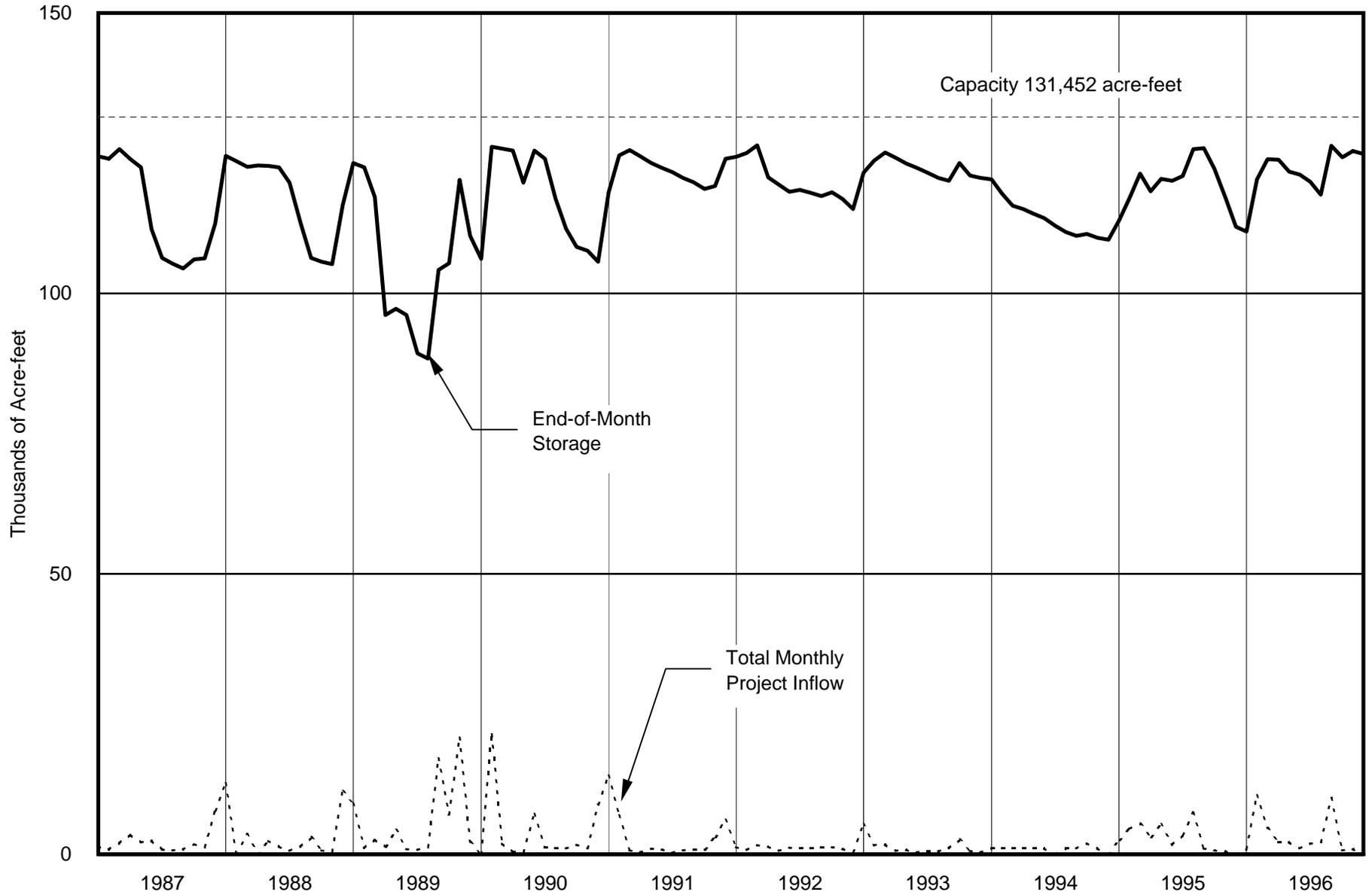
