

State of California
The Resources Agency

DEPARTMENT OF WATER RESOURCES
Division of Operations and Maintenance

STATE WATER PROJECT ANNUAL REPORT OF OPERATIONS 2001

April 2005

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Governor
State of California

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Foreword

This is the twenty-eighth in a series of annual reports summarizing the water and energy operation of the California State Water Project. Although the reports in this series are published considerably after the reference year, they document the official record of operations and provide an important source of historical data. This report summarizes the operation of Project facilities during 2001 and includes any revisions to data previously published in the more timely monthly "State Water Project, Operations Data" reports.

Chief
Division of Operations and Maintenance

Table Of Contents

<i>Section</i>	<i>Page</i>
Organization Page	ii
Foreword	iii
Table of Contents	v
Conversion Factors	viii
Abbreviations and Units	ix
Introduction	1
Highlights of 2001 Operation	1
Project Status in 2001	4
Project Facilities	4
Outages and Limitations.....	6
Water Supply Conditions	8
Water Operations	9
Reservoir Operations.....	9
Water Deliveries and Aqueduct Operations	9
Significant Operational Activities	10
Energy Operations	16
Energy Resources	16
Energy Loads	16
Sacramento-San Joaquin Delta Operations	24
CALFED Bay-Delta Program	24
Net Delta Outflow Index.....	24
Project Operations by Field Division	32
Oroville Field Division	32
Water Storage	32
Water Deliveries	32
Delta Field Division	41
Water Storage	41
Water Deliveries	41
Pumping Plants.....	41
San Luis Field Division	45
Water Storage	45
Pumping and Generating Plants.....	45
Water Deliveries	45
San Joaquin Field Division	50
Water Deliveries	50
Pumping Plants.....	50
Southern Field Division.....	50
Water Storage	50
Water Deliveries	50
Pumping and Generating Plants.....	50

Tables

<i>No.</i>		<i>Page</i>
1	Project Pumping by Plant, 2001	3
2	Water Deliveries, 1962-2001	5
3	Total Energy Resources, 2001	20
4	Total Energy Loads, 2001.....	21
5	Net Delta Outflow Index, 2001.....	26
6	Sacramento Basin and Sacramento-San Joaquin Delta Operations, 2001.....	27
7	Upper Feather Area Lakes Monthly Operation, 2001	33
8	Lake Oroville Monthly Operation, 2001	34
9	Thermalito Forebay Monthly Operation, 2001	39
10	Thermalito Afterbay Monthly Operation, 2001	40
11	Lake Del Valle Monthly Operation, 2001	42
12	Clifton Court Forebay Monthly Operation, 2001	44
13	San Luis Reservoir Monthly Operation, 2001	46
14	O'Neill Forebay Monthly Operation, 2001	48
15	State-Federal San Luis Joint-Use Facilities Operation, 2001	49
16	Pyramid Lake Monthly Operation, 2001	51
17	Elderberry Forebay Monthly Operation, 2001	53
18	Castaic Lake Monthly Operation, 2001.....	54
19	Castaic Lagoon Monthly Operation, 2001	56
20	Silverwood Lake Monthly Operation, 2001	57
21	Lake Perris Monthly Operation, 2001	59
22	Summary of Governor Edmund G. Brown California Aqueduct Operations.....	62 - 69

Figures

<i>No.</i>		<i>Page</i>
1	Total Deliveries from SWP Facilities, Annual Totals	12
2	Combined Operation of Hyatt-Thermalito Powerplants	17
3	SWP Energy Resources, 2001	18
4	Total Energy Resources, 2001	19
5	SWP Energy Loads, 2001	22
6	Total Energy Loads, 2001.....	23
7	Delta Tide, Inflow, and Net Delta Outflow Index, 2001	28
8	Coordinated Delta Operations, 2001	29
9	Coordinated Delta Operations, Lagged Storage Withdrawals, 2001	30
10	Coordinated Delta Operations, Delta Exports, 2001.....	31
11	Oroville-Thermalito Complex, Inflow, Releases, and Diversions, 2001	35
12	Historical Lake Oroville Operation	36
13	Operation of Lake Oroville for Flood Control, 2001	37
14	Lake Oroville Temperatures, 2001	38
15	Historical Lake Del Valle Operation	43
16	Historical San Luis Reservoir Operation.....	47

17	Historical Pyramid Lake Operation	52
18	Historical Castaic Lake Operation	55
19	Historical Silverwood Lake Operation.....	58
20	Historical Lake Perris Operation.....	60

Maps

<i>No.</i>		<i>Page</i>
1	Project Facilities.....	x
2	Field Division Boundaries	2
3	Water Deliveries	11

Glossary	71 - 74
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Conversion Factors

Quantity	Multiply	By	To obtain
Area	acre	43,560	square feet
Volume	cubic foot	7.481	gallons
	cubic foot	62.4	pounds of water
	gallon	0.13368	cubic feet
	acre-foot	325,900	gallons
	acre-foot	43,560	cubic feet
	million gallons	3.07	acre-feet
Flow	cubic foot/second (cfs)	450	gallons/minute (gpm)
	gallons/minute	0.002228	cubic feet/second (cfs)
	million gallons/day	1.5472	cubic feet/second (cfs)
	cubic foot/second (cfs)	646,320	gallons a day
	cubic foot/second (cfs)	1.98	acre-feet a day
	million gallons/day (mgd)	1,120	acre-feet a year
Pressure	feet head of water	.433	pounds/square inch (psi)
Power	kilowatts (kW)	1.3405	horsepower (hp)

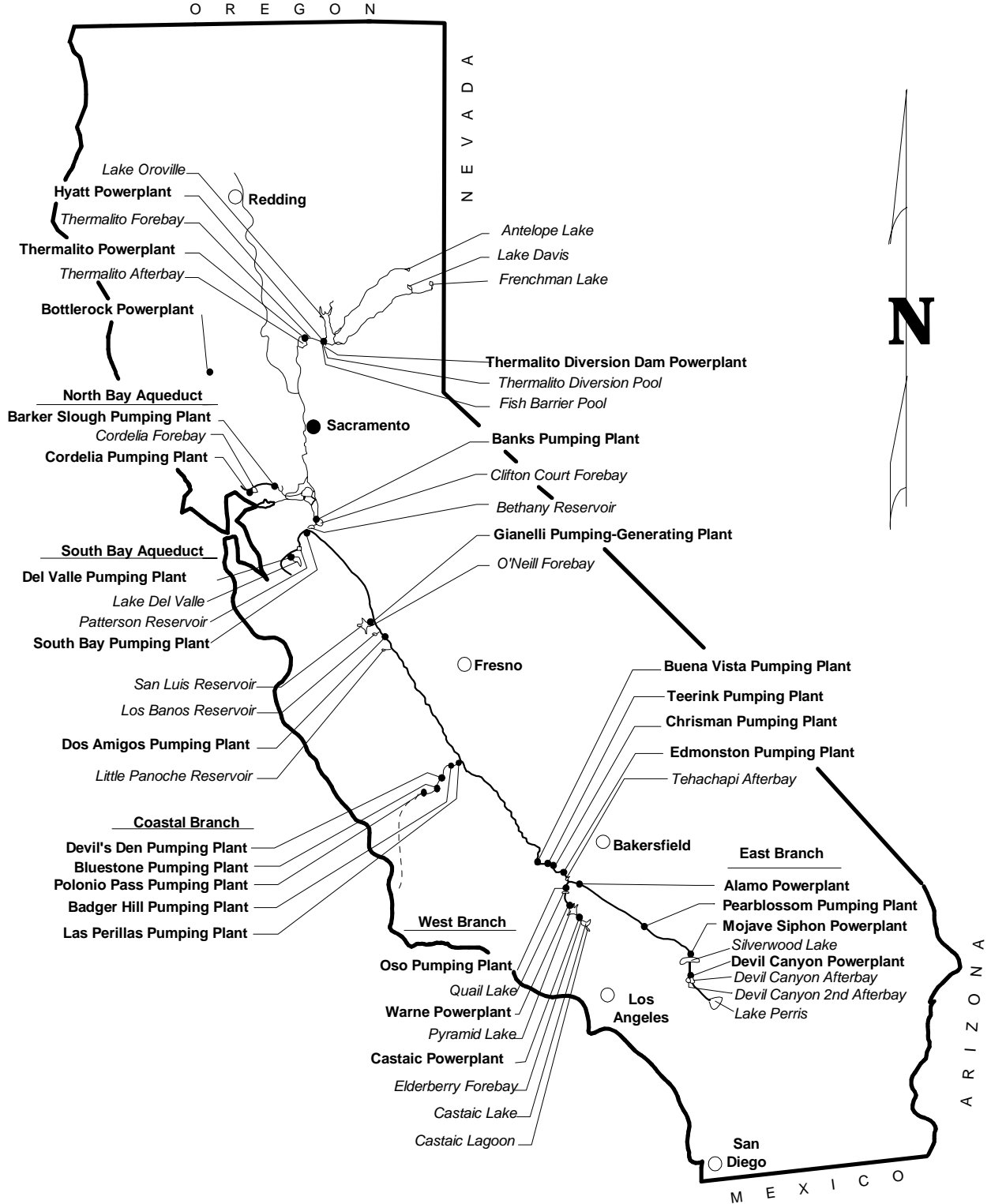
Abbreviations and Units

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
CEA	Capacity Exchange Agreement
cfs	cubic feet per second
CVP	Central Valley Project
D-1485	Water Rights Decision 1485
DFG	Department of Fish and Game
DO	dissolved oxygen
DOI	Delta Outflow Index
DPR	Department of Parks and Recreation
DWR	Department of Water Resources
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

Map 1

Project Facilities



Introduction

The 2001 Annual Report of Operations for the State Water Project is divided into seven parts. The first two parts, "Highlights of 2001 Operation" and "Project Status in 2001," cover conditions and events of statewide significance. The following three sections cover water conditions, water operations, and energy operations in 2001. 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 2001 Operation

Managing available water supplies during the 1987-1992 drought required activities designed to make the most beneficial use of water available to the SWP. The Department of Water Resources 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. Annual Table A represents the total amount of project water that an SWP contractor may request each year, according to that contractor's long-term water supply contracts. Approved Table A (previously called entitlement) represents the amount of annual Table A requested by the contractors and approved for delivery by the Department, based on hydrologic conditions, current reservoir storage, and total requests by the SWP water contractors. 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 Table A water were about 4.12 MAF. The initial allocation in December 2000 provided for 40 percent of Table A or 1.65 MAF. On January 31, 2001, due to unusually dry conditions, the allocation was down graded to 20 percent or 824 TAF. Statewide water year runoff totaled only half of average in the dry 2000-01 water year, and was less than average in all months. Runoff in the Sacramento River and San Joaquin River Regions was about 55 percent of average. As a result of improvements in water conditions, approved Table A amounts were further increased to 1.03 MAF (25 percent) on March 6; 1.24 MAF (30 percent) on March 15; 1.38 MAF (33 percent) on May 4; 1.44 MAF (35 percent) on May 17; and finally to 1.61 MAF (39 percent) on August 16, 2001.

All regions of the State except the Central Coast and Colorado Desert were drier than average with extremely dry conditions prevailing in the North Coast

and North Lahontan Regions. Statewide precipitation was 75 percent of average. Mountain snowpack was low and peaked in mid-March, 2 weeks earlier than normal. The timing of the snow accumulation, this winter was similar to the previous year, but with much less snow.

Eastern tropical Pacific Ocean surface temperatures were cooler than average (a La Nina condition) in fall 2000, which usually leads to dry south/wet north winter weather forecasts. Instead, the opposite occurred. By fall 2001, the sea surface temperatures were near normal. After six years of "wet" or "above normal" conditions, 2000-01 water year was classified as "dry" in both the Sacramento and San Joaquin River Indexes.

Although some stations on the Santa Ynez and Sacramento Rivers exceeded flood stage briefly in early March, water year 2000-01 was a mild year for flood control. Figure 13 in this report illustrates the operation of Lake Oroville for flood control.

A leak was discovered on June 5, 2001 at Mile 4.25 of the aqueduct between Banks Pumping Plant and Bethany Reservoir. For more details, refer to Significant Operational Activities in June.

The DWR-USBR Coordinated Operations Agreement monitors the daily difference between each agency's releases from storage and Delta exports. "Balanced" conditions are declared when releases are in danger of not meeting Delta outflow requirements. "Excess" conditions are declared when releases exceed Delta outflow requirements. DWR and USBR declared balanced Delta water conditions from January 1 through January 16, from January 22 through January 13, from February 6 through February 13, from April 3 through April 9, from April 18 through April 21, and from May 12 through December 5 through December 31 during 2001.

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

Map 2 Field Division Boundaries

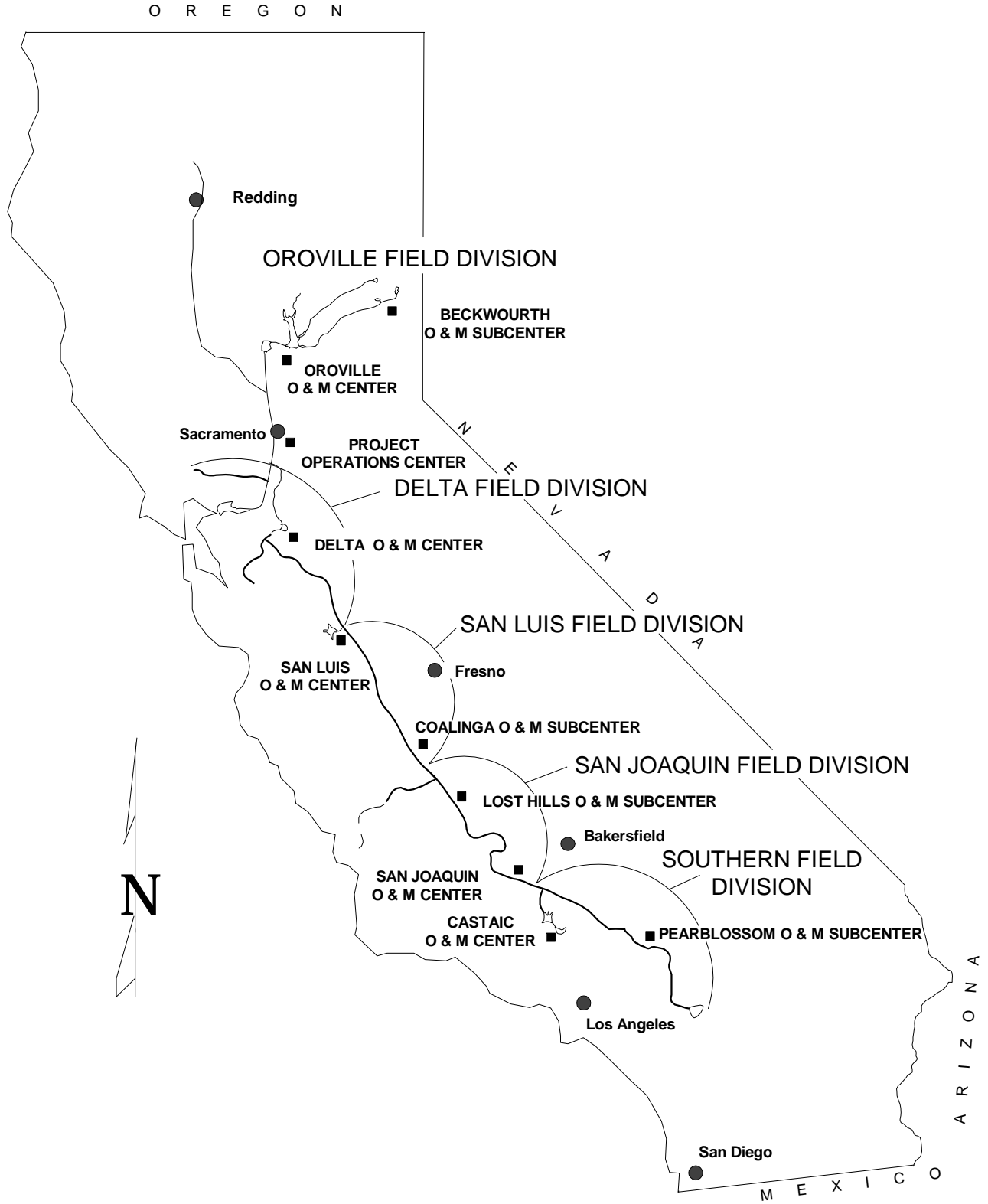


Table 1. Project Pumping by Plant

2001

(in acre-feet)

Pumping Plants	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Totals
Hyatt	45,457	33,824	57,618	47,827	51,153	9,163	5,928	7,232	2,975	0	0	10,267	271,444
Thermalito	47,194	37,744	60,787	55,667	64,207	12,119	6,814	4,840	1,971	0	125	12,630	304,098
Barker Slough	1,995	2,189	1,051	3,920	4,155	5,741	6,376	5,466	4,376	5,319	3,962	1,141	45,691
Cordelia	1,779	1,984	879	2,529	2,247	3,120	3,402	3,233	2,843	3,403	2,702	961	29,082
Banks													
State	240,845	260,853	360,751	98,528	33,823	9,233	158,191	153,086	172,339	60,306	192,176	376,553	2,116,684
Federal	0	0	0	0	0	0	40,377	62,021	40,359	0	0	0	142,757
Other 4/	0	0	0	0	0	0	19,097	33,432	0	0	0	0	52,529
Total	240,845	260,853	360,751	98,528	33,823	9,233	217,665	248,539	212,698	60,306	192,176	376,553	2,311,970
South Bay	6,476	6,601	8,946	10,851	11,633	7,476	16,018	15,498	11,966	15,546	5,267	356	116,634
Del Valle	0	1,209	32	3,547	2,276	875	4,790	1,117	830	818	0	0	15,494
Gianelli 1/													
State	118,571	196,669	195,402	37,281	3,425	563	5,464	36,821	25,687	-1,226	92,107	275,074	985,838
Federal	72,357	23,864	31,384	7,163	0	0	0	7,840	83,405	104,668	158,005	176,260	664,946
Total	190,928	220,533	226,786	44,444	3,425	563	5,464	44,661	109,092	103,442	250,112	451,334	1,650,784
O'Neill 2/													
State	0	0	0	0	0	11,000	0	0	0	0	0	0	11,000
Federal	132,231	107,583	47,423	62,241	0	-4,451	24,180	51,007	92,250	112,757	169,560	195,484	990,265
Total	132,231	107,583	47,423	62,241	0	6,549	24,180	51,007	92,250	112,757	169,560	195,484	1,001,265
Dos Amigos 1/													
State	157,487	59,194	169,592	96,418	187,630	188,739	221,382	159,866	145,642	185,560	120,404	90,673	1,782,587
Federal	75,823	87,689	43,331	70,510	113,410	202,592	158,390	129,748	51,266	4,329	16,054	26,208	979,350
Other 4/	0	0	0	0	0	4,367	20,973	32,354	0	0	0	0	57,694
Total	233,310	146,883	212,923	166,928	301,040	395,698	400,745	321,968	196,908	189,889	136,458	116,881	2,819,631
Las Perillas	6,270	1,475	3,792	4,443	12,260	14,309	14,898	13,177	8,801	3,766	1,828	2,154	87,173
Badger Hill	6,270	1,475	3,792	4,443	12,260	14,309	14,898	13,177	8,801	3,766	1,828	2,154	87,173
Devil's Den	1,422	1,115	1,374	1,709	2,367	3,076	2,811	2,897	2,679	1,592	1,032	1,354	23,428
Bluestone	1,317	1,041	1,290	1,599	2,226	2,889	2,632	2,692	2,484	1,488	955	1,257	21,870
Polonio Pass	1,471	1,160	1,412	1,739	2,326	2,955	2,760	2,858	2,643	1,538	1,064	1,401	23,327
Buena Vista	99,634	52,968	88,061	91,715	159,413	137,242	147,537	139,049	138,887	138,276	126,178	93,059	1,412,019
Teerink	101,719	52,220	83,002	87,712	151,292	123,426	136,004	130,891	136,920	139,633	129,347	95,106	1,367,272
Chrisman	100,245	51,923	80,262	85,544	144,710	114,698	126,853	125,358	131,881	136,412	128,164	93,184	1,319,234
Edmonston	98,632	51,050	79,541	83,772	141,622	110,043	122,930	121,116	128,021	132,801	126,336	92,802	1,288,666
Oso	50,638	19,002	22,157	26,737	69,438	40,247	45,193	45,408	60,015	63,593	64,884	41,418	548,730
Castaic 3/	76,404	71,827	82,745	90,625	123,063	108,965	114,674	112,144	100,419	64,190	54,042	52,425	1,051,523
Pearblossom	43,294	28,706	52,361	50,614	62,299	57,132	63,657	61,104	58,068	58,907	56,955	47,207	640,304

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.

4/ Pumping at Banks for Cross Valley Canal water delivered or transferred to Westlands Water District, Tulare Lake Basin WSD, and Kern Co. WA.

Note: Negative values may appear and indicate a mismatch of scheduled energy and actual pumping.

comprise 28 dams and reservoirs, 25 pumping and generating plants, and nearly 660 miles of aqueducts.

Work continued on the East Branch Extension of the California Aqueduct. Construction began in 1999; the project is anticipated to start operating in fall 2002. The pipeline will convey water from the Crafton Hills Pump Station through Crafton Hills Reservoir and Cherry Valley Pump Station to the Noble Creek Spreading Grounds.

Energy resources totaled 9,107,140 MWh including generation of 5,228,099 MWh from SWP energy sources, 151,959 MWh of federal resources, purchases of 3,060,347 MWh, and 666,736 MWh in Power Exchange (see Figure 4). Energy loads of 9,333,632 MWh include sales of 2,299,310 MWh,

6,622,986 MWh used to deliver water to SWP contractors, 378,451 MWh of federal energy loads for pumping, and losses and system imbalances of 32,885 MWh (see Figure 6).

SWP facilities delivered 4,176,181 AF of water to 43 agencies, including 27 long-term water contractors, in 2001 as shown on Table 2. This amount is 1.37 MAF less than the total State and federal water deliveries from the SWP in 2000. State contractor deliveries were 2,010,526 AF; including 1,580,144 AF of Table A water and 430,382 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 2001

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 2001 included: 28 water storage facilities, 3 pumping-generating plants, 6 power plants, 17 pumping plants, and nearly 660 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. The South Bay Pumping Plant then lifts it 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 San Luis 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 Power plant, then to Lake Perris, SWP's southernmost reservoir. Decades after most existing portions of the State Water Project were built, the East Branch Extension, a 13-mile pipeline project to serve the Yucaipa Valley and the San Gorgonio Pass area in San Bernardino and Riverside counties, is now poised for construction. The \$77 million Phase I of this project will help meet the region's water needs for the next 40 years, reduce groundwater overdraft and provide more flexibility for local water systems. Completion of Phase I will provide an annual supply of up to 8,650 acre-feet to the San Gorgonio Pass Water Agency. (Phase II, which is now in early conceptual stages and won't be built until demand increases, will provide an additional 8,650 acre-feet annually.)

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

Table 2. Water Deliveries 1962-2001

(in acre-feet)

Agency	1962-1996	1997	1998	1999	2000	2001	TOTALS
Oroville Field Division							
Last Chance Creek W.D. (Local Supply)	243,727	12,590	10,046	12,241	13,502	10,959	303,065
Plumas Co. F.C. & W.C.D.*	10,241	231	0	0	0	0	10,472
County of Butte*	7,884	189	528	287	587	525	10,000
Thermalito I.D. (Local Supply)	37,727	1,730	2,271	2,567	2,478	2,537	49,310
Prior Water Rights Deliveries	23,064,708	991,710	870,937	1,094,989	1,083,590	1,066,057	28,171,991
Yuba City*	6,204	1,005	1,054	1,096	901	1,065	11,325
Delta Field Division							
Napa CO. F.C. & W.C.D. *(Local Supply)	162,739	4,341	5,359	5,304	4,958	9,345	192,046
Alameda Co. W.D.* (Local Supply)	672,399	25,022	26,580	29,544	27,962	25,914	807,421
A.C.F.C. & W.C.D., Zone 7* (Local Supply)	644,463	40,372	37,044	43,024	44,644	39,153	848,700
Pleasanton Township W.D.	674	0	0	0	0	0	674
Santa Clara Valley W.D.*	1,885,237	60,601	39,610	52,945	78,258	47,922	2,164,573
Marin W.D.	4,594	0	0	0	0	0	4,594
San Francisco W.D.	82,286	0	0	0	0	0	82,286
Skylonda M.W.D.	10	0	0	0	0	0	10
Oak Flat W.D.*	149,247	5,238	4,286	4,871	4,508	3,592	171,742
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.)	2,906	155	0	0	0	0	3,061
Orestimba Creek	100	0	0	0	0	0	100
Recreation Fish and Wildlife	4,397	0	114	139	145	196	4,991
Western Hills Water District	0	0	0	0	0	638	638
CVP Water	6,081	376	513	607	655	644	8,876
Solano Co. F.C.W.C.D.*	216,398	33,530	29,766	34,753	37,015	34,586	386,048
San Luis Field Division							
Dept. Parks & Rec. (STATE)	1,132	93	72	93	73	126	1,589
Dept. Fish & Game (STATE)	9,695	270	336	812	755	445	12,313
Fed. Customers (Rec.+ Joint-Use)	29,810,716	1,493,362	1,013,030	1,256,771	1,083,991	1,005,813	35,663,683
Fed. Customers (Misc.)	248,549	43	7,117	29	0	0	255,738
Westlands Water District	10,900	0	136,519	130,969	0	30	278,418
San Joaquin Field Division							
Tulare Lake Basin W.S.D.*	3,200,949	20,469	17,677	262,451	178,360	60,519	3,740,425
Empire West Side I. D.*	88,163	0	542	3,176	1,799	1,860	95,540
County Of Kings*	67,822	0	15	4,000	3,600	1,560	76,997
Hacienda W.D.	75,895	0	0	0	0	0	75,895
Kern County Water Agency*	22,074,441	841,319	757,771	1,107,539	1,152,824	458,810	26,392,704
Kern Water Bank	7,501	0	0	0	0	0	7,501
Dudley Ridge Water District*	1,416,072	68,638	55,450	59,611	58,873	47,977	1,706,621
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	6,200	10,000	3,780	16,100	13,380	0	49,460
A.C.F.C. & W.C.D., Zone 7* (Local Supply)	0	0	5,970	22,910	23,940	5,000	57,820
Green Valley Water District	11,054	0	0	0	0	0	11,054
Federal Wheeling	1,249,979	11,272	14,081	10,476	28,962	35,998	1,350,768
General Wheeling	0	0	0	12,804	0	0	12,804
Westlands Water District	0	0	0	0	0	25,164	25,164
Castaic Lake Water Agency	37,117	4,870	311	4,086	8,395	1,238	56,017
M.W.D. Of S.C.	195,092	126,486	69,234	138,012	0	0	528,824
Santa Clara Valley WD	45,000	35,000	23,800	30,000	23,730	0	157,530
San Luis Obispo County*	0	1,099	3,592	3,743	3,962	4,283	16,679
Santa Barbara County*	0	7,439	18,618	20,137	22,741	18,946	87,881
Central Coastal Water Authority	86	527	0	0	0	0	613
Department of Fish and Game	0	0	0	0	0	0	0
Southern Field Division							
A.V.E.K. W.A.*	913,392	63,729	54,271	70,512	84,938	64,090	1,250,932
M.W.D. Of S.C.*	14,974,327	586,537	363,052	681,605	1,357,393	1,093,451	19,056,365
Littlelock Creek I. D.*	12,803	444	404	342	0	0	13,993
Mojave Water Agency*	110,774	12,638	4,580	6,705	10,019	3,048	147,764
Desert Water Agency*	604,106	69,990	70,647	58,100	58,234	15,010	876,087
Coachilla Valley Water District*	373,710	68,340	85,709	50,480	42,323	9,100	629,662
Crestline-Lake Arrowhead Water Agency*	29,918	1,138	704	1,145	1,458	1,657	36,020
San Gabriel Valley M.W.D.*	194,339	18,175	9,310	21,729	15,140	2,360	261,053
San Bernardino Valley M.W.D.*	277,076	9,654	1,878	12,874	18,399	26,488	346,369
Santa Barbara	1,240	0	0	0	0	0	1,240
Dept. Parks & Rec., L.A. Co. Rec. Dept.	65,054	3,624	1,585	3,279	6,559	2,153	82,254
Piru Creek Fish Enhancement	2,915	0	0	0	0	0	2,915
Castaic Lake Water Agency*	231,031	22,842	19,782	28,813	33,674	35,632	371,774
Palmdale Water District*	71,943	11,861	8,752	13,278	9,060	10,427	125,321
Federal Delivery	0	0	0	0	0	13	13
United Water C.D. (Local Supply)	998	0	0	0	0	0	998
Ventura County FCD*	5,824	1,850	1,850	1,850	4,048	1,850	17,272
Los Angeles Dept. of Water and Power	1,495	0	0	0	0	0	1,495
Lilico Pictures	10	0	0	0	0	0	10
Totals	104,177,007	4,668,799	3,778,547	5,316,798	5,545,833	4,176,181	127,663,165

* Long-term contractors

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

Lake Oroville and San Luis Reservoir are the primary conservation facilities of the SWP's 28 dams and reservoirs. The remaining 26 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; 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 2001 were:

January

- Chrisman Pumping Plant Units 2 and 3 were out of service from January 2 to January 25 to replace unit circuit breakers and repair pumps. Unit 5 out of service from January 29 to February 19 to replace unit circuit breaker.
- Edmonston Pumping Plant Units 1, 3, 5, 9, and 13 out of service from January 2 to February 19 to repair discharge valves. Unit 7 out of service from January 2 to March 26 to repair discharge valve, re-wedge the motor, and to retrofit the unit circuit breaker.
- Oso Pumping Plant Unit 3 and 5 out of service from January 2 to February 1 to repair discharge valves. Unit 4 out of service from January 2 to June 7 for annual maintenance and to repair discharge valve, pump, and motor.
- Pine Flat Power plant Units 1, 2 and 3 out of service from January 8 to February 2 for annual maintenance.
- Devil Canyon Power Plant Unit 2 out of service from January 15 to March 8 for annual maintenance and to repair turbine.
- Banks Pumping Plant Unit 8 out of service from January 19 to April 6 for annual maintenance and to repair discharge valve.

February

- Warne Power plant Unit 2 out of service from February 12 to March 1 for annual maintenance.

- Barker Slough Pumping Plant Unit 2 out of service from February 13 to March 29 to refurbish pump and motor.
- Chrisman Pumping Plant Units 6 and 7 out of service from February 19 to March 12 to retrofit unit circuit breakers.

March

- Chrisman Pumping Plant Unit 5 out of service from March 1 to August 10 for annual maintenance and to repair discharge valve and pump.
- Gianelli Pumping-Generating Plant Unit 3 out of service from March 12 to May 30 to repair butterfly valve and to replace field poles. Unit 4 out of service from March 24 to April 28 to repair butterfly valve and pump.
- Dos Amigos Pumping Plant Unit 4 out of service from March 12 to May 21 to repair pump and motor.
- Devil Canyon Power plant Unit 1 out of service from March 12 to May 1 for annual maintenance and replacement of unit circuit breaker.
- Pearblossom Pumping Plant Unit 5 out of service from March 18 to October 25 for annual maintenance and to repair discharge valve and pump.

April

- Edmonston Pumping Plant Unit 3 out of service from April 2 to April 27 to retrofit unit circuit breaker. Unit 6 out of service from April 30 to May 23 to retrofit unit circuit breaker.
- Mojave Siphon Power plant Unit 1 out of service from April 2 to April 19 for annual maintenance.
- Hyatt Power plant Unit 4 out of service from April 8 to May 7 to replace governor.
- Banks Pumping Plant Unit 4 out of service from April 9 to August 22 for unit maintenance, motor re-wedge, discharge valve repair, and penstock gate work. Unit 5 out of service from April 9 to May 19 for penstock gate work.
- Reid Gardner Power plant Unit 4 out of service from April 14 to May 8 for annual maintenance.

May

- South Bay Pumping Plant Unit 3 out of service from May 11 to June 6 to overhaul pump and to repair discharge valve and motor.
- Chrisman Pumping Plant Unit 3 from May 29 for annual maintenance and to repair pump. Completion expected in 2002.

June

- Banks Pumping Plant Units 1 through 11 out of service from June 6 to July 3 for aqueduct leak repairs. Unit 5 out of service from June 11 to July 2 to repair discharge valve oil leak.
- Teerink Pumping Plant Unit 4 out of service from June 6 to June 22 to repair motor.
- Cordelia Pumping Plant Unit 1 out of service from June 25 to July 30 to refurbish pump and motor.

July

- Alamo Power plant Unit 1 out of service from July 9 to August 9 to replace mechanical shaft seal.
- South Bay Pumping Plant Unit 3 out of service from July 24 to August 29 to repair motor bearing.
- Banks Pumping Plant Unit 5 out of service from July 30 to August 28 for annual maintenance and to repair discharge valve and pump.

August

- Del Valle Pumping Plant Unit 4 out of service from August 6 to October 17 to refurbish pump and motor.
- Banks Pumping Plant Unit 11 out of service from August 27 to September 10 to repair discharge valve. Unit 4 out of service from August 28 to November 6 to replace burned control cables. Unit 5 out of service from August 28 to rewind stator after fire. Unit is expected return in 2002.
- Teerink Pumping Plant Unit 6 out of service from August 28 to September 13 to repair motor.
- South Bay Pumping Plant Unit 3 out of service from August 30 to September 22 to repair lower motor guide bearing.

September

- Pine Flat Power Plant Unit 2 out of service from September 4 for annual maintenance and to modify penstock. Expected return in 2002. Units 1 and 3 out of service from September 13 for annual maintenance and to modify penstock. Expected return in 2002.
- Dos Amigos Pumping Plant Unit 1 out of service from September 10 to repair motor and replace field poles. Expected return in 2002.
- Chrisman Pumping Plant Unit 1 out of service from September 17 to October 11 for annual maintenance and to repair pump.

October

- Hyatt Power plant Unit 1 out of service from October 2 to refurbish unit and repair turbine. Expected return in 2002.
- Gianelli Pumping-Generating Plant Unit 7 out of service from October 4 to repair butterfly valve and pump and to replace field poles. Expected return in 2002.
- Thermalito Pumping-Generating plant Unit 2 out of service from October 9 to November 16 for annual maintenance and to replace governor.

November

- South Bay Pumping Plant Unit 8 out of service from November 2 to repair discharge valve and pump and to work on Altamont pipeline. Expected return in 2002.
- Pearblossom Pumping Plant Unit 4 out of service from November 5 to repair discharge valve and pump. Expected return in 2002.
- Devil Canyon Power plant Unit 4 out of service from November 5 to December 14 for annual maintenance and to modify turbine.
- Edmonston Pumping Plant Unit 4 out of service from November 5 to November 29 to repair starting disconnect switch.
- Banks Pumping Plant Unit 4 out of service from November 6 to December 7 to modify CO₂ system.
- Buena Vista Pumping Plant Unit 8 out of service from November 13 to repair discharge valve. Expected return in 2002.
- Warne Power plant Unit 1 out of service from November 26 to December 21 for annual maintenance.

December

- Gianelli Pumping-Generating Plant Unit 3 out of service from December 5 to repair motor. Expected return in 2002.
- South Bay Pumping Plant Units 1 through 7 out of service from December 14 to work on Altamont pipeline. Expected return in 2002. Unit 9 out of service from December 14 to repair discharge valve and work on Altamont pipeline. Expected return in 2002.

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 2001 calendar year and the 2000-01 water year.

Precipitation and Snowpack

All regions of the State except the Central Coast and Colorado Desert were drier than average with extremely dry conditions prevailing in the North Coast and North Lahontan Regions. Statewide precipitation was 75 percent of average, with percentages decreasing from south to north and from the coast inland. Mountain snowpack was only about 60 percent of average and peaked in mid-March, 2 weeks earlier than normal.

Eastern tropical Pacific Ocean surface temperatures were cooler than average (a La Nina condition) in fall 2000, which usually leads to dry south/wet north winter weather forecasts. Instead, the opposite occurred. By fall 2001, the sea surface temperatures were near normal.

After a promising start to the water year with double average precipitation in October 2000, November and December were very dry. Northern Sierra precipitation accumulation dropped below average in mid-November and was only half of average on January 1, 2001. This was the driest start to the water year since 1991.

Several storms arrived in mid and late January, but precipitation was still well below average for the month in the northern Sierra. This raised concerns of potential drought, and the Department appointed a Drought Preparedness Coordinator.

February was the most productive month of the year, but precipitation was only slightly above average. Snow accumulation on south facing slopes above Lake Shasta and Trinity Lake approached normal levels after February storms with southerly flow, but regional snowpack remained below average.

The *dry* pattern resumed after the first week of March, and March precipitation totaled only about two-thirds of average. Sunny weather caused substantial early snowmelt, especially at lower elevations. The statewide snowpack peaked on March 14, and quickly dropped to 60 percent of average on April 1, the date of the historical maximum accumulation

May was very dry, with no rain at most stations. More than 180 daily high temperature records were set at stations ranging from the North Coast to the Colorado Desert during 11 days in May. The snowpack was depleted to 20 percent of average by May 14. Sunny weather and night temperatures above freezing caused a 24-hour melt at all elevations during the hottest

periods. The summer was dry, with the only significant rainfall occurring in far Northern California in late June and in the southern Sierra in early July.

The Northern Sierra Eight Station Precipitation Index finished with 33 inches for the 2000-01 water year (66 percent of average). The Feather River Basin was again among the driest mountain basins, receiving only half of average precipitation during the water year.

Runoff and Storage

Statewide water year runoff totaled only half of average in the dry 2000-01 water year, and was less than average in all months. Runoff in the Sacramento River and San Joaquin River Regions was only about 55 percent of average. Feather River unimpaired inflow to Lake Oroville was 2.1 MAF (46 percent of average) for the water year. Reservoir storage decreased from 108 percent of average at the start of the water year to 86 percent at the end. While storage releases helped many water users, there were water shortages for those exporting water from the Sacramento-San Joaquin Delta and the upper Klamath River.

The Sacramento River Index for water year 2000-01 was 9.8 MAF (54 percent of average). The Sacramento Valley 40-30-30 Index was *dry*. San Joaquin River system unimpaired runoff from the Stanislaus, Tuolumne, Merced, and San Joaquin Rivers was 3.2 MAF (53 percent of average). The San Joaquin Valley 60-20-20 Index was *dry*.

The water year began with low base flow. Statewide unimpaired runoff was 35 percent of average for the 3 months ending December 2000. Reservoir storage dropped to average levels in January, and river levels continued to be very low through February.

The highest water of the year was on March 6 when locally heavy rains caused the Santa Ynez River in Santa Barbara County to rise more than 8 feet above flood stage at the Narrows station near Lompoc. On the Sacramento River, flood stage was slightly exceeded at Tehama on March 5, and the Colusa and Tisdale weirs overflowed into the Sutter Bypass for several days in late February and early March.

Sierra runoff doubled in late March as warm weather melted the low elevation snow. Cool weather

in early April temporarily halted the melt, but late April flow tripled in some mountain streams. Record high temperatures in May accelerated the runoff from snowmelt, which peaked in most snow-fed rivers between May 8 and 12. Statewide runoff during May was two thirds of average, but runoff in the San Joaquin River and Tulare Lake Regions was closer to average due to the accelerated snowmelt. Forecasts of April through July runoff, which were increased by 10 percent in many of the southern Sierra basins after the April storms, had to be reduced by approximately 5 percent in May due to the very dry weather.

Runoff in Sierra basins receded abruptly in June due to the depleted snowpack, while the weather continued warmer and drier than average, despite an unseasonable storm in the far north. Statewide river runoff dropped precipitously to only a quarter of average, the lowest June flows in most rivers since 1992. In the San Joaquin Region, May runoff accounted for well over half of the April through July runoff, the highest fraction this century.

Statewide reservoir storage topped out near average at about three-quarters of capacity in May.

Millerton Lake and Terminus Reservoir filled in late May, but the other major foothill reservoirs did not fill to capacity due to the sub-normal snowpack. Statewide reservoir storage dropped to 10 percent below average on June 30 due to low inflow and high demands. This combination also caused the second lowest June net river accretions in the Sacramento Valley since 1950.

The total April through July river runoff in the Sacramento River Region in summer 2001 ranged from 43 to 74 percent of average, reflecting lower precipitation in the northern Sierra in winter 2001. Run-off from July through September dropped to very low flow levels, much less than half of average in most rivers. Only the upper Sacramento River ran near average, supported by subsurface flow in the Pit basin. SWP reservoir storage statewide dropped to 19.3 MAF on September 30. This was 86 percent of average for the date, as compared to 108 percent a year ago, and was the lowest level since 1994.

Additional and more specific information is available via the Internet at:

<http://cdec.water.ca.gov/snow-rain.html>.

Water Operations

Reservoir Operations

Lake Oroville and San Luis Reservoir are the two main conservation facilities for SWP water supplies. Tables 8 and 13 summarize the operations of these reservoirs during the 2001 calendar year.

Lake Oroville began 2001 with 1,724,942 AF of storage, 456,923 less than it held at the beginning of 2000. Storage in Lake Oroville peaked on May 6, 2001 at 2,203,836 AF (62 percent of normal maximum operating capacity) and ended the year at 45 percent of normal capacity or 1,595,882 AF. Total inflow into Lake Oroville during the 2001 calendar year was 2,030,753 AF. The net effect of operations and water conditions at Lake Oroville resulted in a decrease in storage of 129,251 AF.

At the beginning of 2001, Lake Del Valle held 25,080 AF (66 percent of normal maximum operating capacity). Highest end-of-month storage was in August at 38,987 AF (103 percent of normal maximum operating capacity). At year's end Lake Del Valle held 37,697 AF (99 percent of normal maximum operating capacity).

At the start of 2001, San Luis Reservoir held 1,470,439 AF, 73 percent of its normal maximum operating capacity (2,027,835 AF); the SWP held 481,654 AF, 46 percent of its maximum operating capacity (1,062,183 AF). SWP storage at the end of 2001 increased to 675,995 AF. End-of-year federal

storage was 709,637 AF, for a year-end total of 1,385,632 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 638,940 AF at the beginning of 2001 decreased to 634,595 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 2000 and 2001:

Reservoir	Normal Maximum Operating Capacity	End-of-year Storage 2000	End-of-year Storage 2001
Lake Oroville	3,537,580	1,724,942	1,595,882
Lake Del Valle	40,000	25,080	37,697
San Luis Reservoir (State Share)	1,062,183	481,677	675,995
Pyramid Lake	171,200	166,362	164,144
Silverwood Lake	74,970	73,707	72,102
Lake Perris	131,450	108,793	116,976
Castaic Lake	323,700	288,568	281,373
Totals	5,341,083	2,869,129	2,944,169

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 Table A 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 2001 has been organized in Table 2.

Pursuant to Article 56 of the Monterey Amendments, contractors can elect to store project water outside of their service area for later use within their service area. Qualified contractors can request carryover Table A amounts for delivery in the following year to the extent that such deliveries do not adversely affect current or future project operations. Factors that influence how much extended carryover water can be delivered include operational constraints of project facilities, filling of SWP conservation storage facilities, flood control releases, and water quality restrictions. If storage request exceed the available storage capacity, the amount available is allocated among the contractors requesting storage in proportion to their annual Table A amounts for that year. Eleven SWP contractors took delivery of 289,737 AF of 2000 approved Table A amounts carried over into 2001 as extended carryover. Two SWP contractors had 5,800 AF of their extended carryover delivered to storage outside their service area.

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

Under provisions of their water supply contracts, South Bay and San Joaquin Valley contractors may reduce Table A water deliveries during years in which above-average amounts of local water are available and increase deliveries by an equal amount in later years. No wet-weather credits were given out in 2001.

During 2001, SWP provided water service to 43 agencies, including 27 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.

The State Water Contractor's original request for delivery of Table A Entitlement water in 2001 was 4.124 MAF. Based on projected water supply, updated snow surveys, and hydrology, the final approved amount was 1.608 MAF.

Total Project (State and federal) deliveries for 2001 totaled 5,316,798 AF. This total includes State contract deliveries of 2,965,009 AF, federal deliveries of 1,256,771 AF, Oroville Complex diversions of 1,094,173 AF, 816 AF of Upper Feather River deliveries, and 29 AF of non-chargeable refill water. State contract deliveries include a total of 2,540,616 AF of Table A and related water to 28 long-term contractors, plus 424,422 AF of other water. A graph showing the historical annual deliveries from SWP facilities is shown in Figure 1. Amounts of 2001 water deliveries are shown by field division on Map 2, and include Table A 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 2001:

Table A Water		Other Water	
M & I	946,228	Purchase Pool A	3,800
Agricultural	292,675	Purchase Pool B	14,440
Interruptible	9,333	Federal Wheeling	644
Carryover	34,592	General Wheeling	3,997
Permit	13,505	Local	36,681
Vallejo	7,048	Recreation	2,934
Transfer Carryover	500	Unscheduled	253
Transfer	14	Exchange Water	3,215
Extended Cryover	276,249	Recovery pump in	121,377
		Dry Year Purchase	115,318
		Transfer	33,307
		Exchange Water	42,410
		Wet Wthr Cryovr	1,107
		Arvin-Edison Water	
		Bank Recovery	20,800
		CVC Transfer	30,099
Total	1,580,144	Total	430,382
Total Water		Total	2,010,526

Significant Operational Activities

January

- Western Delta water quality continued to deteriorate through the month. Exports were severely curtailed early to help alleviate salinity intrusion, then at mid month to minimize detrimental effects to migratory juvenile salmon. Turning tides coupled with a moderate increase in Delta inflow greatly improved water quality for the latter half of January, but continued salmon migration concerns governed the use of the EWA to reduce exports. Chloride readings from Contra Costa WD's Pumping Plant 1

Map 3 2001 Water Deliveries (in acre-feet)

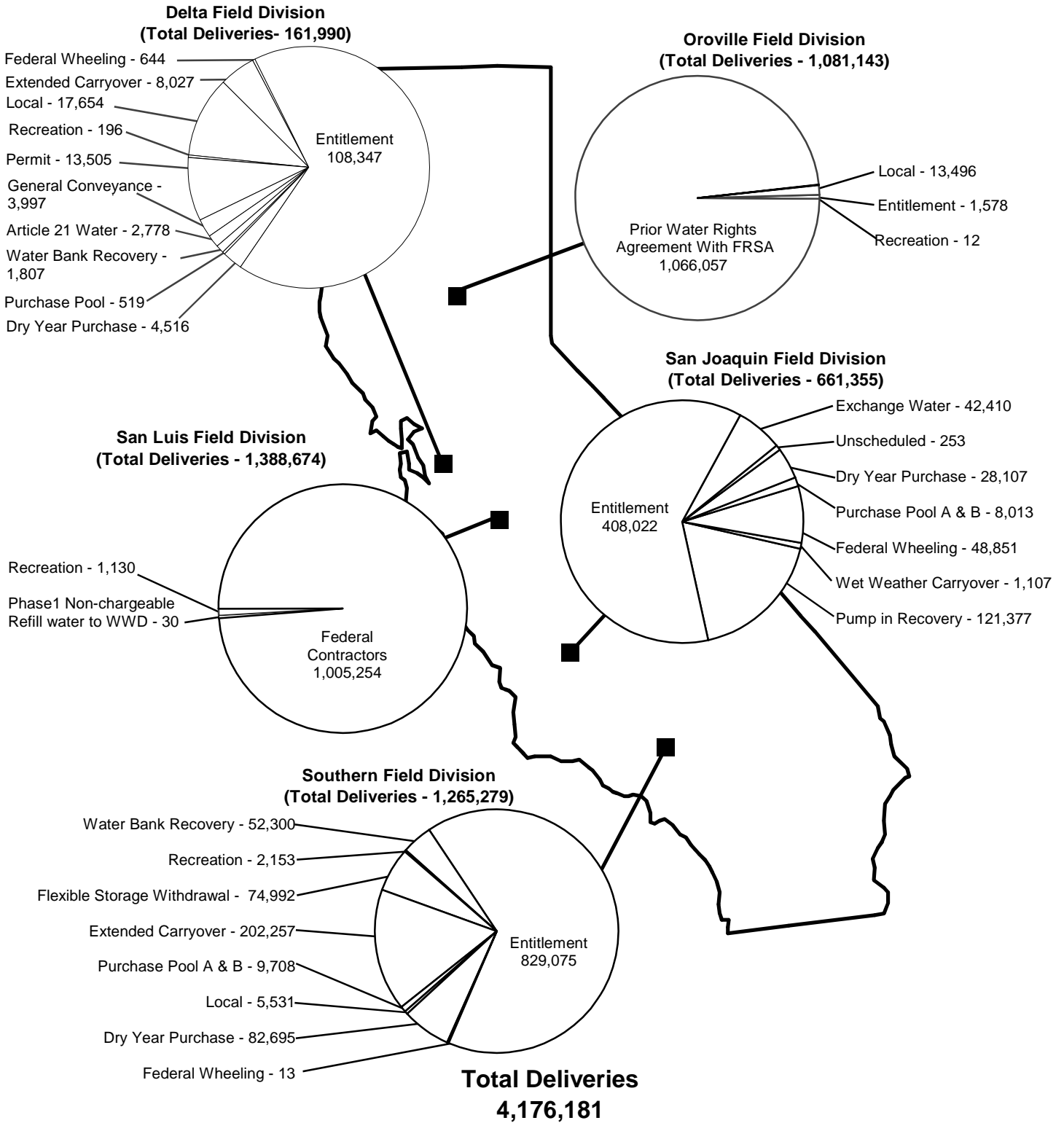
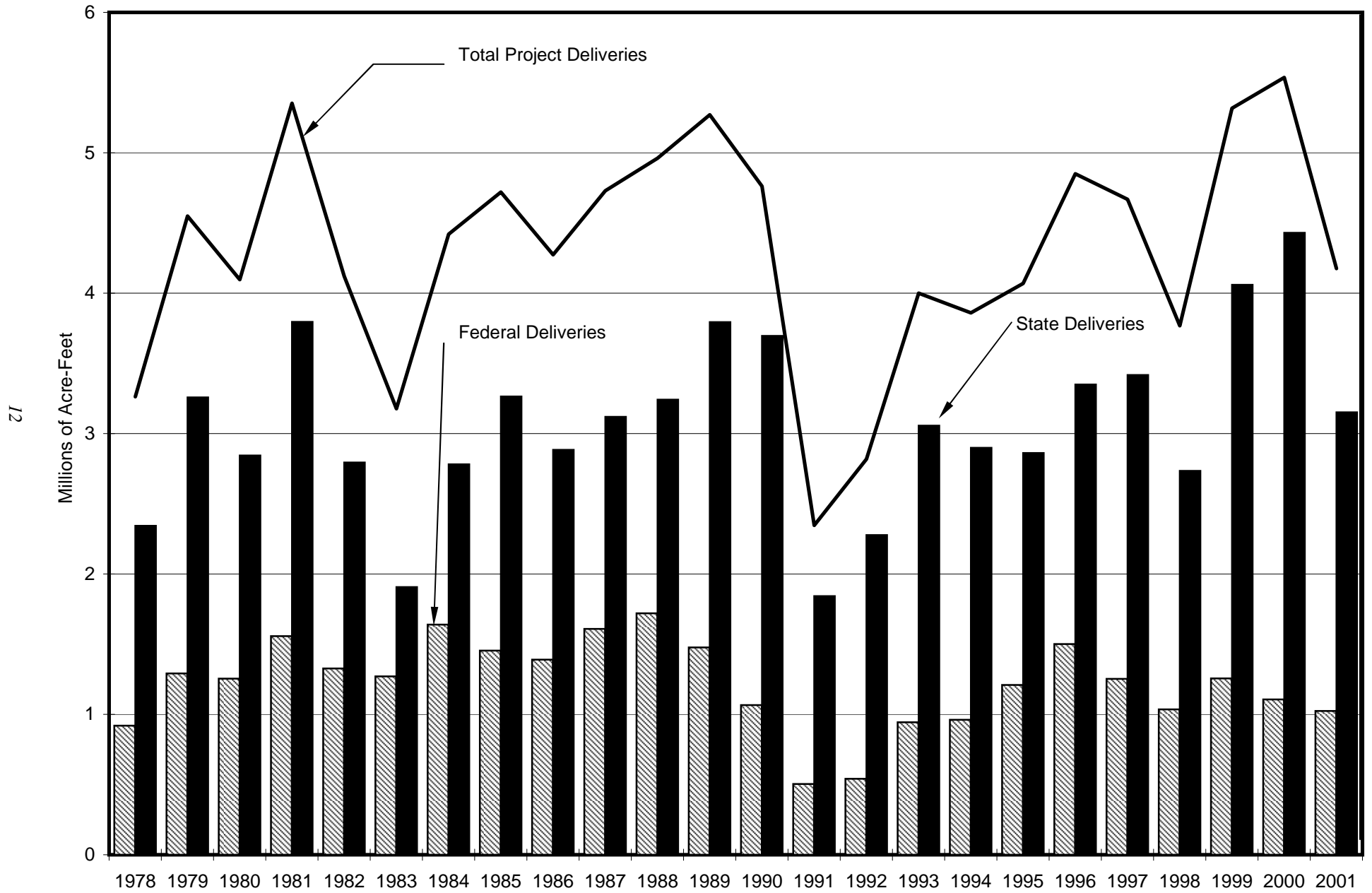


Figure 1. Total Deliveries from SWP Facilities
Annual Totals



continued above 150 mg/l despite lower readings in Old River at Bacon and elsewhere.