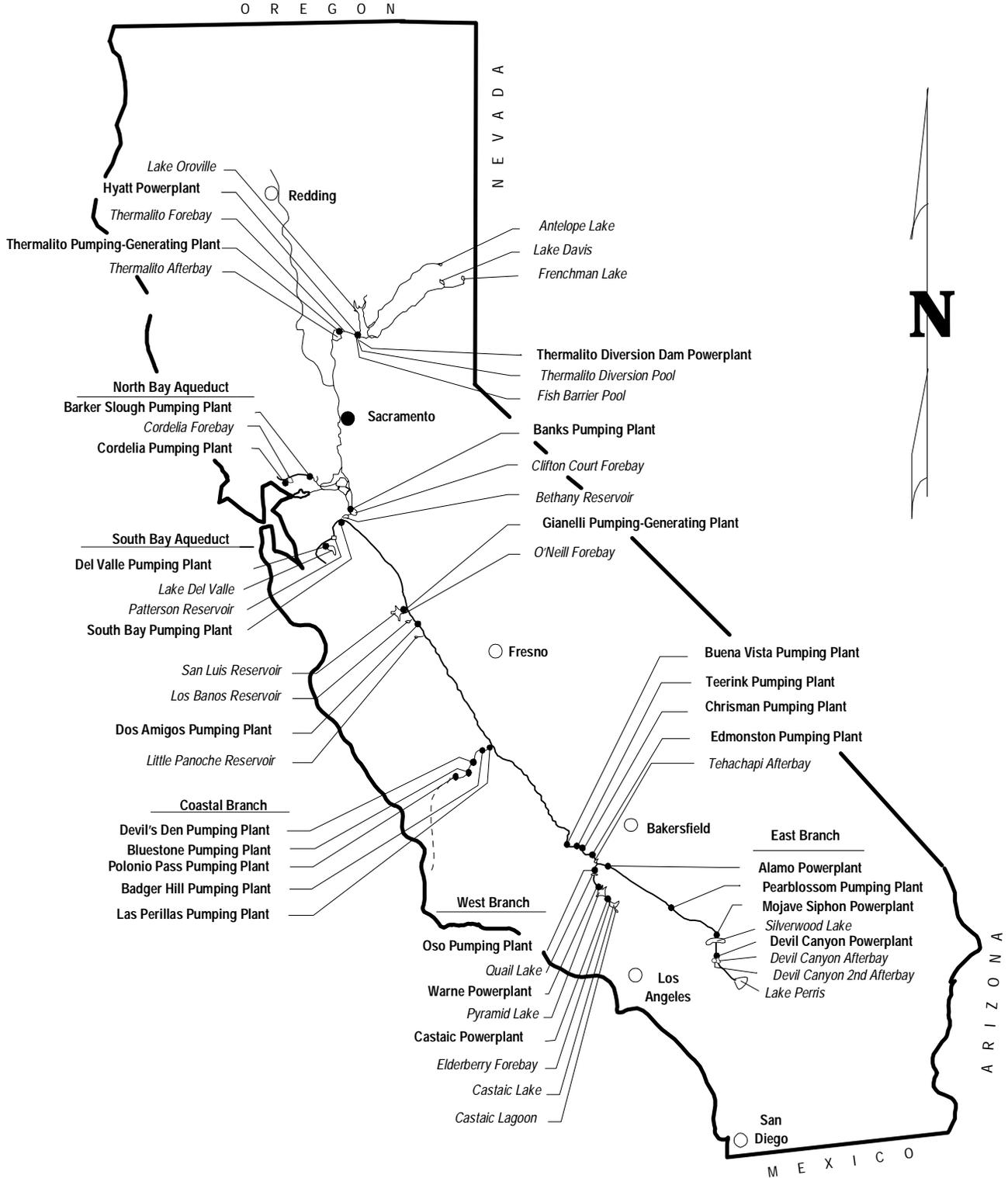


Figure 20. Historical Lake Perris Operation

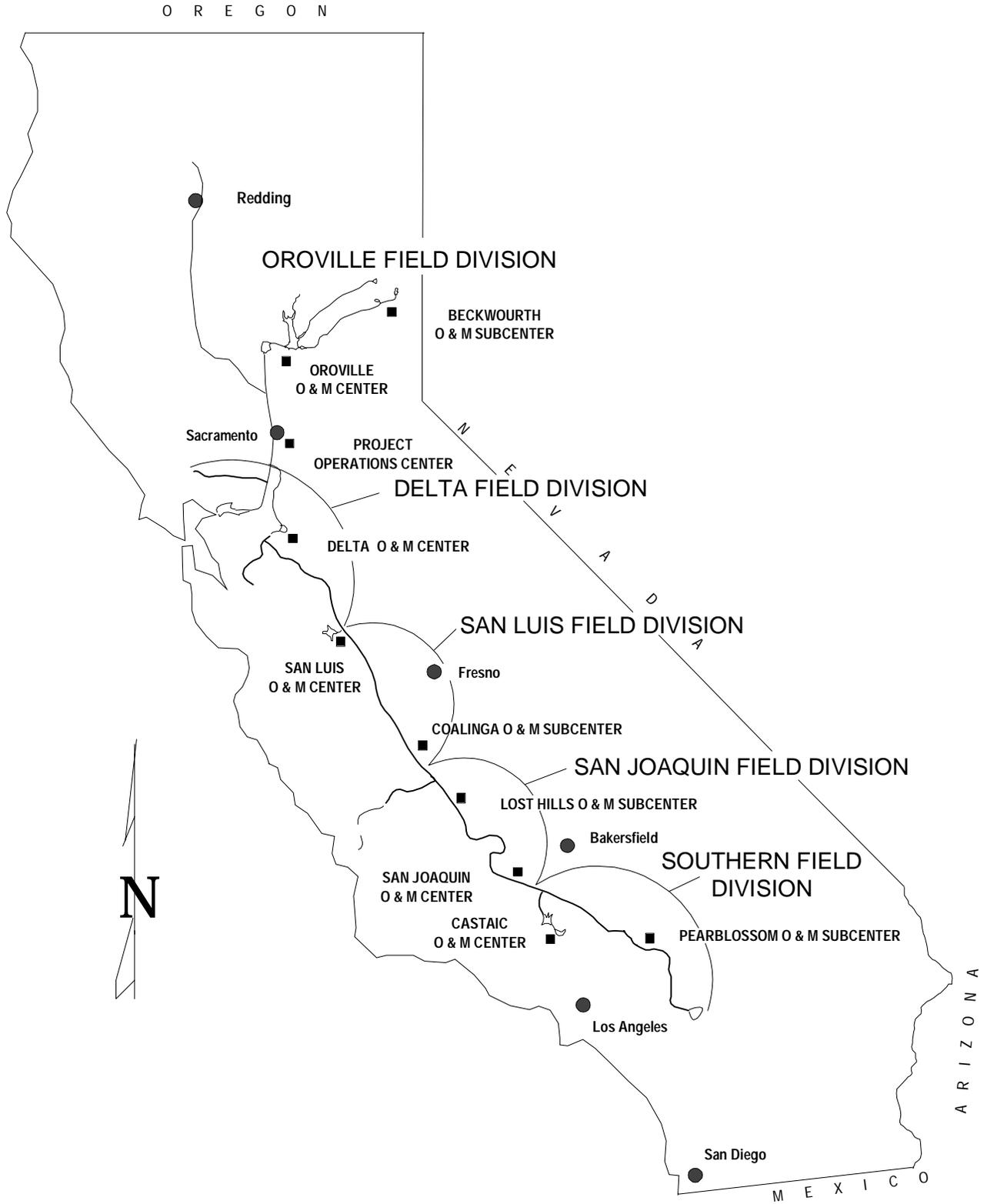


# Map 1

## Project Facilities

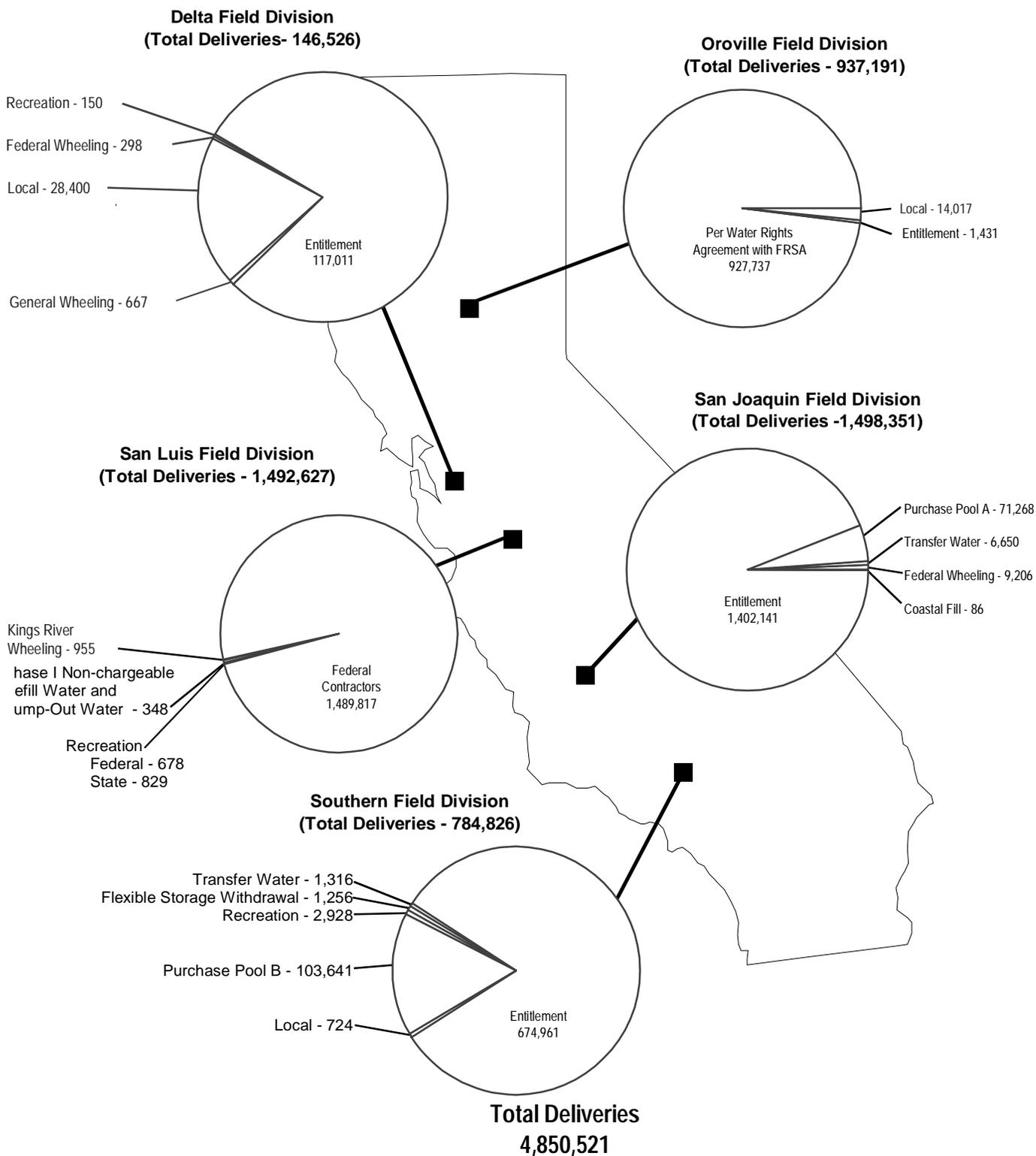


# Map 2 Field Division Boundaries



# Map 3 1996 Water Deliveries

(in acre-feet)



## Glossary

**accretion** - the water accumulated and retained within a service area.

**acre-foot (AF)** - a quantity or volume of water covering one acre to a depth of one foot; equal to 43,560 cubic feet or 325,851 gallons.

**active storage capacity** - the total usable reservoir capacity available for seasonal or cyclic water storage. It is gross reservoir capacity minus inactive storage capacity.

**afterbay** - a reservoir that regulates fluctuating discharges from a hydroelectric power plant or a pumping plant.

**alluvium** - a stratified bed of sand, gravel, silt, and clay deposited by flowing water.

**aquifer** - a geologic formation that stores and transmits water and yields significant quantities of water to wells and springs.