- Approximately 69 TAF of Environmental Water Account (EWA) water was expended to reduce exports between January 17 and 21 and between January 27 and 31, 2001. Per the Juvenile Salmon Protection Plan, developed through CALFED Ops Group process, the initial export reduction was triggered when the juvenile salmon were sampled in the Sacramento River near Sacramento in high numbers (i.e.: the Sacramento Catch Index exceeded a value of 10). The second curtailment occurred when the daily losses of salmon at the export facilities exceeded 25.

February

- The increased Delta inflows from the latter part of January abated quickly at the start of February. Significant precipitation and inflow assured compliance with all standards.
- Perris Lake was drawn down in February for boat ramp construction. Therefore, the combined southern reservoir storage was about 633 TAF, 17 TAF lower than the southern storage this time last year.
- Salvage at the fish facilities, mostly at the SWP, concerned agency biologist who frequently requested export curtailments as expenses against the EWA. Salvage of non-tagged winter-run size chinook salmon exceeded this season's yellow light level of concern of 3,702. Because of the dry January conditions, the E/I for February was 45 percent.
- The Edmonston Pumping Plant East Wing outage was completed on February 19, 2001. During the outage, discharge valve seats and O-rings for Units 1, 3, 5, 7, 9, 11, and 13 were replaced.
- SWP began taking water into the California Aqueduct at Pool 28 for the Kern Water Bank.

March

- From March 19 through March 26, the SWP delivered approximately 40,000 AF of Article 21 water.
- High salvage rates of winter-run size Chinook salmon continued through the first half of March. The EWA spent all of its water set aside for March on SWP export reductions during the first week of March, after which exports were unrestricted through the remainder of the month.
- Water quality was good and flows were plentiful following late February storms and early snow melt runoff as late March temperatures were well

above normal. All water quality standards were met.

- The Delta Field Division performed an inspection on the North Bay Aqueduct.

April

- Late storms in March delayed the runoff estimate used to determine X₂ requirements for April. Early storms in April further confounded outflow estimates for April. This uncertainty complicated export scheduling and operators relied heavily on daily adjustments to the schedule to insure compliance with standards.
- Water level concerns and the timing of the fish barrier installation further complicated Operations planning. Despite relatively low export levels, diverters in the South Delta were experiencing water level problems, especially in Tom Paine Slough. As a result of low water levels, the Department adjusted the Clifton Court Forebay operations to further reduce potential effects during low tide periods.
- This year, the Vernalis Adaptive Management Program (VAMP) started on April 20. During VAMP, San Joaquin flows are augmented by additional upstream releases and exports are curtailed for a 31-day period. In addition, a barrier is placed at the Head of Old River (HOR). Together, these measures are intended to improve conditions for juvenile fall-run salmon emigrating from the San Joaquin system. This year, the VAMP was delayed due to problems with securing permits to allow completion of the HOR barrier.

May

- Delta operations were adjusted as needed to meet several objectives. First, exports remained at 1,500 cfs through May 20. For the first 20 days of the month, exports remained low as part of the Vernalis Adaptive Management Program (VAMP) experiment. However, as delta smelt salvage increased, these low export levels continued between May 21 and May 31 as part of an Environmental Water Account (EWA) action to reduce entrainment of larvae. Exports were reduced about 15 TAF. A total of 42 TAF were expended as part of the VAMP experiment for both April and May.
- Upstream operations were adjusted during May to address Delta water quality concerns. Electrical conductivity readings at Emmaton began to approach the standard for that location, prompting increases in releases from 1,250 cfs to 3,000 cfs. By the end of the month, Sacramento

River flow had increased from about 8,000 cfs to about 12,000 cfs to improve Emmaton water quality. The cross channel gates remained closed per Decision 1641 through May 21. After that date, they were opened on the weekends to facilitate recreational passage through the cross channel and closed again on the weekdays to increase the amount of water passing Emmaton.

June

- A leak was discovered on June 5, 2001 at Mile 4.25 of the aqueduct between Banks Pumping Plant and Bethany Reservoir. The leak, estimated at approximately 2 cfs, was located 29 feet under water. Repair crews controlled the leak by pumping approximately 55 cubic yards of concrete through the lining. Around the clock repairs were initiated to fix the leak and included construction of two 30-foot high cofferdams on either side of the leak. Dewatering of approximately 1200 feet of aqueduct was required to repair the concrete liner. Repair of the liner included installation of a waterproof geomembrane in the leak area. During the repairs, some SWP contractor demands were met by releasing water from Del Valle Reservoir. A temporary pumping plant was also installed in the CVP Delta Mendota Canal (DMC), operated by the San Luis Delta Mendota Water Authority to meet additional demand. A dozen pumps transferred approximately 4,700 AF of water from the DMC into the SWP aqueduct during the outage. The CVP received an equal amount of water from the SWP's share of San Luis Reservoir in return.
- Water quality concerns at Emmaton dictated release schedules from the reservoirs. The X2 requirement at Collinsville, a three-day average of 7,100 cfs outflow, dictated operations for much of June. Only Tracy Pumping Plant was exporting while Banks was shut down for canal repairs after June 12. DWR filed for a temporary urgency permit for use of the Tracy Pumping Plant as a point of diversion for SWP exports. The State Water Resources Control Board (SWRCB) granted the petition and the CVP exported 11,000 AF on behalf of the SWP from June 18 to 30.
- As concerns for delta smelt diminished, the temporary agriculture barriers in the South Delta were made fully operational. Pumping at Barker Slough resumed to full operations after being limited to 65 cfs earlier in the month.

July

- Temperature control on the low-flow channel of the Feather River became a concern early in the month. High temperatures quickly warmed the water exceeding, on July 2, the 65.0 degree Fahrenheit objective, set forth in the National Marine Fishery Service's biological opinion for spring-run Chinook salmon and steelhead. Hyatt's number one shutter configuration was changed in an attempt to release cooler water. This action did not bring about the desired result quickly so an additional 100 cfs was released through the Diversion Dam (and a similar amount reduced from the Afterbay Outlet). Increasing the flow down the low-flow channel resulted in a reduction in temperature at the compliance point at Robinson Riffle.
- The Project facilitated a number of water transfers and wheeling agreements at Banks Pumping Plant in July. These transfers included about 50 TAF of water from the Yuba River system to the Environmental Water Account and about 20 TAF to the Dry Year Program for the State Water Contractors. An additional 36 TAF was pumped for the Central Valley Project and its contractors from Central Valley Project settlement contractors on the Sacramento River. Approximately 18 TAF was wheeled for the Cross Valley Canal contractors under their long-term contract with the State.
- The repair of a leak at Mile 4.25 was completed on July 3, 2001. The leak was discovered on June 5, 2001 between Banks Pumping Plant and Bethany Reservoir. The leak, estimated at approximately 2 cfs, was located 29 feet under water. Repair crews controlled the leak by pumping approximately 55 cubic yards of concrete through the lining. Around the clock repairs were initiated to fix the leak and included construction of two 30-foot high cofferdams on either side of the leak. No water flowed down the California Aqueduct from June 6 through July 3.

August

- Early August diversions were restricted to insure compliance with the agricultural water quality standards, specifically the 14-day average EC at Jersey Point. Despite concerns regarding compliance with the 250 mg/l chloride standard at Contra Costa Canal Pumping Plant #1, no further restrictions to operations were considered until the last days of the month.

September

- Exports were cut to boost outflow and a proposed experiment to operate the Delta Cross Channel was canceled to avoid the extra water

costs that may have been incurred. Water quality continued to degrade throughout the month, and exports were restricted to maintain sufficient outflow to maintain compliance. The outflow standard for September was 3,000 cfs, but average daily outflow values typically exceeded 4,000 cfs.

October

- Delta Outflow and water quality governed operations throughout the month. At times the SWP exports were only a few hundred cfs. The water quality at Contra Costa canal was also a concern. The Delta Cross Channel experiment resumed.

November

- Concern for Contra Costa Canal water quality continued. On November 21, the Delta Cross Channel gates were closed. By November 28, serious concerns for water quality prompted a

reduction to exports and a re-opening of the Delta Cross Channel gates.

- The River Outlet Valves were opened November 1 at Lake Oroville to control inlet temperatures at the Feather River Fish Hatchery. The water released through the River Outlet Valves, a total of 35,332 AF, bypassed Hyatt Power plant. The River Outlet Valves were closed November 21.

December

- Early wet weather and more than adequate flows quickly alleviated water quality concerns. The Delta Cross Channel gates were closed on December 4.
- Hyatt/Thermalito Complex generation was curtailed to maintain Feather River Fish Hatchery temperatures.
- Excess conditions in the Delta were declared on December 6.

Energy Operations

Energy Resources

Energy generation from SWP's eight hydroelectric plants (Hyatt, Thermalito, Gianelli, Warne, Castaic, Alamo, Mojave, and Devil Canyon) during 2001 totaled 3,167,374 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 2001, these plants furnished 155,872 MWh of energy to the SWP. DWR has exchange arrangements with Southern California Edison and the Los Angeles Department of Water and Power 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 Power plant' generation and all of the output of Devil Canyon Power plant and Alamo Power plant 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 and other entities combined return and additional credited to the SWP during 2001 was 666,736 MWh.

Since July 1983, DWR has received energy from Reid Gardner Power plant, 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 (NPC) owns the remainder of Unit 4, as well as all of units 1, 2, and 3. The SWP share of energy generated during 2001 totaled 1,639,116 MWh of energy. On November 20, 2000, NPC sold its share of the Reid Gardner Generation Station to NRG Energy and Dynegy; however, on

April 18, 2001, the Governor of Nevada signed AB 369, which stopped the sale.

Long term contracted energy purchases, such as MWD Hydro, are itemized separately in Table 3. Other purchases totaled 3,060,347 MWh from various utilities and power marketers, such as PacifiCorp and California Power Exchange.

Energy Loads

Energy load data (total energy used by the SWP) is summarized in Table 4, and Figures 5 and 6. For the purpose of balancing energy resources and loads, this report itemizes amounts meeting SWP supplies and demands separately from amounts meeting total DWR supplies and demands. Besides SWP energy loads of 6,622,986 MWh, total DWR energy loads include federal loads of 378,451 MWh, sales of 2,299,310 MWh, and a deviation adjustment of 32,885 MWh, for a total of 9,333,632 MWh.

The San Joaquin Field Division accounted for over half of the total project energy load. Included in this amount is 2,914,382 MWh used at Edmonston Pumping Plant with peak pumping occurring in August.

In 2001, the Department sold power to 19 utilities and 12 power marketers and California ISO, resulting in revenues of over \$256.2 million. The Department also received \$85.48 million for capacity, exchange, and transmission arrangement, including \$80.21 million for transactions made through ISO.

The source of energy data contained in this report is the State Water Project Analysis Office, Bulletin 132-02. No CAISO transaction data was used.

Figure 2. Combined Operation of Hyatt-Thermalito Powerplants

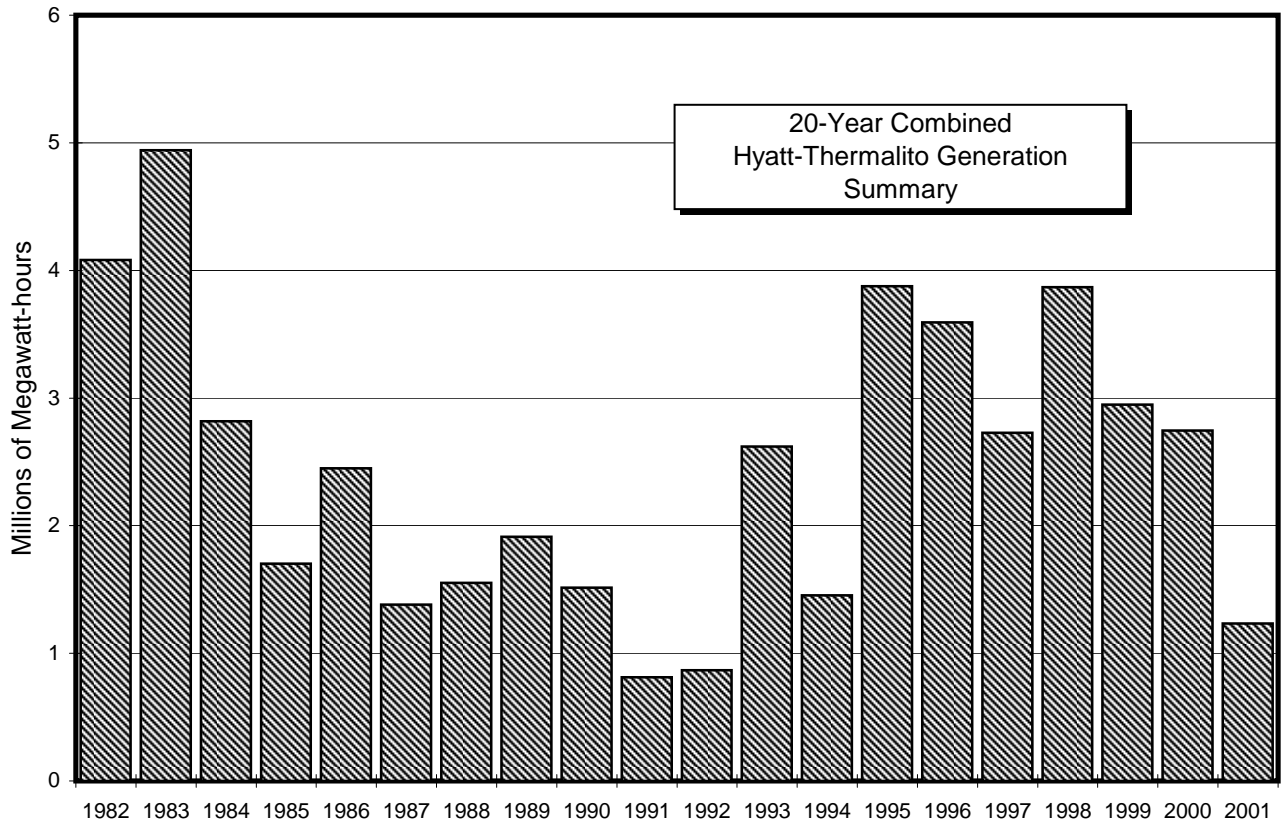
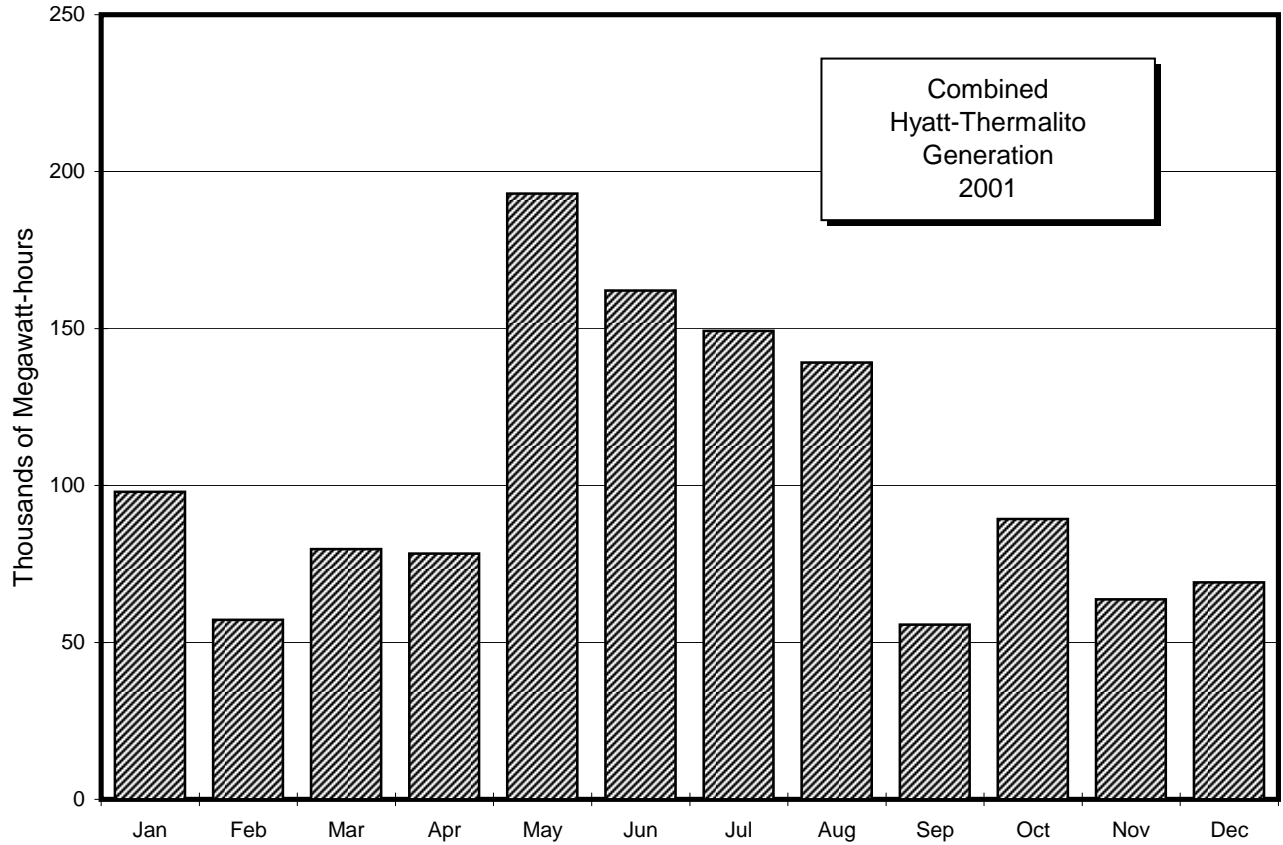
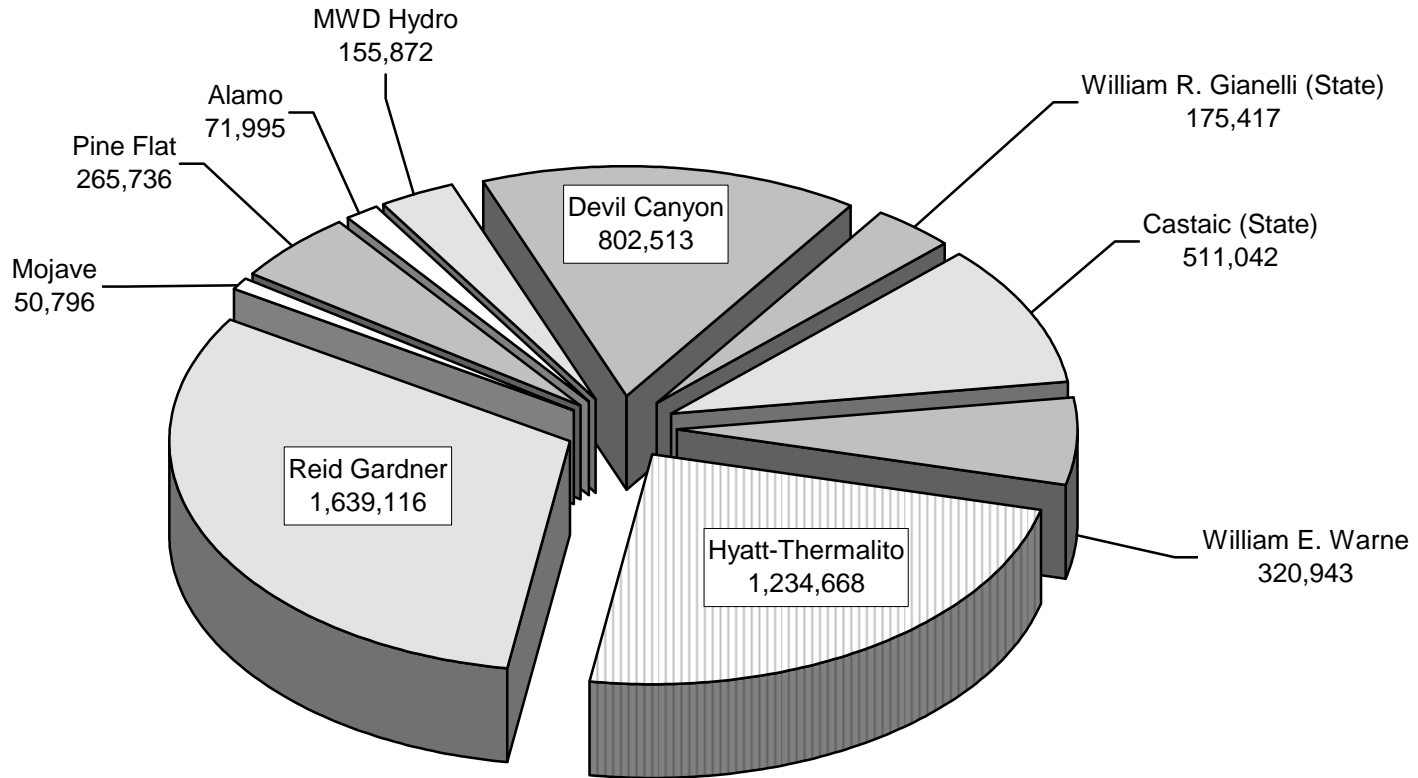


Figure 3. SWP Energy Resources

(all values in MWh)

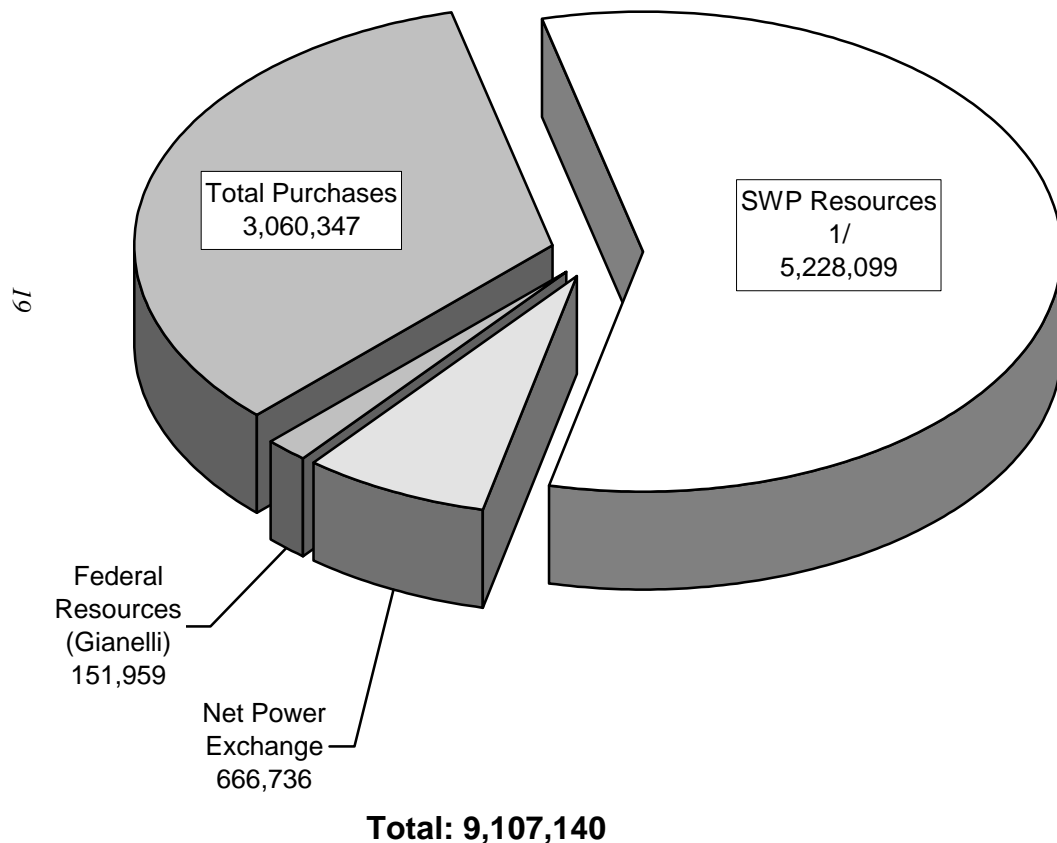
2001



Total: 5,228,099

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. The source of energy data contained on this page is the State Water Project Analysis Office, Bulletin 132-02. No CAISO transaction data was used.

**Figure 4. Total Energy Resources
2001**
(all values in MWh)



1/ See Figure 3 for a breakdown of SWP Energy Resources.

Firm Energy Purchases

Bonneville Power Administration	5,200
PacifiCorp	613,275
BC Hydro, Powerex	5,700
Idaho Power Company	7,800
Sacramento Municipal Utility District	1,502
City and County of San Francisco	11,349
California Energy Resources Scheduling	28,293
Turlock Irrigation District	20
Northern California Power Agency	670
California Power Exchange	69,499
City of Azusa	6,916
City of Riverside	1,904
San Diego Gas and Electric Company	7,623
City of Vernon	95
Arizona Public Service Company	7,800
Public Service Company of New Mexico	23,400
Salt River Project	3,684
Energy Marketers (Eighteen total)	2,265,617
Total Purchases	3,060,347

SWP Resources 1/	5,228,098
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Power Exchange Summary

Power Exchange Delivered to SCE	-1,623,950
Power Exchange Received from SCE	2,254,760
Power Exchange Delivered to Other Entities	-6,786,174
Power Exchange Received from Other Entities	6,821,441
Power System Imbalances	659
Net Power Exchange	666,736

Federal Resources (Gianelli)	151,959
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Total Energy Resources	9,107,140
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**Table 3. Total Energy Resources
2001**

(in megawatt-hours)

Resource	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Totals
Hyatt-Thermalito 1/	97,975	57,222	79,772	78,292	192,980	162,097	149,266	139,137	55,685	89,326	63,770	69,149	1,234,668
Gianelli													
State	9,300	0	1,680	12,527	43,713	38,409	18,841	12,311	3,966	28,352	6,141	178	175,417
Federal	1,372	0	2,217	12,141	58,004	57,107	16,879	4,239	0	0	0	0	151,959
Total	10,672	0	3,897	24,668	101,717	95,516	35,720	16,550	3,966	28,352	6,141	178	327,376
Warne 2/	29,119	12,490	12,424	15,914	39,800	22,851	26,496	26,628	34,302	38,176	37,834	24,908	320,943
Castaic	44,734	18,644	14,210	24,684	67,573	36,867	43,546	42,072	57,911	59,751	60,880	40,171	511,042
Mojave	3,342	2,247	4,257	3,921	4,953	4,578	5,137	4,933	4,612	4,755	4,513	3,548	50,796
Alamo	5,669	3,758	5,090	6,440	7,885	7,615	2,568	5,733	7,733	7,638	5,894	5,971	71,995
Devil Canyon	58,264	41,819	61,628	67,046	72,574	75,838	78,335	77,414	69,458	72,825	68,756	58,557	802,513
MWD Hydro 3/	0	0	0	0	379	15,028	15,448	14,216	11,203	9,288	12,680	77,630	155,872
Reid Gardner 4/	139,468	149,206	178,580	64,860	122,095	120,246	154,462	167,816	150,987	143,446	105,826	142,124	1,639,116
Pine Flat 5/	0	0	1,398	2,877	41,591	114,110	81,048	23,179	1,533	0	0	0	265,736
Firm Energy Purchases 6/	404,025	330,441	432,925	347,110	402,461	224,400	145,200	145,875	143,000	151,550	167,767	165,593	3,060,347
System Imbalances	869	-216	0	0	6	0	0	0	0	0	0	0	659
Power Exchange Total	-65,350	-69,650	-52,190	-22,450	-64,440	-84,030	87,710	122,300	188,750	121,380	180,389	323,658	666,077

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

2/ Includes station-service energy.