**average annual runoff** - the average value of annual runoff amounts for a specified area calculated for a selected period of record that represents average hydrologic conditions.

**balanced water conditions** - exist when upstream reservoir storage releases, plus other inflows, approximately equal the water supply needed to (1) satisfy Sacramento Valley and Sacramento-San Joaquin Delta in-basin needs, including Delta water quality requirements, and (2) meet export needs.

**benthic invertebrates** - aquatic animals without backbones that dwell on or in the bottom sediments of fresh or salt water. Examples: clams, crayfish, and a wide variety of worms.

**biota** - all living organisms of a region, as in a stream or other body of water.

**brackish water** - water containing dissolved minerals in amounts that exceed normally acceptable standards for municipal, domestic, and irrigation uses. Considerably less saline than sea water.

**carriage water** - the amount of water needed above an increased export so as to not increase salinity in the Delta.

**conjunctive use** - the operation of a ground water basin in combination with a surface water storage and conveyance system. Water is stored in the ground water basin for later use by intentionally recharging the basin during years of above-average water supply.

**Decision 1485 operating criteria** - standards for operating water project facilities under Water Rights Decision 1485 regarding the Sacramento-San Joaquin Delta and Suisun Marsh, adopted by the State Water Resources Control Board, August 1978.

**Delta consumptive use** - the sum of evapotranspiration and changes in soil moisture of Delta lands and evaporation from Delta channels.

**Delta outflow index** - a calculated approximation of this seaward freshwater outflow as it passes Chipps Island near Pittsburg, beyond the confluence of the Sacramento and San Joaquin Rivers.

**depletion** - the water consumed within a service area and no longer available as a source of supply.

**dissolved organic compounds** - carbon substances dissolved in water.

**drainage basin** - the area of land from which water drains into a river; for example, the Sacramento River Basin, in which all land area drains into the Sacramento River. Also called, "catchment area," "watershed," or "river basin."

**drought condition** - hydrologic conditions during a defined drought period during which rainfall and runoff are much less than average.

**ecology** - the study of the interrelationships of living organisms to one another and to their surroundings.

**ecosystem** - recognizable, relatively homogeneous units, including the organisms they contain, their environment, and all the interactions among them.

**effluent** - waste water or other liquid, partially or completely treated or in its natural state, flowing from a treatment plant.

**environment** - the sum of all external influences and conditions affecting the life and development of an organism or ecological community; the total social and cultural conditions.

**estuary** - the lower course of a river entering the sea influenced by tidal action where the tide meets the river current.

**evapotranspiration (ET)** - the quantity of water transpired (given off), retained in plant tissues, and evaporated from plant tissues and surrounding soil surfaces. Quantitatively, it is usually expressed in terms of depth of water per unit area during a specified period of time.

**evapotranspiration of applied water (ETAW)** - the portion of the total evapotranspiration which is provided by irrigation.

**forebay** - a reservoir or pond situated at the intake of a pumping plant or power plant to stabilize water levels; also a storage basin for regulating water for percolation into ground water basins.

**fry** - a recently hatched fish.

**gross reservoir capacity** - the total storage capacity available in a reservoir for all purposes, from the streambed to the normal maximum operating level. Includes dead (or inactive) storage, but excludes surcharge (water temporarily stored above the elevation of the top of the spillway).

**ground water** - water that occurs beneath the land surface and completely fills all pore spaces of the alluvium, soil or rock formation in which it is situated.

**ground water basin** - a ground water reservoir, defined by an overlying land surface and the underlying aquifers that contain water stored in the reservoir.

**ground water overdraft** - the condition of a ground water basin in which the amount of water withdrawn by pumping exceeds the amount of water that recharges the basin over a period of years during which water supply conditions approximate average.

**ground water recharge** - increases in ground water storage by natural conditions or by human activity.

**ground water table** - the upper surface of the zone of saturation, except where the surface is formed by an impermeable body.

**hydraulic barrier** - a barrier developed in the estuary by release of fresh water from upstream reservoirs to prevent intrusion of sea water into the body of fresh water.