3/ Includes 152,933 MWh of Upgrade Energy from MWDSC and 2,939 MWh of other small hydro generation.

4/ Includes 9,419 MWh of Upgrade energy from Nevada Power Company and 1,629,697 MWh from RG unit No. 4.

5/ Pine Flat Power Plant is under contract with Kings River Conservation District.

6/ Includes Salt River Project, City & County of San Francisco, Bonneville Power Authority, Turlock Irrigation, NCPA, California Power Exchange, City of Riverside, San Diego Gas and Electric Company, City of Vernon, City of Azusa, PacificCorp, BC Hydro, Powerex, Idaho Power company, SMUD, California Energy Resources Scheduling, Arizona Public Service Company, Public Service Company of New Mexico, Eighteen Energy Marketers.

Total SWP and Long Term Resources: 5,228,098

Total Purchases: 3,060,347

Total Imbalances: 659

Total Exchange: 666,077

Total SWP Energy Resources: 8,955,181

-2,299,310

Net Energy Provided to SWP: 6,655,871

Total Federal: 151,959

Total Energy Resources (Total Provided+Federal): 9,107,140

Table 4. Total Energy Loads

2001

(in megawatt hours)

Source	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Totals
Hyatt-Thermalito 1/	34,040	25,824	44,176	38,534	42,116	7,523	4,539	5,669	2,098	36	118	7,954	212,626
North Bay 2/	1,133	1,106	597	1,827	1,543	2,195	2,449	2,256	1,959	2,348	1,711	597	19,722
South Bay	5,224	5,259	7,045	8,819	9,117	6,168	13,217	12,395	9,828	12,606	4,207	590	94,476
Del Valle	9	57	8	293	188	76	357	76	68	57	5	8	1,202
Banks Total	69,492	75,252	103,405	28,189	9,948	3,071	73,151	88,257	70,704	15,888	52,712	106,396	696,465
State	69,492	75,252	103,405	28,189	9,948	3,071	61,159	69,836	58,715	15,888	52,712	106,396	654,063
CVP and CVC	0	0	0	0	0	0	11,992	18,421	11,989	0	0	0	42,402
Bottle Rock 3/	45	45	40	38	31	30	31	29	13	0	0	0	301
Gianelli Total	63,727	77,843	87,959	17,509	1,359	231	1,687	11,858	29,636	28,164	68,783	134,100	522,855
State	39,668	69,410	76,062	14,584	1,359	231	1,687	9,745	7,116	-208	25,363	81,929	326,945
CVP and CVC	24,059	8,433	11,897	2,925	0	0	0	2,113	22,520	28,372	43,420	52,171	195,910
Dos Amigos Total	31,309	19,559	28,770	22,878	41,012	53,375	54,111	43,598	26,478	26,134	18,684	16,135	382,044
State	21,121	7,894	22,935	13,206	25,562	25,508	29,844	21,605	19,673	25,530	16,488	12,538	241,905
CVP and CVC	10,188	11,665	5,835	9,672	15,450	27,867	24,267	21,993	6,805	604	2,196	3,597	140,139
Pine Flat 3/	56	202	156	147	0	0	0	0	3	1	0	0	564
Las Perillas	488	118	291	342	954	1,121	1,155	1,033	688	302	148	170	6,811
Badger Hill	1,304	283	765	904	2,613	3,082	3,176	2,878	1,914	779	363	413	18,475
Devil's Den	1,047	824	1,010	1,194	1,709	2,158	1,998	2,061	1,911	1,147	775	1,000	16,834
Bluestone	992	781	956	1,132	1,631	2,062	1,903	1,960	1,812	1,089	731	951	15,999
Polonio	1,066	839	1,023	1,199	1,686	2,099	1,965	2,037	1,879	1,116	778	1,022	16,709
Buena Vista	24,259	12,883	21,176	22,037	38,439	33,079	35,602	33,325	33,336	33,475	30,424	22,438	340,473
Teerink	27,004	14,022	22,018	23,211	39,519	32,373	35,646	34,291	36,257	36,651	34,087	25,059	360,137
Chrisman	61,270	31,715	49,058	51,893	87,948	69,383	76,996	75,449	80,563	81,843	77,136	56,684	799,937
Edmonston	223,912	115,824	179,704	188,582	319,677	248,968	277,006	273,135	292,840	299,731	285,211	209,791	2,914,382
Oso	13,578	5,243	6,069	7,115	18,323	10,659	11,942	12,060	15,831	16,818	17,190	11,194	146,022
Mojave 3/	11	32	26	8	6	1	0	0	0	0	11	10	106
Pearblossom	29,651	19,727	35,559	34,352	42,128	38,628	43,040	41,229	39,224	39,827	37,987	31,717	433,067
Warne 3/	191	97	32	262	85	234	96	119	99	28	5	28	1,276
Alamo 3/	13	26	39	20	16	21	57	40	17	20	24	10	304
Devil Canyon 3/	96	117	100	83	103	54	5	0	0	11	29	51	649
Sales	168,362	152,007	166,837	165,392	284,315	238,945	211,939	197,234	128,436	141,091	113,484	331,269	2,299,310
Actual Deviation	3,383	6,375	688	-2,143	2,555	10,339	-7,753	-16,847	-5,141	16,301	15,463	9,665	32,885
Total Energy Load	761,661	566,059	757,506	613,817	947,020	765,875	844,316	824,142	770,453	755,463	760,065	967,254	9,333,632

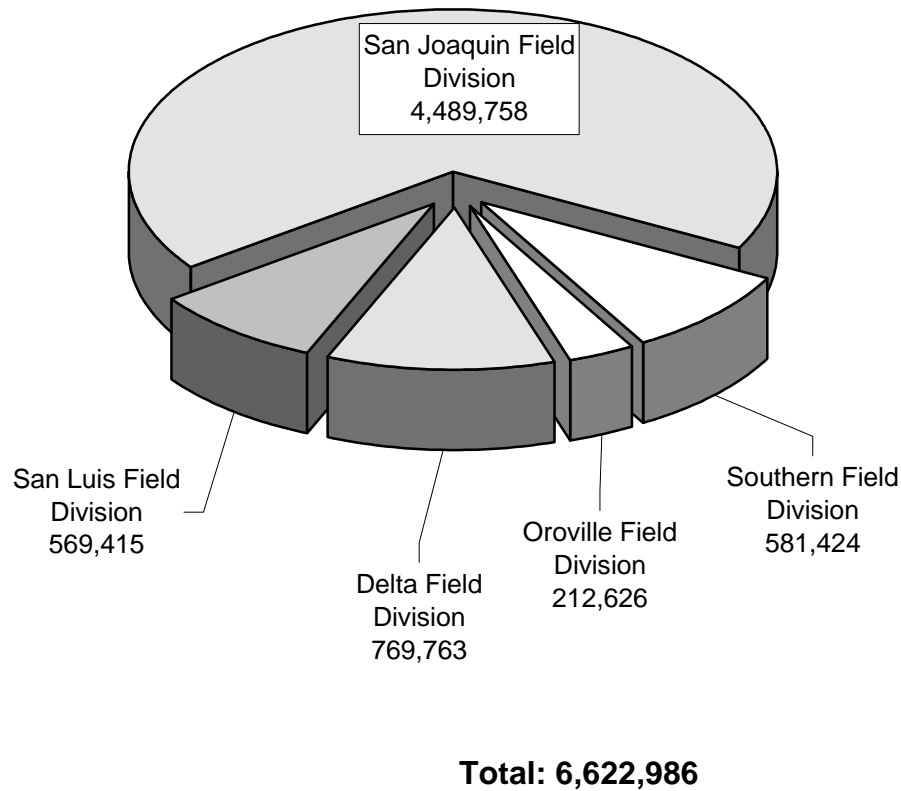
1/ Pumpback and Station Service

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

3/ Station Service only.

SWP Energy Loads:	6,622,986
Total Deviation:	32,885
Net Energy Loads:	6,655,871
Total Sales:	2,299,310
Total SWP Energy Loads:	8,955,181
Total Federal:	378,451
Total Loads:	9,333,632

**Figure 5. SWP Energy Loads
2001**
(all values in MWh)



Oroville Field Division

Hyatt-Thermalito Complex (Pumpback and Station Service)	212,626
Subtotal:	212,626

Delta Field Division

North Bay	19,722
South Bay	94,476
Del Valle	1,202
Banks	654,063
Bottle Rock (Station Service)	301
Subtotal:	769,764

San Luis Field Division

Gianelli	326,945
Dos Amigos	241,905
Pine Flat (Station Service)	564
Subtotal:	569,415

San Joaquin Field Division

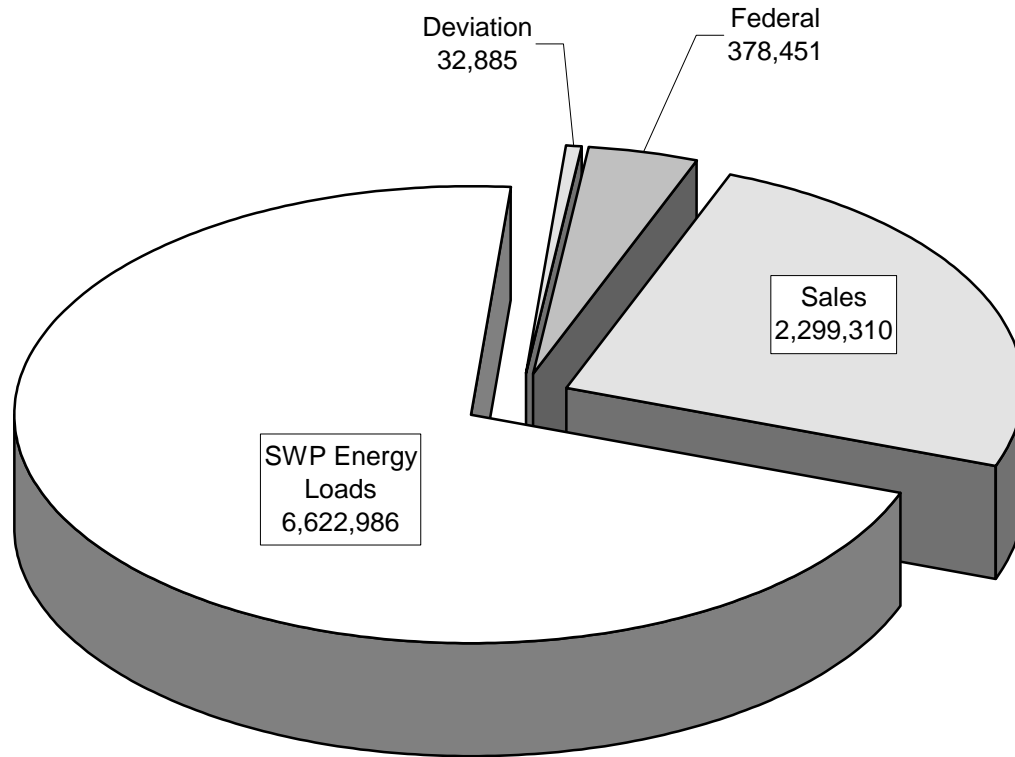
Las Perillas	6,811
Badger Hill	18,475
Devil's Den	16,834
Bluestone	15,999
Polonio	16,709
Buena Vista	340,473
Teerink	360,137
Chrisman	799,937
Edmonston	2,914,382
Subtotal:	4,489,758

Southern Field Division

Oso	146,022
Mojave	106
Pearblossom	433,067
Alamo	304
Devil Canyon	649
Warne (Station Service)	1,276
Subtotal:	581,424

Total SWP Energy Loads: 6,622,986

**Figure 6. Total Energy Loads
2001**
(all values in MWh)



Total: 9,333,632

SWP Energy Loads

SWP Energy Loads 1/	6,622,986
Subtotal:	6,622,986

Deviation

Actual deviation	32,885
Subtotal:	32,885

Federal Energy Loads

Banks Pumping Plant	42,402
Gianelli Pumping	195,910
Dos Amigos Pumping	140,139
Subtotal:	378,451

Sales

Adjusted CAISO Ancillary Energy	147,647
Bonneville Power Administration	960
Idaho Power Company	250
Portland General Electric Company	600
City and County of San Francisco	31,720
City of Redding	665
Northern California Power Agency	13,987
Sacramento Municipal Utility District	36,029
State of California Department of Water Resources	936,051
Turlock Irrigation District	1,245
California Power Exchange	21,834
City of Azusa	7,288
City of Banning	1,336
City of Glendale	14,589
City of Riverside	65,410
City of Vernon	174
Los Angeles Dept. of Water and Power	5,423
Metropolitan Water District of Southern California	1,210
San Bernardino Valley MWD	64
Nevada Power Company	271,911
Twelve Marketers	740,917
Subtotal:	2,299,310

Total Energy Loads: 9,333,632

1/ See Figure 5 for a breakdown of SWP Energy Loads.

Sacramento - San Joaquin Delta Operations

Delta Resources and Environmental Issues

The 738,000-acre Delta is the heart of California's water environment. The Delta, at the convergence of the Sacramento and San Joaquin Rivers, is a network of islands, sloughs, marshes, and reclaimed farmland that stretches from Sacramento to San Francisco Bay. A source of drinking water for about two-thirds of California's population, the Delta also provides irrigation for the Central Valley, which produces about 55 percent of the country's fruits and vegetables.

The State Water Resources Control Board has adopted water quality control plans and policies to protect the Delta's water quality and ecosystem while at the same time maintaining SWP water supply reliability.

CALFED Bay-Delta Program

The CALFED Bay-Delta Program is a cooperative effort among State and federal agencies and California's environmental, urban, and agricultural communities. CALFED was started in 1995 to address environmental and water management problems associated with the Bay-Delta system.

CALFED actions in 2001 included DWR and the Bureau evaluating three options for public ownership based on a proposal by Delta Wetlands Properties, studying the effects of Shasta Lake enlargement, developing a contingency plan to reduce critical water shortages, continuing Integrated Storage Investigation operations, establishing operating principles and a financial plan for the Environmental Water Account, and identifying south Delta improvements.

CALFED implemented seven projects in 2001 totaling \$26 million for drinking water quality including salinity/selenium treatment and blending and exchanging source waters.

They hosted the first CALFED Science Conference to engage the scientific community and the public and co-sponsored and participated in the October '01 State of the Estuary Conference.

They continued planning and design of permanent fish barriers to Clifton Court Forebay operable tidal and fish barriers in an effort to increase periodic pumping to 10,300 cfs.

They also implemented one project in 2001 to address ecosystem water quality in the Stockton Deep Water Ship Channel.

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 new index, the Net Delta Outflow Index (NDOI), 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 2001.

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 2001, the Yolo Bypass flows of about 375 TAF contributed only 2.7 percent of total Delta inflow of about 13.65 MAF. A comparison of Delta Inflow and NDOI is plotted on Figure 7. The NDOI, Delta exports, and Delta Consumptive Use are plotted on Figure 8.

The 2001 daily NDOI averaged 11,332 cfs for the year and was 15,383 cfs less than the 2000 daily average. The greatest mean monthly NDOI occurred in March at 23,174 cfs and the greatest mean daily was 51,492 cfs on March 9. The lowest monthly NDOI occurred in October (4,166 cfs) and the year's lowest daily NDOI occurred on November 6 with 2,077 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 2001.

The term Sacramento River accretions/depletions refers to the difference between the amounts of water released to the Sacramento and its tributaries by the CVP and SWP, and the amount which flows past Sacramento and into the Delta. Depending on the time of year and hydrologic conditions, this amount may represent a net gain (accretion) or a net loss (depletion). Accretions/Depletions are forecasted for both short-term and long-term operations planning purposes. Short-term forecasts, up to about seven days in the future are used to estimate inflows to the Delta, at key points on the Sacramento River, and to provide guidance to project operators on predicting

release requirement 5-7 days in advance (the maximum travel time from Keswick Dam to the Delta). Such short-term predictions of accretions/depletions may make use of real time flow data, temperature and weather forecasts, travel time, non-project reservoir releases, existing trends in accretions and depletions, and on advice and input from some of the major districts using water on the Sacramento. Accretions/Depletions, total Delta exports, and total lagged storage withdrawals are plotted on Figure 9. Figure 10 shows total exports plotted to show both SWP and CVP shares.

Longer-range forecasts of accretions and depletions are made for purposes of planning operations on a seasonal or monthly basis. For this purpose, accretion/depletions are treated as monthly quantities and are customarily forecasted or estimated for 12 months into the future. This discussion will focus on the long-range forecasts of accretions/depletions.

Annually, the net accretions/depletions has ranged from about 1.0 MAF (in 1977) to more than 20 MAF (1983). The range of this quantity, in addition to the scope and complexity of the processes within the Sacramento Valley add to the problems of forecasting accretions/depletions accurately. Fortunately, certain predictable tendencies help to

characterize the accretions/depletions. Furthermore, operational considerations limit the range of accretions which have any practical effect on project operations to periods of Delta balanced conditions. When Excess conditions exist, the projects are storing and exporting as much water as possible. Thus the accuracy of the estimate of accretions/depletions is significant to project operations only within the range that is associated with the projects capability to respond operationally.

Forecasts of Delta requirements are perhaps the most difficult to make. There are so many factors that can influence conditions in the Delta that it is unlikely that any forecast will succeed in correctly identifying them all. For example, there are four major water export locations in the Delta, but literally hundreds of minor exporters. There are forecasted tide tables, but no long-term forecasts of barometric pressure, which can affect the magnitude of the tide; and there are no long-term forecasts of daily meteorological events. Despite the inaccuracies, forecasts of Delta requirements are necessary. Without them, planning for upstream reservoir operations and south of the Delta water deliveries would be impossible and the reliability of the projects would be compromised. Table 6 includes monthly totals for the Sacramento River accretion/depletions.

**Table 5. Net Delta Outflow Index
2001**

(in cfs-days except as noted)

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	5,081	15,392	35,868	8,500	11,699	9,942	7,458	4,666	4,577	3,320	6,047	19,903
2	5,655	12,681	27,661	8,207	11,644	8,386	7,137	4,317	4,355	2,710	6,016	25,854
3	6,169	11,005	26,432	8,551	11,736	8,567	7,582	4,462	4,536	2,634	5,481	35,124
4	4,658	9,156	24,096	8,447	10,816	8,851	6,493	3,946	3,864	3,369	5,596	37,206
5	4,606	8,324	24,784	10,103	10,692	8,725	6,234	3,626	3,808	2,832	3,555	33,928
6	5,003	7,027	36,741	10,158	10,888	9,177	5,941	4,072	3,552	4,825	2,077	29,668
7	7,701	6,855	46,990	13,801	10,647	8,161	5,352	4,194	3,615	4,909	3,738	25,375
8	9,636	6,602	49,610	14,902	10,629	7,676	5,651	3,611	3,582	4,502	4,817	18,166
9	17,632	5,560	51,492	17,008	10,703	8,061	4,722	3,660	3,975	4,166	4,687	18,126
10	20,038	7,550	49,072	15,170	10,144	8,962	4,126	3,957	4,629	3,488	3,486	17,922
11	25,466	11,013	41,036	14,411	9,595	8,458	4,275	4,348	4,037	3,612	3,140	14,340
12	28,654	14,249	31,275	11,279	9,422	7,566	3,750	4,740	3,871	3,087	3,002	11,904
13	30,055	19,020	27,235	10,901	9,184	7,770	4,012	3,675	4,868	3,361	9,674	10,651
14	27,311	23,535	24,691	8,069	10,248	7,238	4,162	3,547	5,357	3,221	11,564	9,830
15	25,607	20,852	22,186	8,222	10,513	6,311	4,677	2,900	4,736	2,944	11,710	10,960
16	17,446	20,295	20,074	7,576	10,247	6,090	4,367	3,446	4,277	3,435	12,568	11,282
17	16,008	14,916	18,065	7,601	10,336	5,840	4,847	3,013	3,970	3,563	9,641	16,165
18	17,793	12,391	15,903	7,961	10,834	7,594	4,579	3,028	3,951	3,504	4,842	18,181
19	16,312	11,921	14,432	7,366	11,592	8,016	4,498	3,000	3,783	3,709	4,013	15,841
20	15,063	14,043	13,032	10,381	11,645	7,178	4,080	3,100	4,077	3,906	3,435	14,677
21	11,440	18,239	12,220	17,759	11,787	7,435	4,518	3,833	4,052	3,410	4,534	19,049
22	6,896	23,222	12,186	20,908	11,236	8,157	5,040	3,282	4,486	3,704	8,835	21,802
23	6,430	31,264	11,056	21,438	10,481	8,012	5,339	3,012	4,180	5,010	5,075	27,122
24	6,220	35,383	10,348	20,915	9,794	7,697	5,391	2,601	3,731	6,095	4,562	31,321
25	8,079	38,189	9,935	20,688	9,039	8,206	4,336	2,431	5,188	5,618	10,682	30,094
26	12,347	40,047	10,659	14,517	8,442	8,065	4,669	2,685	6,172	6,062	15,904	27,360
27	23,361	41,700	10,976	13,512	6,716	7,207	4,659	3,066	4,384	6,208	17,868	25,394
28	28,876	40,143	10,264	12,885	8,317	7,742	4,782	3,327	4,911	6,271	19,507	21,691
29	31,241		10,605	13,168	10,361	7,842	4,951	3,001	5,195	5,675	20,909	27,308
30	28,834		10,259	12,419	11,376	8,513	4,392	3,139	3,387	4,758	20,913	34,282
31	20,280		9,219		11,679		4,482	4,070		5,245		37,575
Total	489,898	520,574	718,402	376,823	322,442	237,445	156,502	109,755	129,106	129,153	247,878	698,101
Ave.	15,803	18,592	23,174	12,561	10,401	7,915	5,048	3,540	4,304	4,166	8,263	22,519
Max.	31,241	41,700	51,492	21,438	11,787	9,942	7,582	4,740	6,172	6,271	20,913	37,575
Min.	4,606	5,560	9,219	7,366	6,716	5,840	3,750	2,431	3,387	2,634	2,077	9,830
Total In AF	971,713	1,032,559	1,424,950	747,428	639,564	470,972	310,422	217,699	256,082	256,175	491,666	1,384,683

Annual Total = 8,203,913 acre-feet

**Table 6. Sacramento Basin and Sacramento-San Joaquin Delta Operations
2001**

(in thousands of acre-feet except as noted)

Month	Upstream Reservoir Releases to River			Sacramento River Accretions or Depletions ^{2/}	Delta Inflow				Net Delta Consumptive Use	Delta Exports					Net Delta Outflow Index
	Keswick ^{1/}	Oroville ^{1/}	Nimbus		Sacramento River at Sacramento ^{3/}	Miscellaneous Inflows ^{4/}	San Joaquin River at Vernalis	Total Inflow		Clifton Court Forebay Intake ^{5/}	Barker Slough Pumping Plant	Tracy Pumping Plant	Contra Costa Pumping Plant	Total Exports	
Jan	256	131	127	279	1,061	75	150	1,287	-97	241	2	168	1	413	972
Feb	188	97	84	391	1,145	64	173	1,382	-116	263	2	195	5	465	1,033
Mar	266	108	94	561	1,579	82	224	1,885	-27	361	1	116	9	487	1,425
Apr	338	80	97	122	753	65	179	997	-1	101	3	128	19	251	747
May	575	95	111	-111	572	95	228	895	150	36	4	52	14	106	639
Jun	776	139	149	-163	737	77	101	915	220	16	5	179	24	224	471
Jul	904	117	128	-114	925	64	86	1,075	268	226	6	253	12	497	310
Aug	726	130	94	-59	829	51	83	963	233	250	5	252	5	512	218
Sep	522	71	89	34	750	34	82	866	145	215	4	242	4	465	256
Oct	388	83	80	0	531	13	116	660	110	62	5	223	4	294	256
Nov	295	83	60	154	741	22	123	886	-30	193	4	223	4	424	492
Dec	234	74	90	638	1,663	69	123	1,855	-136	376	1	225	4	606	1,385
Total	5,468	1,208	1,203	1,732	11,286	711	1,668	13,666	718	2,340	42	2,256	105	4,744	8,204

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

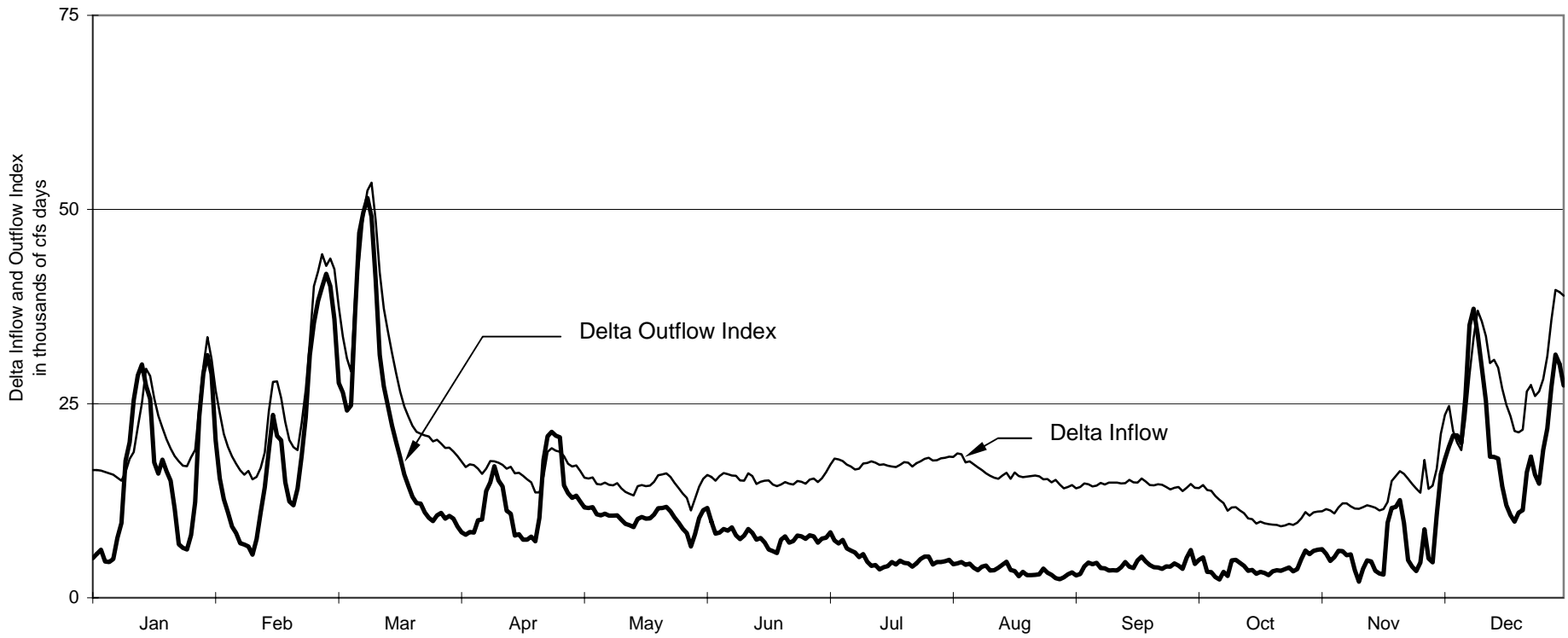
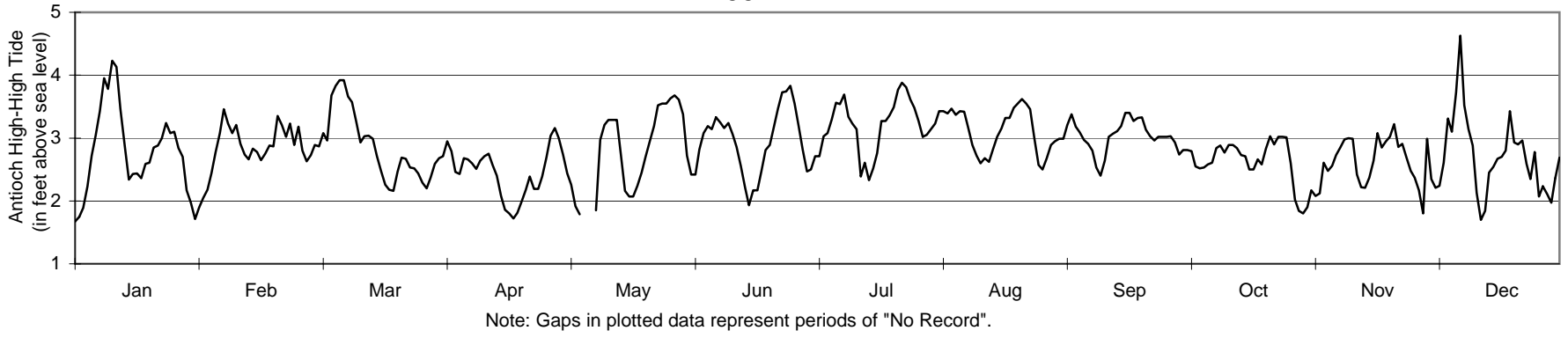
2/ Positive values are accretions; negative values are depletions.