**hydrologic balance** - an accounting of all water inflow to, water outflow from, and changes in water storage within a hydrologic unit over a specified period of time.

**hydrologic basin** - the complete drainage area upstream from a given point on a stream.

**hydrologic region** - a study area, consisting of one or more planning subareas.

**joint-use facilities** - specific pumping plants, power plants, canals, and reservoirs in which both State and federal agencies participated in the construction, use, and maintenance.

**land subsidence** - the lowering of the natural land surface in response to earth movements; lowering of fluid pressure (or lowering of ground water level); removal of underlying supporting materials by mining or solution of solids, either artificially or from natural causes; compaction caused by wetting (hydrocompaction); oxidation of organic matter in soils; or added load on the land surface.

**megawatt** - one million watts.

**milligrams per liter (mg/L)** - the weight in milligrams of any substance dissolved in one liter of liquid; nearly the same as parts per million.

**natural flow** - the flow past a specified point on a natural stream that is unaffected by stream diversion, storage, import, export, return flow, or change in use caused by modification in land use.

**percolation** - the downward movement of water throughout the soil or alluvium to a ground water table.

**permeability** - the capability of soil or other geologic formations to transmit water.

**phytoplankton** - minute plants, usually algae, that live suspended in bodies of water and that drift about because they cannot move by themselves or because they are too small or too weak to swim effectively against a current.

**pollution (of water)** - the alteration of the physical, chemical, or biological properties of water by the introduction of any substance into water that adversely affects any beneficial use of water.

**prior water right** - a water designation used for water delivered based on its use prior to SWP construction.

**pumping-generating plant** - a plant at which the turbine-driven generators can also be used as motor-driven pumps.

**recharge basin** - a surface facility, often a large pond, used to increase the percolation of surface water into a ground water basin.

**riparian vegetation** - vegetation growing on the banks of a stream or other body of water.

**runoff** - the total volume of surface flow from an area during a specified time.

**Sacramento River index** - the sum of the Sacramento Valley's unimpaired runoff at the following four locations: Sacramento River near Red Bluff; total Feather River inflow to Lake Oroville; Yuba River at Smartville; and total American River inflow to Folsom Lake.

**salinity** - generally, the concentration of mineral salts dissolved in water. Salinity may be measured by weight (total dissolved solids), electrical conductivity, or osmotic pressure. See **total dissolved solids**.

**salinity intrusion** - the movement of salt water into a body of fresh water. It can occur in either surface water or ground water bodies.

**salt-water barrier** - a physical facility or method of operation designed to prevent the intrusion of salt water into a body of fresh water.

**sediment** - soil or mineral material transported by water and deposited in streams or other bodies of water.

**seepage** - the gradual movement of a fluid into, through, or from a porous medium.

**service area** - the geographical land area served by a distribution system of a water agency.

**snow water content** - a calculated or measured amount of water contained in packed snow based on its depth and density.

**spawning** - the depositing and fertilizing of eggs (roe) by fish and other aquatic life.

**streamflow** - the rate of water flow past a specified point in a channel.

**surplus water** - developed water supplies in excess of contract entitlement or apportioned water.

**total dissolved solids (TDS)** - a quantitative measure of the residual minerals dissolved in water that remain after evaporation of a solution. Usually expressed in milligrams per liter. See **salinity**.

**transpiration** - an essential physiological process in which plant tissues give off water vapor to the atmosphere.

**unimpaired runoff** - represents the natural water production of a river basin, unaltered by upstream diversions, storage, or by export or import of water to or from other watersheds.

**waste water** - the water, liquid waste, or drainage from a community, industry, or institution.

**water conservation** - reduction in applied water due to more efficient water use.

**water quality** - used to describe the chemical, physical, and biological characteristics of water, usually in regard to its suitability for a particular purpose or use.

**water right** - a legally protected right to take possession of water occurring in a natural waterway and to divert that water for beneficial use.

**water table** - see **ground water table**.

**water year** - a continuous 12-month period for which hydrologic records are compiled and summarized. In California, it begins on October 1 and ends September 30 of the following year.

**watershed** - see **drainage basin**.