3/ These values are based on a measured daily average taken from the Sacramento River at Freeport and include Sacramento County Regional Waste Treatment Plant.

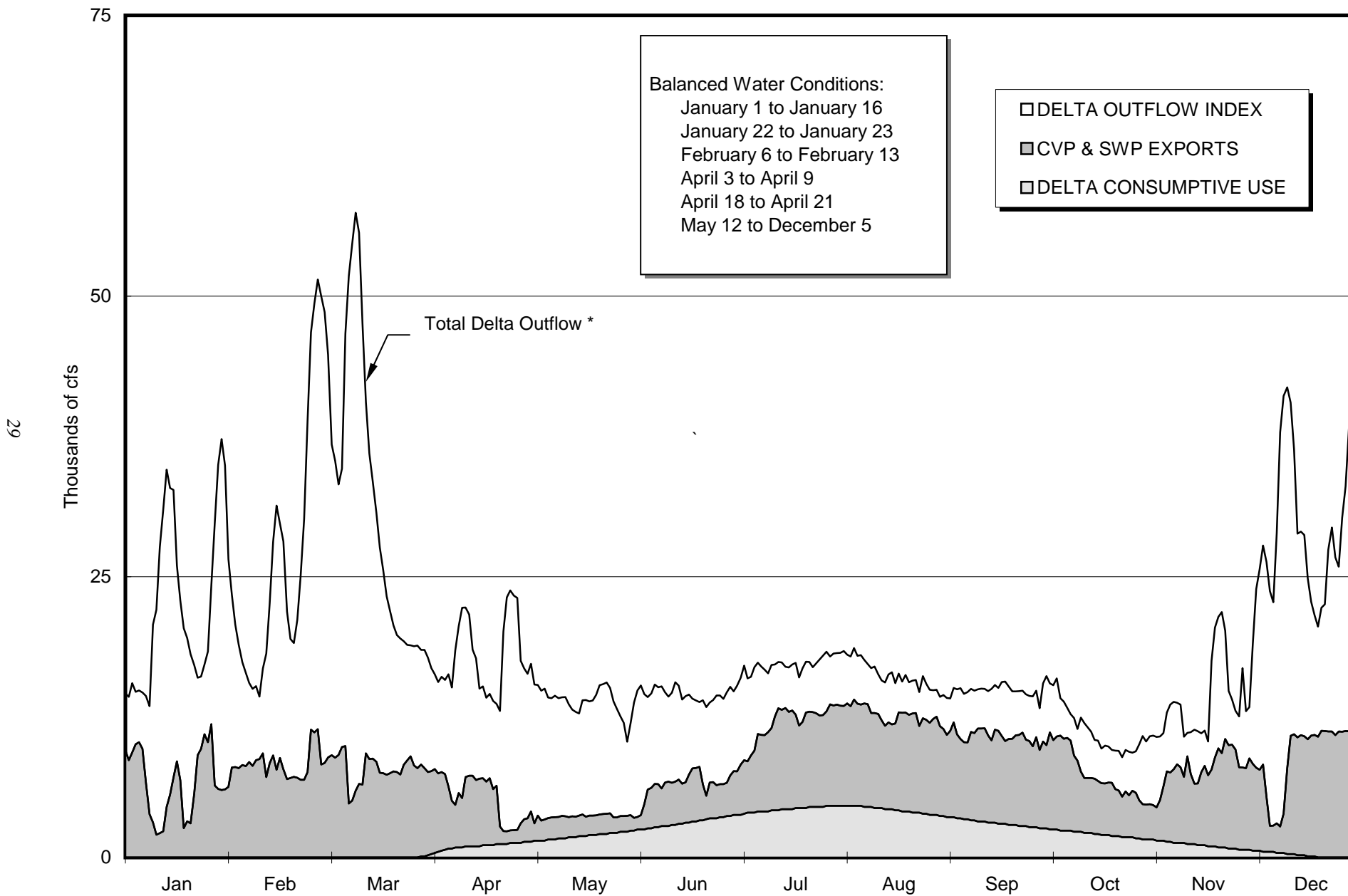
4/ Includes Yolo Bypass, Eastside Streams, and Miscellaneous Inflows.

5/ Includes Byron Bethany Diversion Canal.

**Figure 7. Delta Tide, Inflow, and Outflow Index
2001**

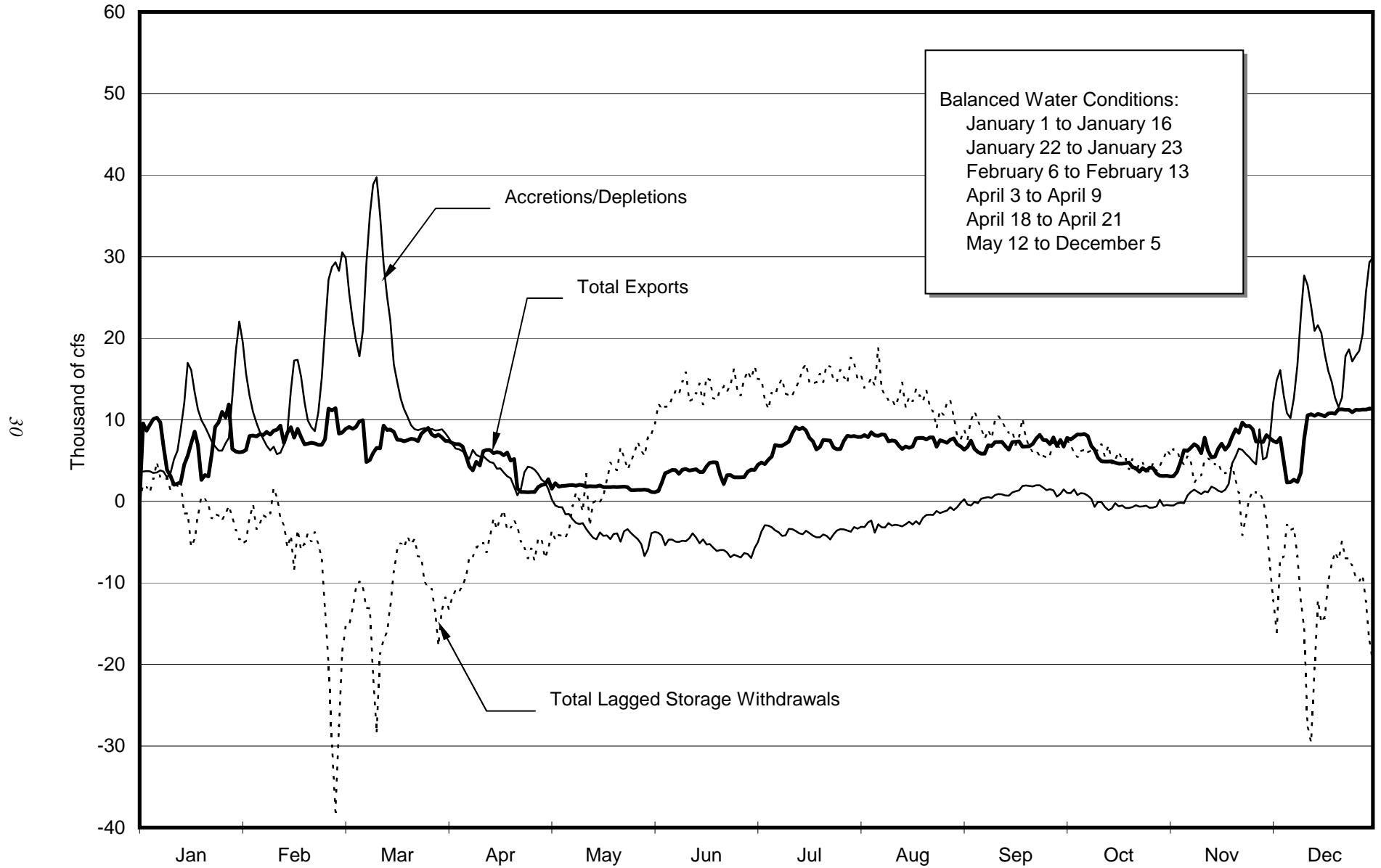


**Figure 8. Coordinated Delta Operations
2001**

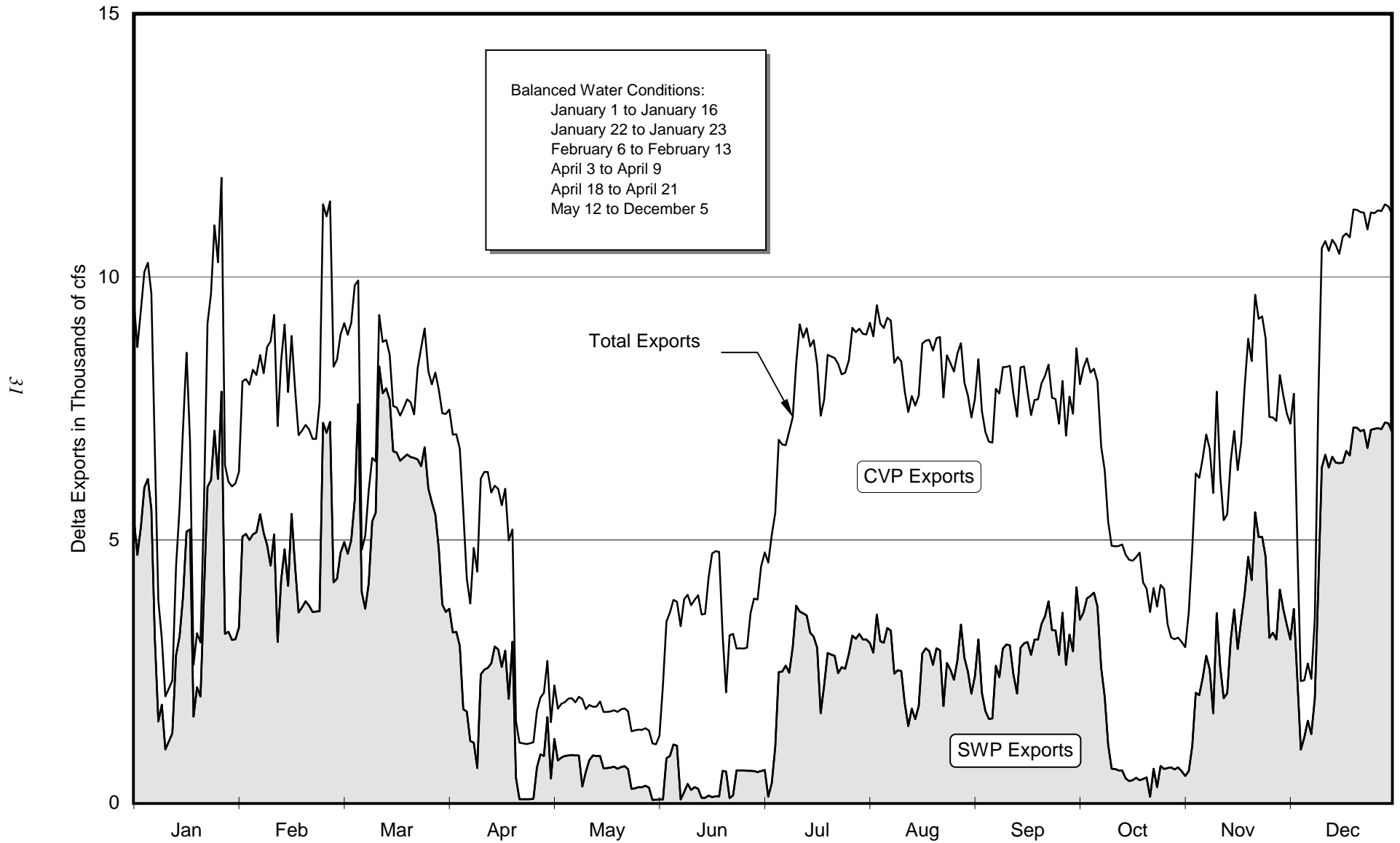


* Total Delta Outflow = Exports + Outflow + Consumptive Use.

**Figure 9. Coordinated Delta Operations
Lagged Storage Withdrawals
2001**



**Figure 10. Coordinated Delta Operations
Delta Exports
2001**



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		
	Antelope (Capacity: 22,566)	Frenchman (Capacity: 55,477)	Davis (Capacity: 84,371)
2001	(May) 18,075	(Apr) 42,821	(Mar) 57,491
2000	(Apr) 23,409	(Apr) 54,627	(Apr) 71,573
1999	(May) 23,437	(Apr) 57,555	(May) 80,204
1998	(Apr) 24,030	(Apr) 56,894	(Jun) 74,142
1997	(Mar) 23,637	(Mar) 56,238	(Jan) 78,840

The total amount of unimpaired runoff to Lake Oroville for the 2000-01 water year totaled about 2.11 MAF, (46 percent of average). Lake Oroville storage at the beginning of 2001 was 1,724,942 AF (49 percent of normal maximum operating capacity). Storage peaked on May 6, 2001 at 2,203,722 AF, (62 percent of normal maximum operating capacity). Lowest storage in Lake Oroville in 2001 was 1,362,994 (39 percent of normal maximum operating capacity) on November 20.

Lake Oroville's computed inflow is tabulated in Table 8 and plotted along with releases, diversions, and storage withdrawals on Figure 11. A ten-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. The temperature of water entering the fish hatchery can then be con-

trolled by adding or removing shutters as necessary. A complete illustration of water temperature and intake operation is shown on Figure 14.

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. Prior water rights deliveries from Frenchman Lake totaled 10,959 AF local supply to Last Chance Creek WD and 876 AF were made out of Lake Davis (Non-project).

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 (FRSA) 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.

Total deliveries in the Oroville Field Division were 1,081,143 AF in 2001. Included in this amount were deliveries of Local Supply to Thermalito Irrigation District (2,537 AF) and Last Chance WD (10,959 AF), Table A water to Yuba City (1,065 AF) and County of Butte (525 AF), and FRSA diversions totalling 1,066,057 AF. All FRSA diversions are detailed below:

Sutter Butte Canal	572,390
Richvale Canal	152,790
Sunset Pumps	9,056
Western Canal Lateral	4,627
Western Canal	291,990
Tudor Mutual	3,681
Garden Highway	15,101
Plumas Mutual	7,945
Oswald Water District	289
Dana Brothers	680
Palermo Canal	6,632
Valverdi- Romelli	876
Total in AF	1,066,057

Table 2 shows a breakdown of total deliveries by agency, Map 3 shows a breakdown by water type.

Table 7. Upper Feather Area Lakes Monthly Operation

2001

(in acre-feet except as noted)

Month	Lake Storage			Outflow						Inflow	
	Water Surface Elevation (in feet)	End of Month Storage	Storage Change	Regulated Release			Spill	Estimated Evaporation and Seepage	Total Outflow	Computed	
				Stream-Flow Maint.	Prior Water Rights						Total Regulated Release
				Local Supply	Non-Project						
Antelope Lake Capacity 22,566 acre-feet											
Jan	4990.77	13,492	-838	1,230	0	0	1,230	0	49	1,279	441
Feb	4991.12	13,733	241	440	0	0	440	0	55	495	736
Mar	4994.13	15,916	2,183	307	0	0	307	0	87	394	2,577
Apr	4996.62	17,871	1,955	298	0	0	298	0	157	455	2,410
May	4996.87	18,075	204	307	0	0	307	0	262	569	773
Jun	4995.83	17,236	-839	298	0	0	298	0	685	983	144
Jul	4994.52e	16,214	-1,022	307	0	0	307	0	749	1,056	34
Aug	4993.17	15,199	-1,015	307	0	0	307	0	735	1,042	27
Sep	4992.19	14,487	-712	298	0	0	298	0	456	754	42
Oct	4991.53	14,019	-468	307	0	0	307	0	207	514	46
Nov	4991.63	14,089	70	298	0	0	298	0	112	410	480
Dec	4992.34	14,594	505	307	0	0	307	0	78	385	890
Total	---	---	264	4,705	0	0	4,705	0	3,632	8,337	8,601
Frenchman Lake Capacity 55,477 acre-feet											
Jan	5577.78	40,750	235	184	0	0	184	0	91	275	510
Feb	5578.13	41,209	459	167	0	0	167	0	92	259	718
Mar	5579.01	42,378	1,169	152	0	0	152	0	159	311	1,480
Apr	5579.34	42,821	443	117	30	0	147	0	264	411	854
May	5576.05	38,527	-4,294	0	3,935	0	3,935	0	653	4,588	294
Jun	5572.76	34,514	-4,013	0	3,172	0	3,172	0	939	4,111	98
Jul	5570.68	32,126	-2,388	0	1,658	0	1,658	0	792	2,450	62
Aug	5568.35	29,582	-2,544	0	1,847	0	1,847	0	748	2,595	51
Sep	5567.72	28,916	-666	54	198	0	252	0	507	759	93
Oct	5567.22	28,394	-522	123	119	0	242	0	357	599	77
Nov	5567.47	28,654	260	119	0	0	119	0	166	285	545
Dec	5568.07	29,285	631	123	0	0	123	0	116	239	870
Total	---	---	-11,230	1,038	10,959	0	11,997	0	4,884	16,881	5,651
Lake Davis Capacity 84,371 acre-feet											
Jan	5767.09	55,745	-740	922	0	0	922	0	224	1,146	406
Feb	5767.14	55,906	161	833	0	0	833	0	224	1,057	1,218
Mar	5767.63	57,491	1,585	922	0	0	922	0	387	1,309	2,894
Apr	5767.50	57,068	-423	889	0	0	889	0	650	1,539	1,116
May	5766.89	55,107	-1,961	402	0	213	615	0	1,465	2,080	119
Jun	5766.02	52,380	-2,727	543	0	52	595	0	2,190	2,785	58
Jul	5765.22	49,945	-2,435	272	0	343	615	0	1,844	2,459	24
Aug	5764.36	47,397	-2,548	530	0	97	627	0	1,951	2,578	30
Sep	5763.67	45,409	-1,988	432	0	171	603	0	1,440	2,043	55
Oct	5763.16	43,972	-1,437	573	0	0	573	0	979	1,552	115
Nov	5763.25	44,223	251	595	0	0	595	0	447	1,042	1,293
Dec	5763.66	45,380	1,157	611	0	0	611	0	310	921	2,078
Total	---	---	-11,105	7,525	0	876	8,401	0	12,111	20,512	9,407

**Table 8. Lake Oroville Monthly Operation
2001**

(in acre-feet except as noted)

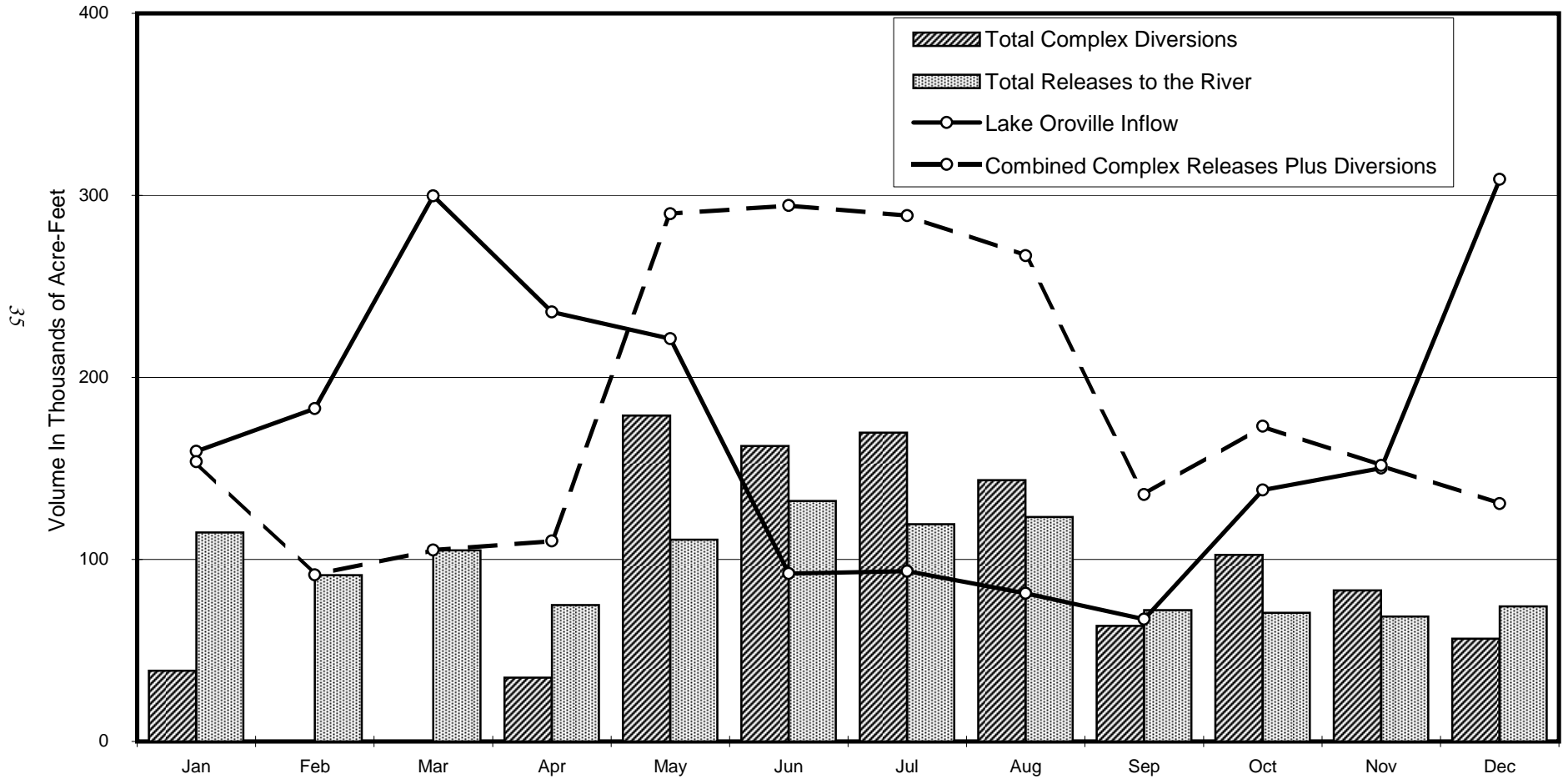
Capacity 3,537,577 acre-feet

Month	Water Surface Elevation (in feet)	Storage	Storage Change	Outflow					Hyatt Pumpback	Computed Inflow 2/
				Hyatt Generation 1/	Palermo Canal	Evaporation	Spill	Total Outflow		
Jan	756.32	1,737,247	12,305	191,527	91	944	0	192,562	45,457	159,410
Feb	767.07	1,842,155	104,908	110,539	0	1,250	0	111,789	33,824	182,873
Mar	786.90	2,048,313	206,158	148,550	35	2,573	0	151,158	57,618	299,698
Apr	799.70	2,188,360	140,047	139,941	339	3,394	0	143,674	47,827	235,894
May	793.46	2,118,838	-69,522	333,386	1,020	7,567	0	341,973	51,153	221,298
Jun	774.60	1,918,274	-200,564	293,464	1,010	7,542	0	302,016	9,163	92,289
Jul	755.66	1,730,944	-187,330	277,929	1,050	7,795	0	286,774	5,928	93,516
Aug	734.74	1,539,411	-191,533	271,817	1,050	7,305	0	280,172	7,232	81,407
Sep	728.78	1,487,684	-51,727	115,871	1,010	5,048	0	121,929	2,975	67,227
Oct	722.37	1,433,405	-54,279	187,525	747	4,202	0	192,474	0	138,195
Nov	720.39	1,416,920	-16,485	165,094	217	1,297	0	166,608	0	150,123
Dec	741.09	1,595,882	178,962	139,461	63	574	0	140,098	10,267	308,793
Total	---	---	-129,060	2,375,104	6,632	49,491	0	2,431,227	271,444	2,030,723

1/ Includes bypass flows.

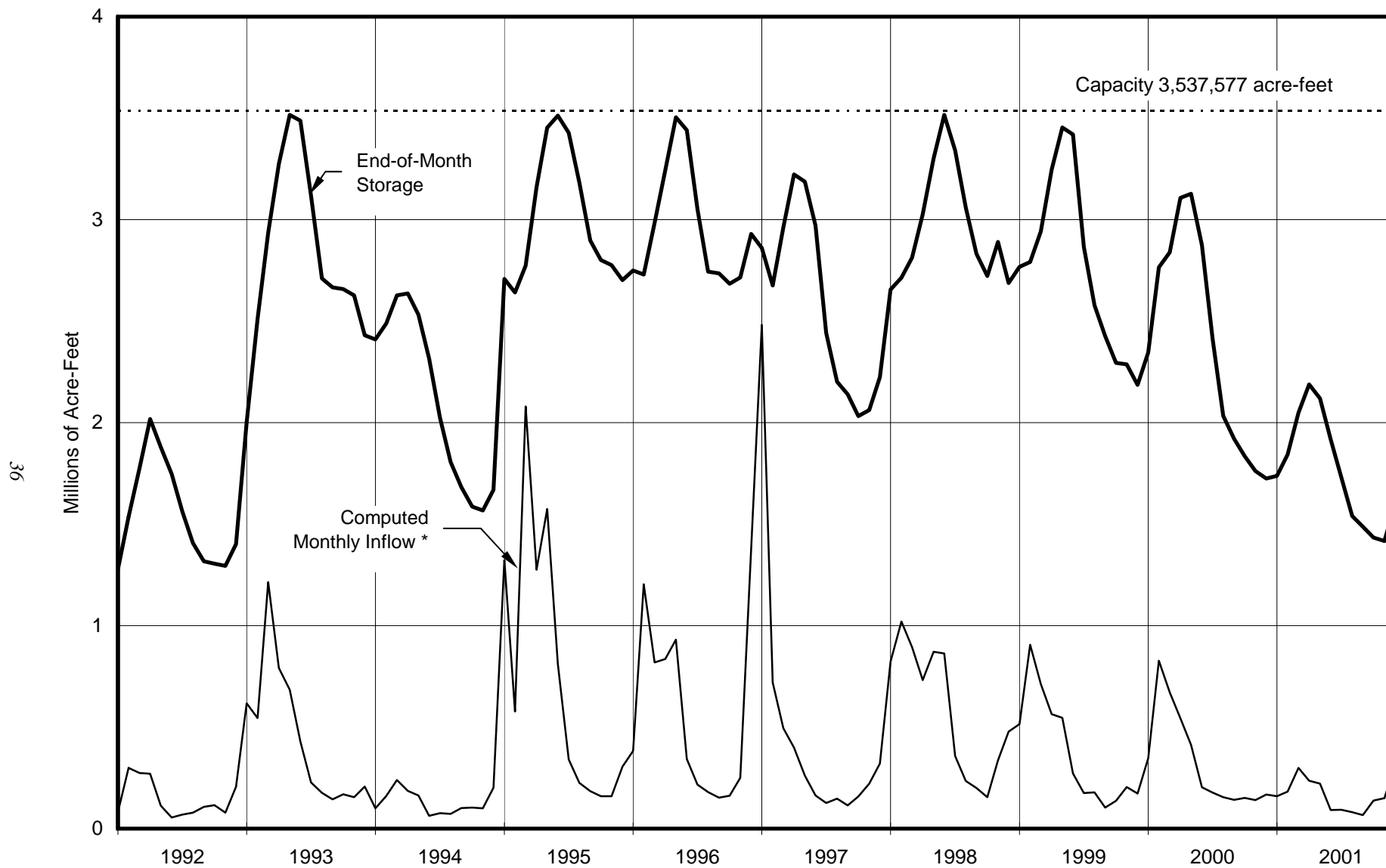
2/ Does not include pumpback.

Figure 11. Oroville-Thermalito Complex
 Inflow, Releases, and Diversions
2001



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
2000-2001**

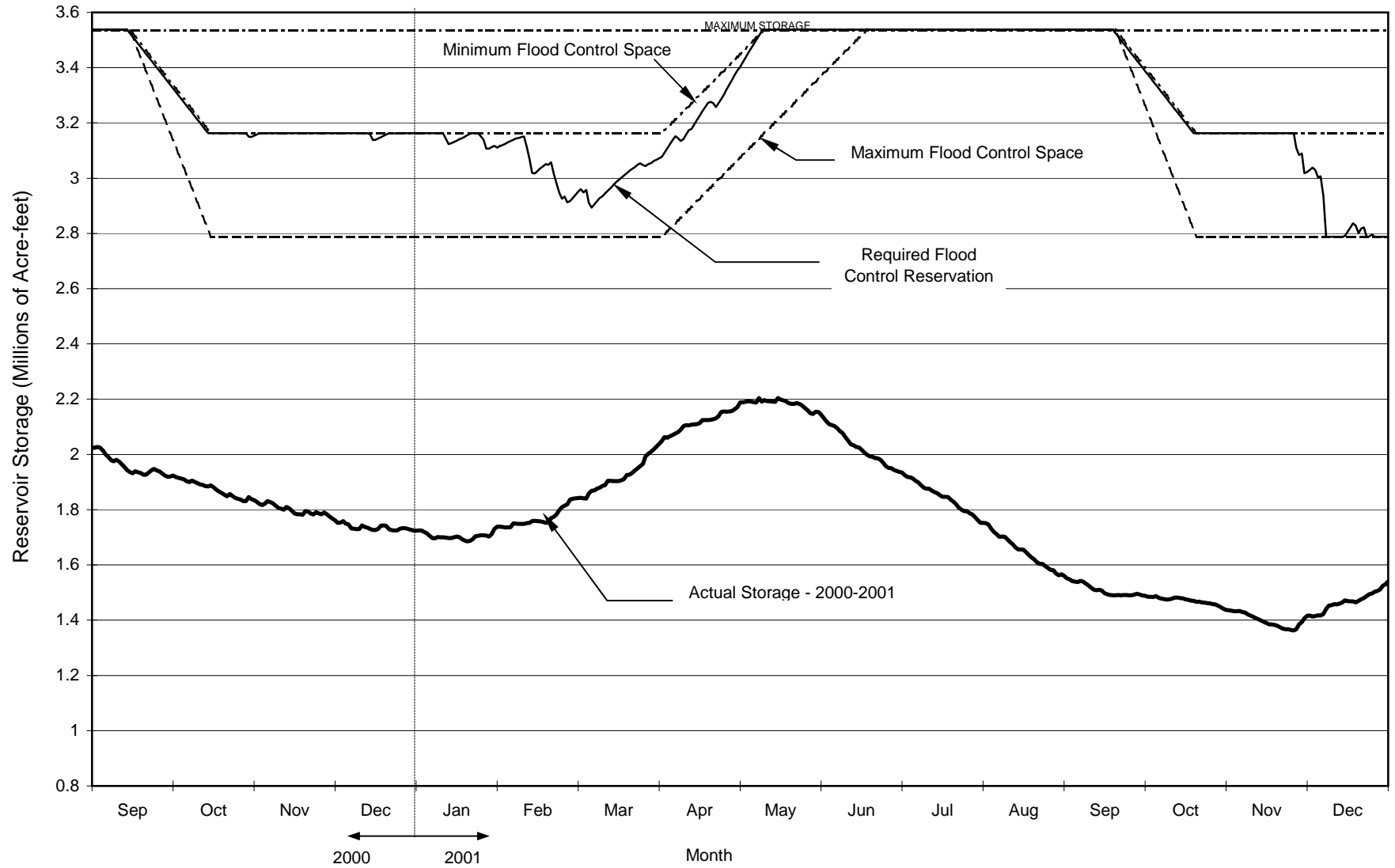
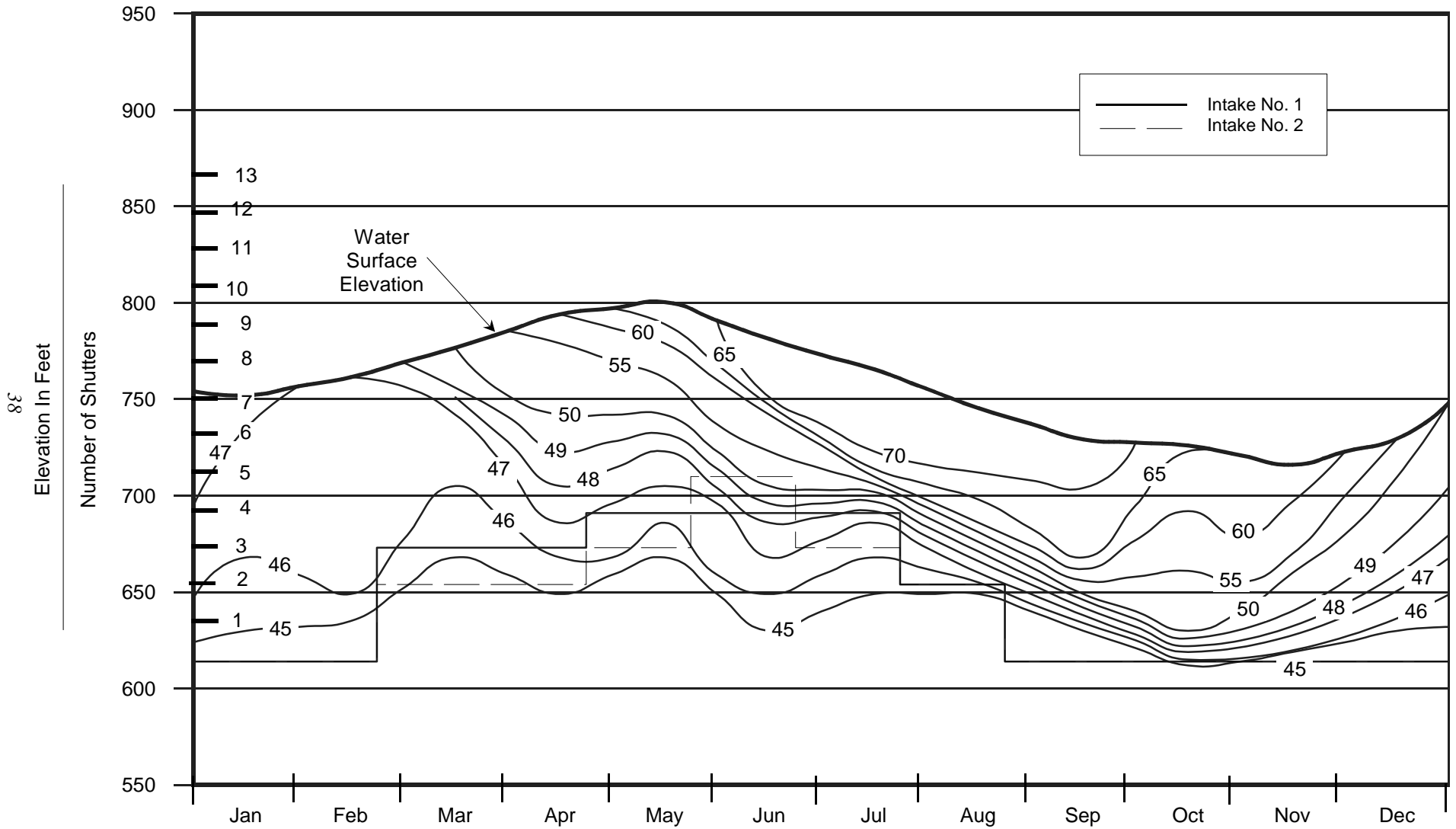


Figure 14. Lake Oroville Temperatures
2001
 (isotherms in degrees Farenheit)



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

**Table 9. Thermalito Forebay Monthly Operation
2001**

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

Month	Storage 1/	Storage Change	Inflow			Outflow					Losses (-) And Gains (+)
			Lake Oroville Releases 2/	Kelly Ridge Generation	Thermalito Pumpback	Thermalito Generation 3/	Butte County 4/	Thermalito Irrigation District	Releases To River 5/	Hyatt Powerplant Pumpback	
Jan	23,629	-327	191,527	6,790	47,194	166,081	81	110	38,779	45,457	4,670
Feb	23,839	210	110,539	8,060	37,744	94,640	42	81	35,230	33,824	7,684
Mar	24,508	669	148,550	15,710	60,787	132,836	103	127	38,730	57,618	5,036
Apr	23,193	-1,315	139,941	9,730	55,667	124,361	85	145	37,600	47,827	3,365
May	23,217	24	333,386	12,580	64,207	326,801	6	336	38,117	51,153	6,264
Jun	24,343	1,126	293,464	13,510	12,119	273,371	4	394	37,210	9,163	2,175
Jul	24,460	117	277,929	15,430	6,814	253,810	23	414	44,390	5,928	4,509
Aug	24,383	-77	271,817	14,991	4,840	244,590	24	384	41,300	7,232	1,805
Sep	23,475	-908	115,871	7,070	1,971	85,495	8	280	37,690	2,975	628
Oct	24,133	658	187,525	0	0	151,160	30	228	38,640	0	3,191
Nov	24,119	-14	165,094	254	125	131,317	43	21	37,490	0	3,384
Dec	24,194	75	139,461	12,675	12,630	124,000	76	17	38,320	10,267	7,989
Total	- - -	238	2,375,104	116,800	304,098	2,108,462	525	2,537	463,496	271,444	50,700

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/ Includes 12 AF recreation water to Delaware Water Co.

5/ Sum of Diversion Dam generation plus Hatchery.

**Table 10. Thermalito Afterbay Monthly Operation
2001**

(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	128.31	26,767	2,326	166,081	23,610	38	9,100	5,860	76,059	47,194	-1,894
Feb	128.47	27,257	490	94,640	0	0	0	0	56,150	37,744	-256
Mar	128.94	28,720	1,463	132,836	0	0	0	0	66,210	60,787	-4,376
Apr	127.28	23,717	-5,003	124,361	22,550	202	5,330	6,750	37,400	55,667	-1,465
May	130.42	33,562	9,845	326,801	94,690	723	23,970	54,980	72,790	64,207	-5,596
Jun	130.44	33,629	67	273,371	88,600	959	22,440	48,420	94,896	12,119	-5,870
Jul	129.30	29,865	-3,764	253,810	89,540	938	24,970	51,670	74,920	6,814	-8,722
Aug	131.95	38,938	9,073	244,590	83,920	820	16,900	40,570	82,040	4,840	-6,427
Sep	126.60	21,799	-17,139	85,495	47,790	30	2,940	12,070	34,500	1,971	-3,333
Oct	124.76	18,239	-3,560	151,160	42,930	439	15,440	43,390	32,040	0	-20,481
Nov	126.04	20,279	2,040	131,317	45,740	331	16,410	20,400	31,170	125	-15,101
Dec	132.05	39,302	19,023	124,000	33,020	147	15,290	7,880	35,910	12,630	-100
Totals			14,861	2,108,462	572,390	4,627	152,790	291,990	694,085	304,098	-73,621

1/ Includes bypass flows.

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 back into the Aqueduct usually occurs in the fall and is detailed in Table 11. Storage in Lake Del Val reached a maximum of 39,787 AF (52 percent of maximum operating capacity) on May 13, 2001, and a minimum of 25,065 AF (33 percent of maximum operating capacity) on January 6. Inflow and storage changes for the last ten years at Lake Del Valle are shown on Figure 15. Losses for 2001 totaled 2,577 AF.

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*. In 2001, 2,342,754 AF flowed into Clifton Court Forebay. Monthly inflows to Clifton Court Forebay along with corresponding storage changes are shown in Table 12.

Water Deliveries

The North Bay Aqueduct system, completed in May 1988, begins in the North Delta at the Barker Slough Facilities. Sacramento River water is conveyed to the Barker Slough pumping plant. From the pumping plant, water is conveyed by pipeline for 24 miles to contractors in Napa and Solano Counties 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 North Bay Aqueduct terminates at the Napa Terminal Tank. The Aqueduct supplied 43,931 AF to Napa and Solano counties.

The South Bay Aqueduct system, 43 miles long, begins at South Bay Pumping Plant and terminates at the Santa Clara Terminal Reservoir. South Bay Pumping Plant exports project water flowing through Bethany reservoir. In 2001, this system supplied 112,989 AF of deliveries to Zone 7, Alameda Co. WD., and Santa Clara WD.

The California Aqueduct, beginning at Banks through Check 12, delivered 4,874 AF of Project and CVP water in the Delta Field Division to Oak Flat, Western Hills, Musco Olive, VA Cemetery, and Tracy Golf.

Total deliveries in the Delta Field Division were 161,990 AF in 2001. Included were 108,347 AF to SWP Table A contractors, 17,654 AF of Local Water to Alameda Co. FC&WCD, Zone 7, and to Alameda County WD, 644 AF of Federal Wheeling to Musco Olive, Tracy Golf Course, and the V. A. Cemetery, 3,997 AF of General Wheeling to Alameda County Flood Control and Water Conservation District, Zone 7, 196 AF of Recreation water, and 31,152 AF to miscellaneous purchases, Article 21, permit water, carryover, and water bank recovery. These and other deliveries are summarized in Table 2.

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. As a result of water quality concerns, pumping at Banks was curtailed to less than 1,000 AF per day during October. Normal exports were not resumed until excess conditions were declared on December 6.

In 2001, the SWP diverted 2,311,970 AF of water at Banks Pumping Plant, including 142,757 AF of CVP water and 52,529 AF of CVC water wheeled by the Department. Below is a five-year summary of federal, State, and total pumping at Banks:

Banks Pumping Plant			
Year	Federal And Other	State	Total
2001	195,286	2,116,684	2,311,970
2000	235,119	3,500,533	3,735,652
1999	35,704	2,671,131	2,706,835
1998	28,087	1,659,323	1,687,410
1997	201,033	2,343,653	2,544,686

Table 11. Lake Del Valle Monthly Operation

2001

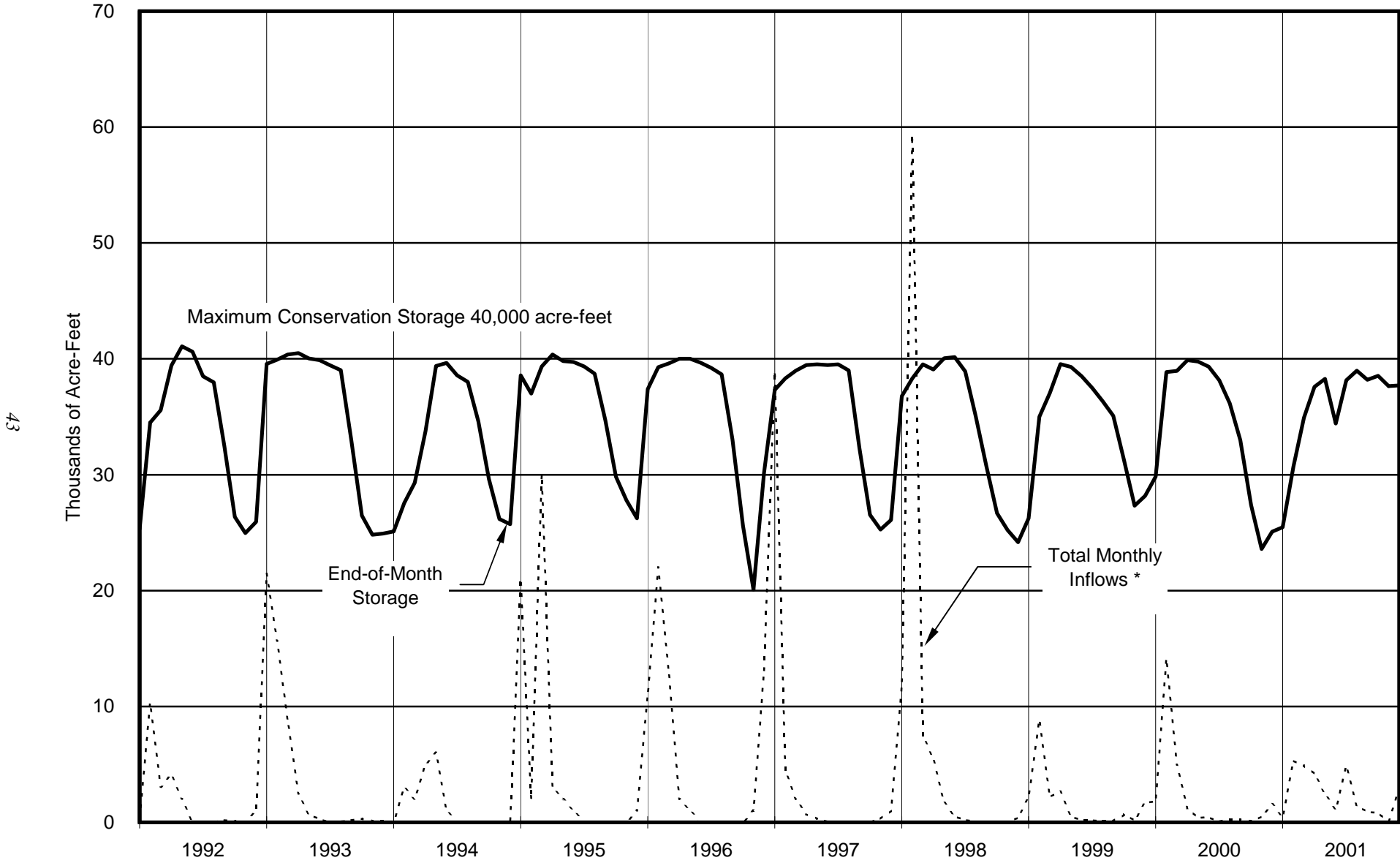
(in acre-feet except as noted)

Month	Water Surface Elevation (in feet)	Storage	Storage Change	Inflow		Outflow					Precipitation (inches)
				Natural 1/	From South Bay Aqueduct	Arroyo Valle	South Bay Aqueduct	Recreation Deliveries 2/	Evaporation	Total	
Jan	679.39	25,472	392	444	0	0	0	7	45	52	2.65
Feb	688.87	30,704	5,232	4,094	1,209	0	0	4	67	71	2.90
Mar	695.66	34,929	4,225	4,868	32	0	524	8	143	675	1.62
Apr	699.64	37,581	2,652	658	3,547	0	1,371	8	174	1,553	1.71
May	700.64	38,267	686	144	2,276	0	1,330	18	386	1,734	0.00
Jun	694.86	34,412	-3,855	246	875	0	4,525	27	424	4,976	0.00
Jul	700.46	38,143	3,731	55	4,790	0	691	31	392	1,114	0.00
Aug	701.68	38,987	844	275	1,117	0	88	56	404	548	0.00
Sep	700.54	38,198	-789	73	830	0	1,295	25	372	1,692	0.26
Oct	701.02	38,529	331	-10	818	0	142	9	326	477	0.23
Nov	699.72	37,636	-893	113	0	0	875	1	130	1,006	2.29
Dec	699.81	37,697	61	2,867	0	1,376	1,358	2	70	2,806	5.69
Total	---	---	12,617	13,827	15,494	1,376	12,199	196	2,933	16,704	17.35

1/ Total inflow from stream gaging station above Lang Canyon and accretions/depletions.

2/ To East Bay Regional Park District.

Figure 15. Historical Lake Del Valle Operation



* Natural and pumped inflows.

Table 12. Clifton Court Forebay Monthly Operation

2001

(elevation in feet, storage in acre-feet)

Month	Water Surface Elevation	Storage	Storage Change	Inflow
Jan	-0.69	16,778	236	241,081
Feb	0.28	18,866	2,088	262,941
Mar	0.01	18,285	-581	361,559
Apr	0.24	18,780	495	102,623
May	-1.39	15,274	-3,506	36,566
Jun	-1.45	15,145	-129	16,043
Jul	0.59	19,534	4,389	226,802
Aug	-0.52	17,144	-2,390	250,688
Sep	-0.81	16,520	-624	214,565
Oct	-1.15	15,790	-730	60,477
Nov	-0.73	16,692	902	193,160
Dec	-0.90	16,327	-365	376,249
Total	---	---	-215	2,342,754

San Luis Field Division

Water Storage

San Luis Reservoir reached its maximum end-of-month storage for 2001, 1,977,986 AF (97 percent of maximum operating storage), at the end of March. Maximum operating storage capacity in San Luis is 2,027,835 AF. Minimum end-of-month storage for the year of 760,039 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 996,742 AF (94 percent of State's maximum operating storage) in January, and the minimum of 357,410 AF (34 percent of State's maximum operating storage) was reached in August. Table 13 and Figure 16 show San Luis Reservoir operations during 2001. Table 14 shows the monthly operation of O'Neill Forebay during 2001.

There are two accounting procedures for calculating storage shares in O'Neill Forebay. One calculates storage shares using actual SWP/USBR deliveries from water pumped at Dos Amigos PP. The other method calculates storage shares in O'Neill using amounts pumped for each agency derived from scheduled energy at Dos Amigos only. Since scheduled pumping and water deliveries never match, there is always a difference that is carried over into subsequent months. These mismatches are used to "underschedule" or "overschedule" energy and pumping at Dos Amigos only in order to bring the mismatch back into alignment or closer to zero. The end-of-year mismatch at Dos Amigos was about 6,600 AF underscheduled for 2001.

Pumping and Generating Plants

Total pumping in 2001 at Gianelli Pumping-Generating Plant was 1,650,784 AF. Water released from San Luis Reservoir to O'Neill Forebay for generation was 1,494,869 AF. Total pumping at Dos Amigos Pumping Plant in 2001 was 2,819,631 AF, about 1,253,667 AF less than was pumped in 2000. The total water pumped at Dos Amigos Pumping Plant includes 57,694 AF of CVC water wheeled by SWP for Cross Valley Canal exchanges and transfers, 979,350 AF for the USBR, and 178,257 for the SWP. Table 15 summarizes joint-use plant activity on a monthly basis.

Water Deliveries

Water deliveries in the San Luis Field Division during 2001 were a total of 1,388,674 AF and included 1,130 AF of State and federal deliveries to the DFG and the Department of Parks and Recreation (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	124	445	569
Federal	93	464	557
Sub-total	217	909	1,126
Pools 16, 17, & 18 (Reach 5)			
	DPR	DFG	Total
State	0	2	2
Federal	0	2	2
Sub-total	0	4	4

Also included were federal deliveries from the joint-use facilities totaling 1,005,254 AF, and 30 AF of non-chargeable water WWD.

**Table 13. San Luis Reservoir Monthly Operation
2001**

(in acre-feet except as noted)

Month	Water Surface Elevation (in feet)	Storage	Storage Change	Inflow	Outflow			Gain (+) And Loss (-)
				Gianelli P-G Plant Pumping	Gianelli P-G Plant Generation	Pacheco Tunnel	Parks and Rec. Del	
Jan	507.62	1,595,959	125,520	190,928	44,355	12,635	0	-8,418
Feb	524.47	1,797,186	201,227	220,533	0	8,912	0	-10,394
Mar	539.06	1,977,986	180,800	226,786	14,253	8,593	0	-23,140
Apr	533.71	1,910,991	-66,995	44,444	92,314	14,133	0	-4,992
May	498.73	1,493,135	-417,856	3,425	402,890	21,105	0	2,714
Jun	456.07	1,033,071	-460,064	563	447,828	22,785	0	9,986
Jul	435.25	829,778	-203,293	5,464	186,599	21,758	0	-400
Aug	427.72	760,039	-69,739	44,661	92,684	17,114	0	-4,602
Sep	435.23	829,590	69,551	109,092	22,438	12,668	0	-4,435
Oct	428.16	764,056	-65,534	103,442	157,098	11,383	0	-495
Nov	449.21	964,447	200,391	250,112	33,498	10,440	0	-5,783
Dec	489.21	1,385,632	421,185	451,334	912	9,233	19	-19,985
Total	---	---	-84,807	1,650,784	1,494,869	170,759	19	-69,944

Figure 16. Historical San Luis Reservoir Operation

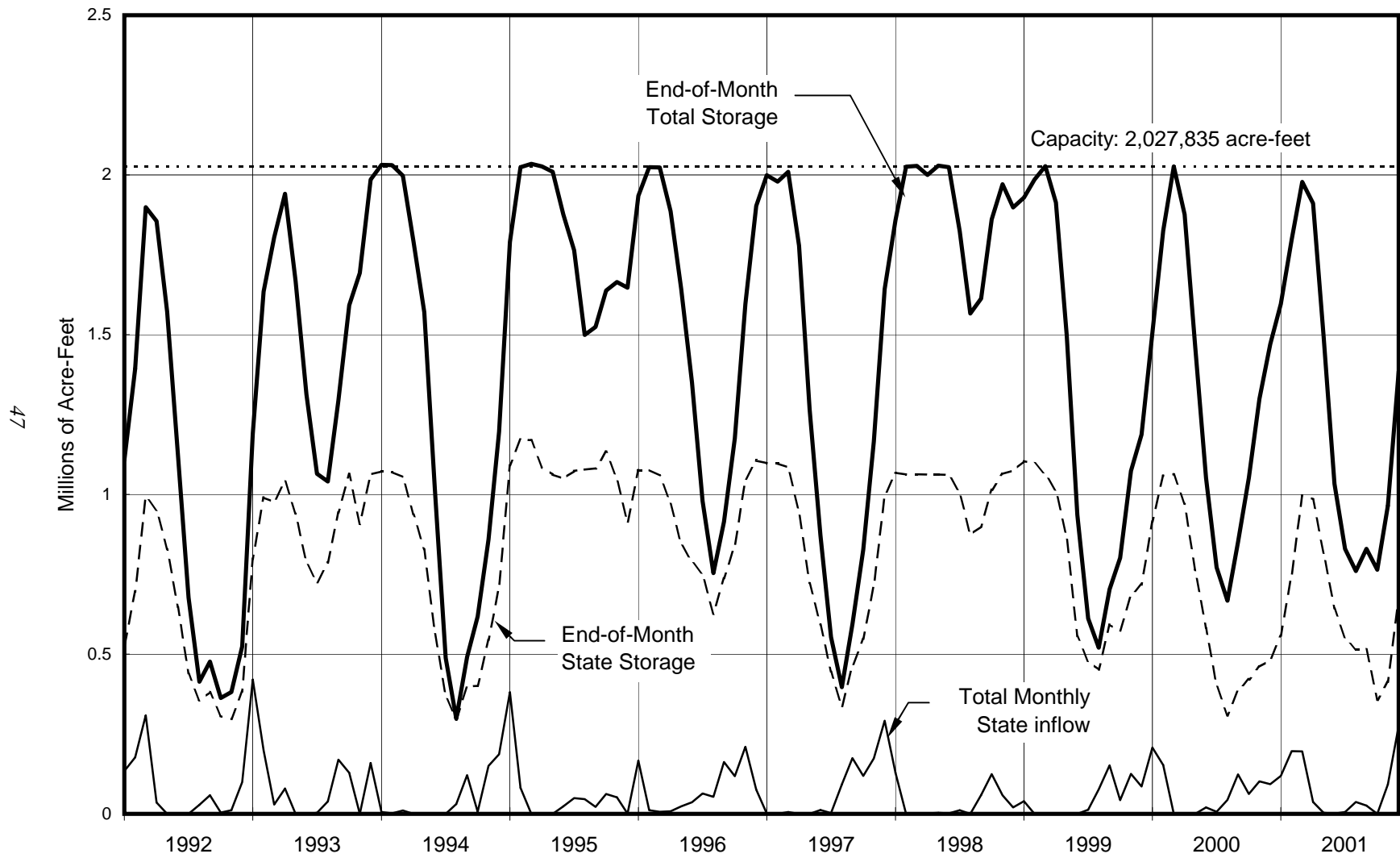


Table 14. O'Neill Forebay Monthly Operation

2001

(in acre-feet except as noted)

Month	Water Surface Elevation (in feet)	Storage	Storage Change	Inflow				Outflow				Gain (+) And Losses (-)
				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 2/	
Jan	219.69	42,351	-4,879	0	132,231	44,355	224,384	0	190,928	233,310	99	18,488
Feb	221.54	47,178	4,827	0	107,583	0	243,023	0	220,533	146,883	408	22,045
Mar	218.92	40,381	-6,797	0	47,423	14,253	338,686	5,184	226,786	212,923	483	38,217
Apr	222.53	49,793	9,412	0	62,241	92,314	80,901	16,905	44,444	166,928	707	2,940
May	221.34	46,653	-3,140	0	0	402,890	16,429	110,246	3,425	301,040	1,526	-6,222
Jun	222.84	50,619	3,966	0	6,549	447,828	4,863	45,169	563	395,698	1,608	-12,236
Jul	219.48	41,810	-8,809	0	24,180	186,599	183,566	2,146	5,464	400,745	2,154	7,355
Aug	220.29	43,905	2,095	0	51,007	92,684	219,083	831	44,661	321,968	1,722	8,503
Sep	220.24	43,775	-130	0	92,250	22,438	186,630	0	109,092	196,908	680	5,232
Oct	222.35	49,314	5,539	0	112,757	157,098	35,606	0	103,442	189,889	660	-5,931
Nov	219.39	41,579	-7,735	0	169,560	33,498	172,696	0	250,112	136,458	298	3,379
Dec	223.04	51,153	9,574	0	195,484	912	359,996	0	451,334	116,881	314	21,711
Total	---	---	3,923	0	1,001,265	1,494,869	2,065,863	180,481	1,650,784	2,819,631	10,659	103,481

1/ Pump-in located at Mile 79.67R.

2/ Includes 795 AF to DFG at O'Neill Forebay, 1 AF of Phase 1 water, 207 AF to P&R, 4 AF to Cattle, and 9,652 AF to SLWD.

**Table 15. Monthly Operations Summary, State-Federal San Luis Joint-Use Facilities
2001**

(In acre-feet except as noted)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Check 12													
State	224,384	243,023	338,686	80,901	16,429	4,863	143,189	157,062	146,271	35,606	172,696	359,996	1,923,106
Federal	0	0	0	0	0	0	40,377	62,021	40,359	0	0	0	142,757
Total	224,384	243,023	338,686	80,901	16,429	4,863	183,566	219,083	186,630	35,606	172,696	359,996	2,065,863
O'Neill P-G Plant													
Amount Pumped													
State	0	0	0	0	0	11,000	0	0	0	0	0	0	11,000
Federal	132,231	107,583	47,423	62,241	0	-4,451	24,180	51,007	92,250	112,757	169,560	195,484	990,265
Total	132,231	107,583	47,423	62,241	0	6,549	24,180	51,007	92,250	112,757	169,560	195,484	1,001,265
Generation													
Federal	0	0	5,184	16,905	110,246	45,169	2,146	831	0	0	0	0	180,481
O'Neill Forebay													
End-of-Month Storage													
State *	21,212	20,535	21,641	28,847	24,744	23,505	20,097	21,940	21,995	27,187	19,844	26,943	---
Federal *	21,139	26,643	18,740	20,946	21,909	27,114	21,713	21,965	21,780	22,127	21,735	24,210	---
Total	42,351	47,178	40,381	49,793	46,653	50,619	41,810	43,905	43,775	49,314	41,579	51,153	---
San Luis Reservoir													
End-of-Month Storage													
State	556,990	747,943	996,742	984,647	815,833	643,347	549,821	515,197	516,007	357,410	412,836	675,995	---
Federal	1,038,969	1,049,243	981,244	926,344	677,302	389,724	279,957	244,842	313,583	406,646	551,611	709,637	---
Total	1,595,959	1,797,186	1,977,986	1,910,991	1,493,135	1,033,071	829,778	760,039	829,590	764,056	964,447	1,385,632	---
Gianelli P-G Plant													
Amount Pumped													
State	118,571	196,669	195,402	37,281	3,425	563	5,464	36,821	25,687	-1,226	92,107	275,074	985,838
Federal	72,357	23,864	31,384	7,163	0	0	0	7,840	83,405	104,668	158,005	176,260	664,946
Total	190,928	220,533	226,786	44,444	3,425	563	5,464	44,661	109,092	103,442	250,112	451,334	1,650,784
Generation													
State	38,607	0	6,155	47,065	173,733	178,541	98,770	68,913	22,438	157,098	33,498	912	825,730
Federal	5,748	0	8,098	45,249	229,157	269,287	87,829	23,771	0	0	0	0	669,139
Total	44,355	0	14,253	92,314	402,890	447,828	186,599	92,684	22,438	157,098	33,498	912	1,494,869
Pacheco Tunnel													
Federal	12,635	8,912	8,593	14,133	21,105	22,785	21,758	17,114	12,668	11,383	10,440	9,233	170,759
Dos Amigos P.P.													
State	157,487	59,194	169,592	96,418	187,630	188,739	221,382	159,866	145,642	185,560	120,404	90,673	1,782,587
Federal	75,823	87,689	43,331	70,510	113,410	202,592	158,390	129,748	51,266	4,329	16,054	26,208	979,350
Other	0	0	0	0	0	4,367	20,973	32,354	0	0	0	0	57,694
Total	233,310	146,883	212,923	166,928	301,040	395,698	400,745	321,968	196,908	189,889	136,458	116,881	2,819,631

* 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.

San Joaquin Field Division

Water Deliveries

A total of 661,355 AF of deliveries were made in the San Joaquin Field Division in 2001. Water types include Table A water, purchase water, federal wheeling, and general wheeling. Kern County Water Agency (KCWA) represented 69 percent of the total SWP water delivered within the Division.

In addition to SWP deliveries, 18,752 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 on Table 2 and by water type on Map 3.

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 2001, 1,816,601 AF of State water and 18,752 AF of federal water flowed past Check 21 into the San Joaquin Field Division. The total water pumped at Edmonston Pumping Plant in 2001 was 1,288,666 AF compared to 1,689,921 AF in 2000.

Southern Field Division

Water Storage

There are four storage reservoirs in the Southern Field Division (Pyramid Lake, Castaic Lake, Lake Silverwood, and Lake Perris) with a combined storage capacity of 701,320 AF. Combined storage at the beginning of the year was 636,265 AF. End-of-year combined storage was 634,595 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 1,265,279 AF. Thirteen agencies received the water, which included Table A, Water Bank recovery, Article 21 interruptible, extended carryover, flexible storage withdrawal, dry year purchase, Purchase Pool A, Purchase Pool B, local, recreation, and Federal water.

Pumping and Generating Plants

Pumping plants in the Southern Field Division include Oso and Castaic on the West Branch, Pearblossom on the East Branch, and Cherry Valley, Green Spot, and Crafton Hills on the East Branch extension. 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, Mojave Siphon, and Devil Canyon on the East Branch. Energy available from each generating plant is summarized in Table 3. Combined generation at all five plants in 2001 totaled 1,757,289 MWh compared to 2,295,977 MWh in 2000.

**Table 16. Pyramid Lake Monthly Operation
2001**

(in acre-feet except as noted)

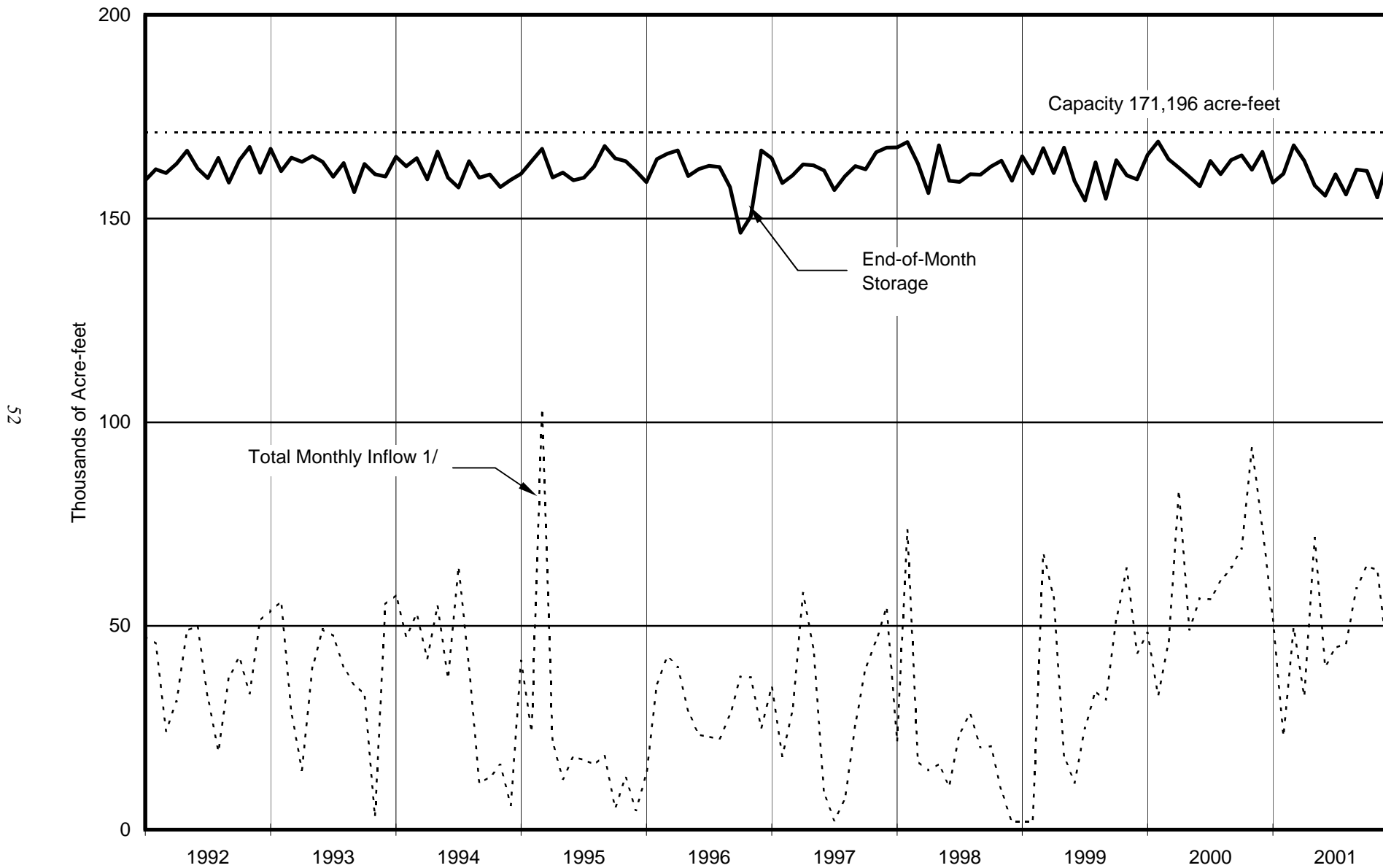
Month	Water Surface Elevation (in feet)	Storage	Natural Inflow Storage Shares	Storage Change	Inflow			Outflow			Computed Losses (-) Ans Gains (+)
					Project		Natural Stream Flow	Project		Natural To Piru Creek 2/	
					Castaic Powerplant Pumpback 1/ *	Warne Powerplant		Castaic Powerplant Generation *	Recreation Deliveries		
Jan	2569.21	158,800	-3,370	-7,562	76,404	50,451	1,206	134,847	0	331	-445
Feb	2570.95	160,959	-838	2,159	71,827	20,181	2,828	92,948	0	296	567
Mar	2576.52	167,997	-2,330	7,038	82,745	20,765	28,765	96,868	0	30,257	1,888
Apr	2573.51	164,169	489	-3,828	90,625	26,458	6,309	122,508	0	3,490	-1,222
May	2568.66	158,122	1,596	-6,047	123,063	68,904	2,644	195,867	2	1,537	-3,252
Jun	2566.59	155,585	926	-2,537	108,965	39,148	876	148,111	1	1,546	-1,868
Jul	2570.89	160,884	-7	5,299	114,674	43,968	687	147,001	3	1,620	-5,406
Aug	2566.84	155,890	-1,171	-4,994	112,144	45,132	449	156,900	2	1,613	-4,204
Sep	2571.78	161,995	-1,707	6,105	100,419	58,706	514	148,844	2	1,050	-3,638
Oct	2571.50	161,645	-1,575	-350	64,190	64,214	540	126,034	2	408	-2,850
Nov	2566.29	155,220	-1,182	-6,425	54,042	62,928	755	122,566	1	362	-1,221
Dec	2573.49	164,144	-743	8,924	52,425	41,546	816	83,784	0	377	-1,702
Total	---	---	---	-2,218	1,051,523	542,401	46,389	1,576,278	13	42,887	-23,353

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.

* Values supplied by LADWP, not verified by DWR.

Figure 17. Historical Pyramid Lake Operation



1/ Includes Warne Powerplant and natural stream flow only.

**Table 17. Elderberry Forebay Monthly Operation
2001**

(in acre-feet except as noted)

Month	Water Surface Elevation (in feet)	Storage	Storage Change	Inflow		Outflow			Computed Losses (-) And Gains (+)
				Castaic Powerplant Generation *	Natural Stream Flow	Castaic Powerplant Pumpback 1/ *	To Castaic Lake		
							Natural *	Project *	
Jan	1524.80	25,327	4,365	134,847	260	76,404	260	54,105	27
Feb	1522.95	24,513	-814	92,948	3,540	71,827	3,540	28,417	6,482
Mar	1508.06	18,445	-6,068	96,868	4,458	82,745	4,458	20,163	-28
Apr	1518.43	22,576	4,131	122,508	802	90,625	802	27,351	-401
May	1524.65	25,260	2,684	195,867	164	123,063	164	69,686	-434
Jun	1533.70	29,418	4,158	148,111	9	108,965	9	35,219	231
Jul	1522.75	24,426	-4,992	147,001	0	114,674	0	38,570	1,251
Aug	1531.27	28,272	3,846	156,900	0	112,144	0	40,075	-835
Sep	1511.93	19,934	-8,338	148,844	0	100,419	0	57,266	503
Oct	1517.47	22,175	2,241	126,034	0	64,190	0	59,124	-479
Nov	1529.01	27,225	5,050	122,566	0	54,042	0	62,806	-668
Dec	1516.54	21,790	-5,435	83,784	11	52,425	11	36,266	-528
Total	---	---	828	1,576,278	9,244	1,051,523	9,244	529,048	5,121

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

* Values supplied by LADWP, not verified by DWR.

**Table 18. Castaic Lake Monthly Operation
2001**

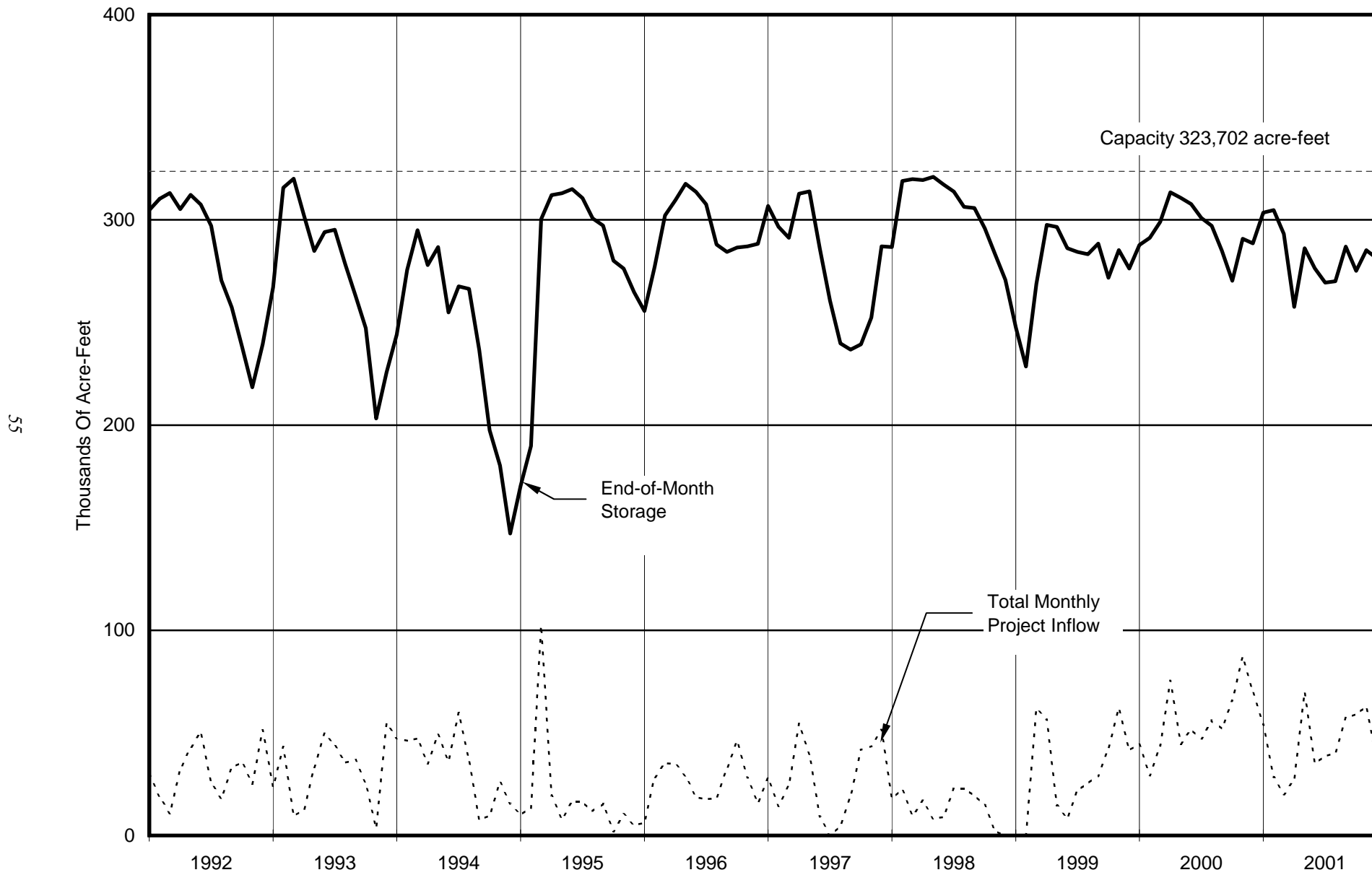
(in acre-feet except as noted)

Month	Water Surface Elevation (in feet) 1/	Storage	Natural Inflow Storage Shares	Storage Change	Inflow		Outflow		Computed Losses (-) Gains (+)	
					From Elderberry Forebay		Natural	Deliveries		Released To Castaic Lagoon 1/
					Natural	Project *				
Jan	1,505.81	303,539	234	14,971	260	54,105	230	39,226	292	-106
Feb	1,506.40	304,811	4,882	1,272	3,540	28,417	1,870	27,269	762	-4,524
Mar	1,500.94	293,164	9,481	-11,647	4,458	20,163	1,508	37,024	1,367	615
Apr	1,483.44	257,591	9,933	-35,573	802	27,351	628	64,474	978	1,098
May	1,497.59	286,151	9,954	28,560	164	69,686	170	42,064	313	917
Jun	1,492.84	276,377	9,986	-9,774	9	35,219	23	43,799	179	-1,047
Jul	1,489.39	269,404	9,986	-6,973	0	38,570	0	47,461	192	2,110
Aug	1,489.70	270,027	9,986	623	0	40,075	0	40,307	394	1,249
Sep	1,498.01	287,024	9,986	16,997	0	57,266	0	40,569	190	490
Oct	1,492.24	275,157	9,986	-11,867	0	59,124	0	71,499	0	508
Nov	1,497.12	285,175	17	10,018	0	62,806	17	52,611	0	-194
Dec	1,495.28	281,373	110	-3,802	11	36,266	82	40,532	0	371
Total	---	---	---	-7,195	9,244	529,048	4,528	546,835	4,667	1,487

1/ Includes 3,712 AF of Project water and 955 AF of recreation water.

* Values supplied by LADWP, not verified by DWR.

Figure 18. Historical Castaic Lake Operation



**Table 19. Castaic Lagoon Monthly Operation
2001**

(in acre-feet except as noted)

Month	Water Surface Elevation (in feet)	Storage	Storage Change	Inflow	Natural Outflow		Deliveries to Recreation	Computed Losses (-) And Gains (+)
					Release From Castaic Lagoon			
					Surface	Sub-Surface		
Jan	1134.84	5,435	187	292	0	53	52	0
Feb	1136.21	5,703	268	762	389	56	49	0
Mar	1136.28	5,717	14	1,367	1,216	62	75	0
Apr	1136.23	5,707	-10	978	867	60	61	0
May	1136.01	5,664	-43	313	221	62	73	0
Jun	1135.54	5,572	-92	179	0	124	147	0
Jul	1135.05	5,476	-96	192	0	149	0	-139
Aug	1135.42	5,548	72	394	0	176	0	-146
Sep	1134.37	5,538	-10	190	0	75	0	-125
Oct	1134.10	5,292	-246	0	0	89	0	-157
Nov	1133.20	5,120	-172	0	0	122	0	-50
Dec	1132.51	4,990	-130	0	0	86	0	-44
Total	---	---	-258	4,667	2,693	1,114	457	-661

**Table 20. Silverwood Lake Monthly Operation
2001**

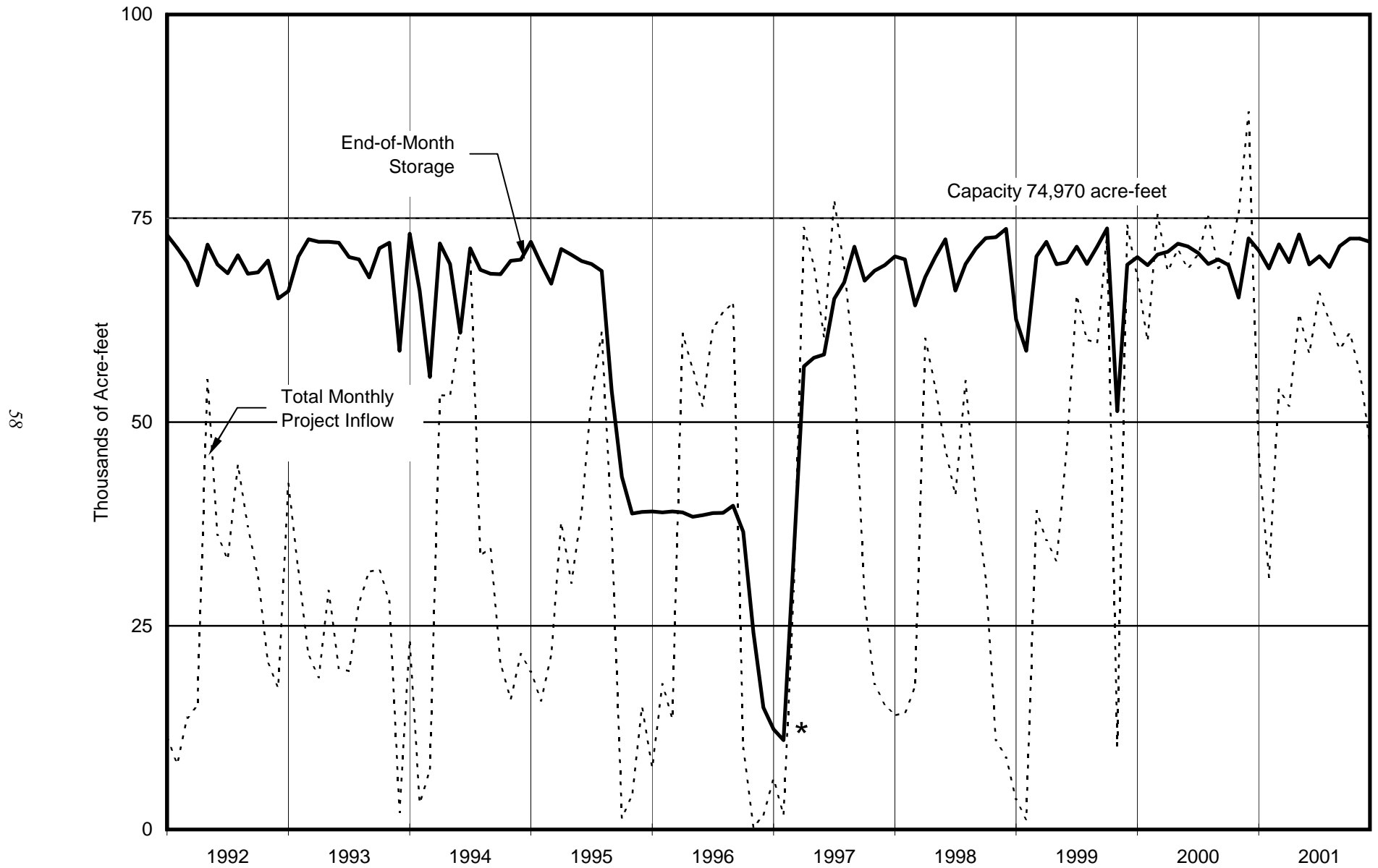
(in acre-feet except as noted)

Month	Water Surface Elevation (in feet)	Storage	Storage Change	Inflow			Outflow				Computed Losses (-) And Gains (+)	Total Natural Inflow Released 2/
				Mojave Siphon Powerplant	Mojave Bypass Flume	Natural 1/	Project			Natural Inflow to Mojave River		
							Delivered to CLAWA	Recreation	San Bernardino Tunnel			
Jan	3,350.90	71,026	-1,516	44,909	703	142	112	2	47,723	12	579	96
Feb	3,348.57	68,837	-2,189	29,008	0	2,036	100	2	33,923	607	1,399	892
Mar	3,351.71	71,796	2,959	51,974	0	2,003	98	1	50,296	641	18	1,962
Apr	3,349.39	69,603	-2,193	50,907	0	1,094	97	4	54,736	75	718	840
May	3,353.00	73,032	3,429	62,860	0	347	132	10	59,560	13	-63	662
Jun	3,349.09	69,323	-3,709	58,370	0	56	160	10	61,832	12	-121	201
Jul	3,350.17	70,337	1,014	65,753	0	0	180	13	64,082	12	-452	76
Aug	3,348.75	69,005	-1,332	62,522	0	0	209	12	63,199	12	-422	70
Sep	3,351.48	71,577	2,572	58,999	0	0	182	11	56,590	11	367	86
Oct	3,352.44	72,494	917	60,837	0	0	167	8	59,134	12	-599	98
Nov	3,352.46	72,513	19	56,199	0	0	118	3	56,541	11	493	63
Dec	3,352.03	72,102	-411	47,294	0	16	102	2	47,610	11	4	11
Total	---	---	-440	649,632	703	5,694	1,657	78	655,226	1,429	1,921	5,057

1/ Houston Creek appropriation included in total.

2/ 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.

Figure 19. Historical Silverwood Lake Operation



* Record low storage in early 1997 was to complete intake tower construction.

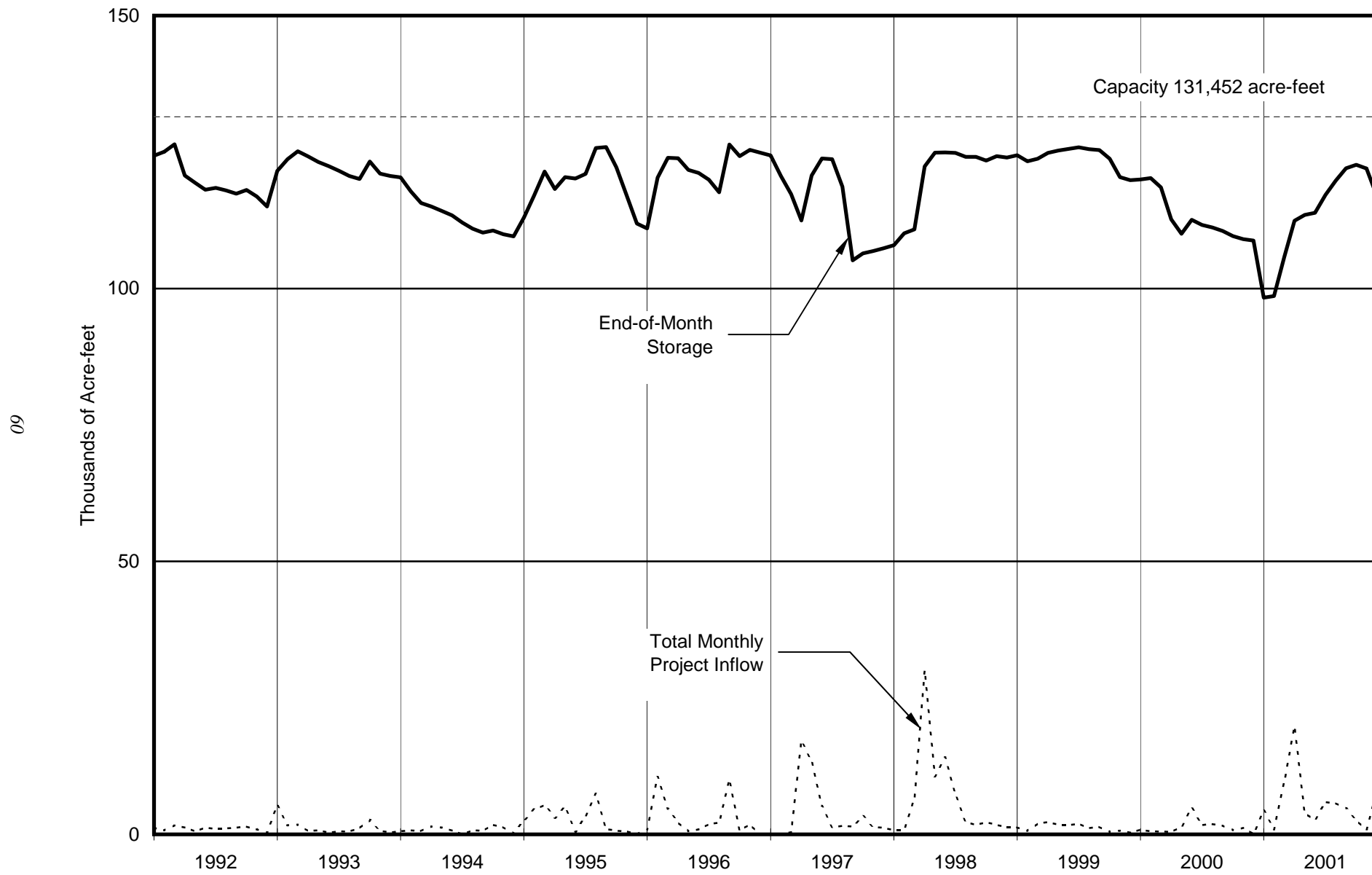
**Table 21. Lake Perris Monthly Operation
2001**

(in acre-feet except as noted)

Month	Water Surface Elevation (in feet)	Storage	Storage Change	Inflow 1/	Outflow	Computed Losses (-) And Gains (+)
Jan	1574.97	98,303	-10,490	4,386	14,066	-810
Feb	1575.12	98,617	314	926	503	-109
Mar	1578.48	105,732	7,115	9,630	1,102	-1,413
Apr	1581.57	112,430	6,698	19,739	10,001	-3,040
May	1582.05	113,484	1,054	3,878	948	-1,876
Jun	1582.23	113,880	396	2,698	303	-1,999
Jul	1583.72	117,176	3,296	5,901	325	-2,280
Aug	1584.87	119,744	2,568	5,712	495	-2,649
Sep	1585.88	122,016	2,272	4,733	327	-2,134
Oct	1586.17	122,672	656	2,647	336	-1,655
Nov	1585.86	121,971	-701	892	352	-1,241
Dec	1583.63	116,976	-4,995	7,753	11,012	-1,736
Total	---	---	8,183	68,895	39,770	-20,942

1/ Inflow calculated

Figure 20. Historical Lake Perris Operation



**Table 22. Summary of California Aqueduct Operation
2001
(in acre-feet)**

Description	Jan	Feb	Mar	Apr	May	Jun
DELTA FIELD DIVISION						
Note: North Bay Aqueduct, South Bay Aqueduct, and Lake Del Valle they are shown here						
North Bay Aqueduct						
Pumped at Barker Slough Pumping Plant	1,995	2,189	1,051	3,920	4,155	5,741
Deliveries (Travis & Fairfield/Vacaville)	162	143	109	1,276	1,753	2,427
Pumped at Cordelia Pumping Plant	1,779	1,984	879	2,529	2,247	3,120
Deliveries (Benicia, Vallejo, A.C. 1&2, & Napa)	1,779	1,984	879	2,529	2,247	3,120
Computed Losses (-), Gains (+)	-54	-62	-63	-115	-155	-194
	-10,526	-10,984	-13,405	-6,232	-4,919	637
California Aqueduct						
Pumped at Banks Pumping Plant	240,845	260,853	360,751	98,528	33,823	9,233
Pumped at South Bay Pumping Plant	6,476	6,601	8,946	10,851	11,633	7,476
Deliveries to Contracting State Agencies	49	9	43	193	760	817
Deliveries to Federal Agencies	43	50	59	41	7	56
Change in Storage	-524	325	-172	609	672	-2,710
Outflow at Check 12	224,384	243,023	338,686	80,901	16,429	4,863
Computed Losses (-), Gains (+)	-10,417	-10,845	-13,189	-5,933	-4,322	1,269
South Bay Aqueduct						
Pumped at South Bay Pumping Plant	6,476	6,601	8,946	10,851	11,633	7,476
Inflow from Lake Del Valle (Natural)	0	0	524	658	144	246
Inflow from Lake Del Valle (Project)	0	0	0	0	0	4,037
Inflow from Lake Del Valle (Stored)	0	0	0	713	1,186	242
Outflow, To Lake Del Valle	0	1,209	32	3,547	2,276	875
Deliveries to Contracting State Agencies	6,466	5,382	9,428	8,665	10,631	11,112
Computed Losses (-), Gains (+)	-10	-10	-10	-10	-56	-14
Lake Del Valle Operation:						
Inflow from South Bay Aqueduct	0	1,209	32	3,547	2,276	875
Natural inflow	444	4,094	4,868	658	144	246
Releases to South Bay Aqueduct	0	0	524	1,371	1,330	4,525
Releases to Arroyo Valle	0	0	0	0	0	0
Deliveries to EBRP District	7	4	8	8	18	27
End-of-Month Storage	25,472	30,704	34,929	37,581	38,267	34,412
Change in Storage	392	5,232	4,225	2,652	686	-3,855
Computed Losses (-), Gains (+) (Evaporation)	-45	-67	-143	-174	-386	-424
SAN LUIS FIELD DIVISION						
O'Neill Forebay Operation						
End-of-Month Storage	42,351	47,178	40,381	49,793	46,653	50,619
Inflow, California Aqueduct	224,384	243,023	338,686	80,901	16,429	4,863
Inflow, O'Neill P.- G. Plant	132,231	107,583	47,423	62,241	0	6,549
Inflow, Gianelli P.- G. Plant	44,355	0	14,253	92,314	402,890	447,828
Miscellaneous Outflow (Phase 1)	1	0	0	0	0	0
Deliveries to Dept. of Fish and Game (State)	26	29	52	54	23	8
Deliveries to Dept. of Fish and Game (Fed.)	22	23	42	45	19	6
Deliveries to Dept. of Parks & Rec. (State)	0	0	0	0	0	0
Deliveries to Dept. of Parks & Rec. (Fed.)	0	0	0	0	0	0
Deliveries to Fed. Customers	50	356	389	608	1,484	1,594
Outflow, O'Neill P.- G. Plant	0	0	5,184	16,905	110,246	45,169
Outflow, Gianelli P.- G. Plant	190,928	220,533	226,786	44,444	3,425	563
Outflow, Dos Amigos P.P.	233,310	146,883	212,923	166,928	301,040	395,698
Change in Storage	-4,879	4,827	-6,797	9,412	-3,140	3,966
Computed Losses (-), Gains (+)	18,488	22,045	38,217	2,940	-6,222	-12,236
San Luis Reservoir Operation						
State End-of-Month Storage	556,990	747,943	996,742	984,647	815,833	643,347
Total End-of-Month Storage	1,595,959	1,797,186	1,977,986	1,910,991	1,493,135	1,033,071
Inflow, Gianelli P.- G. Plant	190,928	220,533	226,786	44,444	3,425	563
Outflow, Gianelli P.- G. Plant	44,355	0	14,253	92,314	402,890	447,828
Deliveries to Dept. of Parks & Rec. (Fed.)	0	0	0	0	0	0
Deliveries to Dept. of Parks & Rec. (State)	0	0	0	0	0	0
Pacheco Tunnel Diversion	12,635	8,912	8,593	14,133	21,105	22,785
Change in Storage (Total)	125,520	201,227	180,800	-66,995	-417,856	-460,064
Computed Losses (-), Gains (+)	-8,418	-10,394	-23,140	-4,992	2,714	9,986

Table 22. Summary of California Aqueduct Operations

2001

(in acre-feet)

Jul	Aug	Sep	Oct	Nov	Dec	Total	Description	
are not within the Edmond G. Brown California Aqueduct, for completeness.								DELTA FIELD DIVISION
								North Bay Aqueduct
6,376	5,466	4,376	5,319	3,962	1,141	45,691	Pumped at Barker Slough Pumping Plant	
2,759	1,813	1,399	1,733	1,117	158	14,849	Deliveries (Travis & Fairfield/Vacaville)	
3,402	3,233	2,843	3,403	2,702	961	29,082	Pumped at Cordelia Pumping Plant	
3,402	3,233	2,843	3,403	2,702	961	29,082	Deliveries (Benicia, Vallejo, A.C. 1&2, & Napa)	
-215	-420	-134	-183	-143	-22	-1,760	Computed Losses (-), Gains (+)	
-14,945	-14,005	-14,516	-9,070	-14,292	-16,558			
								California Aqueduct
217,665	248,539	212,698	60,306	192,176	376,553	2,311,970	Pumped at Banks Pumping Plant	
16,018	15,498	11,966	15,546	5,267	356	116,634	Pumped at South Bay Pumping Plant	
835	530	455	488	49	2	4,230	Deliveries to Contracting State Agencies	
44	77	76	86	81	24	644	Deliveries to Federal Agencies	
2,892	183	-419	29	193	-251	827	Change in Storage	
183,566	219,083	186,630	35,606	172,696	359,996	2,065,863	Outflow at Check 12	
-14,310	-13,168	-13,990	-8,551	-13,890	-16,426	-123,772	Computed Losses (-), Gains (+)	
								South Bay Aqueduct
16,018	15,498	11,966	15,546	5,267	356	116,634	Pumped at South Bay Pumping Plant	
55	88	73	0	0	1,107	2,895	Inflow from Lake Del Valle (Natural)	
636	0	1,222	142	875	68	6,980	Inflow from Lake Del Valle (Project)	
0	0	0	0	0	183	2,324	Inflow from Lake Del Valle (Stored)	
4,790	1,117	830	818	0	0	15,494	Outflow, To Lake Del Valle	
11,891	14,456	12,411	14,860	6,013	1,674	112,989	Deliveries to Contracting State Agencies	
-28	-13	-20	-10	-129	-40	-350	Computed Losses (-), Gains (+)	
								Lake Del Valle Operation:
4,790	1,117	830	818	0	0	15,494	Inflow from South Bay Aqueduct	
55	275	73	-10	113	2,867	13,827	Natural inflow	
691	88	1,295	142	875	1,358	12,199	Releases to South Bay Aqueduct	
0	0	0	0	0	1,376	1,376	Releases to Arroyo Valle	
31	56	25	9	1	2	196	Deliveries to EBRP District	
38,143	38,987	38,198	38,529	37,636	37,697	---	End-of-Month Storage	
3,731	844	-789	331	-893	61	12,617	Change in Storage	
-392	-404	-372	-326	-130	-70	-2,933	Computed Losses (-), Gains (+) (Evaporation)	
								SAN LUIS FIELD DIVISION
								O'Neill Forebay Operation
41,810	43,905	43,775	49,314	41,579	51,153	---	End-of-Month Storage	
183,566	219,083	186,630	35,606	172,696	359,996	2,065,863	Inflow, California Aqueduct	
24,180	51,007	92,250	112,757	169,560	195,484	1,001,265	Inflow, O'Neill P.- G. Plant	
186,599	92,684	22,438	157,098	33,498	912	1,494,869	Inflow, Gianelli P.- G. Plant	
0	0	0	0	0	0	1	Miscellaneous Outflow (Phase 1)	
2	14	8	130	62	30	438	Deliveries to Dept. of Fish and Game (State)	
1	11	7	107	50	24	357	Deliveries to Dept. of Fish and Game (Fed.)	
0	0	0	0	0	116	116	Deliveries to Dept. of Parks & Rec. (State)	
0	0	0	0	0	95	95	Deliveries to Dept. of Parks & Rec. (Fed.)	
2,151	1,697	665	423	186	49	9,652	Deliveries to Fed. Customers	
2,146	831	0	0	0	0	180,481	Outflow, O'Neill P.- G. Plant	
5,464	44,661	109,092	103,442	250,112	451,334	1,650,784	Outflow, Gianelli P.- G. Plant	
400,745	321,968	196,908	189,889	136,458	116,881	2,819,631	Outflow, Dos Amigos P.P.	
-8,809	2,095	-130	5,539	-7,735	9,574	3,923	Change in Storage	
7,355	8,503	5,232	-5,931	3,379	21,711	103,481	Computed Losses (-), Gains (+)	
								San Luis Reservoir Operation
549,821	515,197	516,007	357,410	412,836	675,995	---	State End-of-Month Storage	
829,778	760,039	829,590	764,056	964,447	1,385,632	---	Total End-of-Month Storage	
5,464	44,661	109,092	103,442	250,112	451,334	1,650,784	Inflow, Gianelli P.- G. Plant	
186,599	92,684	22,438	157,098	33,498	912	1,494,869	Outflow, Gianelli P. - G. Plant	
0	0	0	0	0	9	9	Deliveries to Dept. of Parks & Rec. (Fed.)	
0	0	0	0	0	10	10	Deliveries to Dept. of Parks & Rec. (State)	
21,758	17,114	12,668	11,383	10,440	9,233	170,759	Pacheco Tunnel Diversion	
-203,293	-69,739	69,551	-65,534	200,391	421,185	-84,807	Change in Storage (Total)	
-400	-4,602	-4,435	-495	-5,783	-19,985	-69,944	Computed Losses (-), Gains (+)	

**Table 22. Summary of California Aqueduct Operation
2001
(in acre-feet)**

Description	Jan	Feb	Mar	Apr	May	Jun
SAN LUIS FIELD DIVISION (Cont.)						
California Aqueduct (Pools 14 thru 21)						
Inflow, Dos Amigos P.P.(State)	157,487	59,194	169,592	96,418	187,630	188,739
Inflow, Dos Amigos P.P.(Fed. and Other)	75,823	87,689	43,331	70,510	113,410	206,959
Total Inflow, Dos Amigos P.P.	233,310	146,883	212,923	166,928	301,040	395,698
Flow into Aqueduct	17	0	2,106	16	0	0
Deliveries to Dept. of Fish and Game (State)	0	0	0	0	0	0
Deliveries to Dept. of Fish and Game (Fed.)	0	0	0	0	0	0
Miscellaneous Outflow (Phase 1)	0	0	0	10	0	0
Deliveries, Miscellaneous to Fed. Customers	0	0	0	0	0	2,234
Deliveries to Fed. Customers	87,045	77,381	58,563	72,300	124,972	192,665
Outflow, Check 21 (State)	145,833	66,966	151,673	96,029	179,506	200,782
Outflow, Check 21 (Fed.)	649	641	0	0	294	260
Change in Storage	-2,116	1,038	2,641	-1,383	-1,624	1,634
Computed Losses (-), Gains (+)	-1,916	-857	-2,152	12	2,108	1,877
SAN JOAQUIN FIELD DIVISION						
California Aqueduct, Check 21 to Buena Vista Pumping Plant						
Inflow, Check 21 (State)	145,833	66,966	151,673	96,029	179,506	200,782
Inflow, Check 21 (Fed.)	649	641	0	0	294	260
Total Inflow, Check 21	146,482	67,607	151,673	96,029	179,800	201,042
Kern River Intertie	0	0	0	0	0	0
Deliveries to Contracting State Agencies	35,247	10,622	61,215	22,484	28,511	67,356
Deliveries to Fed. Customers	649	641	0	0	294	260
Friant CVP Inflow	0	0	6,363	24,226	27,156	23,956
Outflow, Buena Vista P.P.	99,634	52,968	88,061	91,715	159,413	137,242
Coastal Br. Diversion	6,270	1,475	3,792	4,443	12,260	14,309
Change in Storage	-770	580	-150	99	-642	-14
Computed Losses (-), Gains (+)	-5,452	-1,321	-5,118	-1,514	-7,120	-5,845
California Aqueduct, Buena Vista P.P. to Teerink Pumping Plant						
Inflow, Buena Vista P.P.	99,634	52,968	88,061	91,715	159,413	137,242
Deliveries to Contracting State Agencies	1,446	1,955	6,613	5,519	12,849	17,406
W.R.M.W.S.D. Pumpback	0	0	0	16	189	125
Outflow, Teerink Pumping Plant	101,719	52,220	83,002	87,712	151,292	123,426
Change in Storage	169	-139	-8	-10	-60	51
Computed Losses (-), Gains (+)	3,700	1,068	1,546	1,490	4,479	3,516
California Aqueduct, Teerink Pumping Plant to Chrisman Pumping Plant						
Inflow, Teerink Pumping Plant	101,719	52,220	83,002	87,712	151,292	123,426
Deliveries to Contracting State Agencies	232	382	1,502	1,485	3,533	7,038
Outflow, Chrisman Pumping Plant	100,245	51,923	80,262	85,544	144,710	114,698
Change in Storage	27	-30	19	14	-3	19
Computed Losses (-), Gains (+)	-1,215	55	-1,219	-669	-3,052	-1,671
California Aqueduct, Chrisman Pumping Plant to Edmonston Pumping Plant						
Inflow, Chrisman Pumping Plant	100,245	51,923	80,262	85,544	144,710	114,698
Deliveries to Contracting State Agencies	150	11	191	852	2,231	3,101
Outflow, Edmonston Pumping Plant	98,632	51,050	79,541	83,772	141,622	110,043
Change in Storage	24	146	-86	34	-137	143
Computed Losses (-), Gains (+)	-1,439	-716	-616	-886	-994	-1,411
Coastal Branch, California Aqueduct						
Inflow, Las Perillas P.P.	6,270	1,475	3,792	4,443	12,260	14,309
B.M.W.S.D. Pumpback	0	0	0	0	0	0
Deliveries to Contracting State Agencies	6,638	1,550	3,802	4,499	12,200	14,210
Deliveries to Fed. Customers	0	0	0	0	0	0
Change in Storage	11	5	-7	-12	-24	16
Computed Losses (-), Gains (+)	379	80	3	44	-84	-84

**Table 22. Summary of California Aqueduct Operations
2001**

(in acre-feet)

Jul	Aug	Sep	Oct	Nov	Dec	Total	Description
							SAN LUIS FIELD DIVISION (Cont.)
							California Aqueduct (Pools 14 thru 21)
221,382	159,866	145,642	185,560	120,404	90,673	1,782,587	Inflow, Dos Amigos P.P.(State)
179,363	162,102	51,266	4,329	16,054	26,208	1,037,044	Inflow, Dos Amigos P.P.(Fed. and Other)
400,745	321,968	196,908	189,889	136,458	116,881	2,819,631	Total Inflow, Dos Amigos P.P.
0	0	0	0	0	0	2,139	Flow into Aqueduct
0	0	0	0	0	7	7	Deliveries to Dept. of Fish and Game (State)
0	0	0	0	0	98	98	Deliveries to Dept. of Fish and Game (Fed.)
0	0	7	12	0	0	29	Miscellaneous Outflow (Phase 1)
12,101	12,122	0	0	0	0	26,457	Deliveries, Miscellaneous to Fed. Customers
159,248	105,365	26,068	30,713	15,840	18,985	969,145	Deliveries to Fed. Customers
231,035	207,979	164,208	156,880	118,822	96,888	1,816,601	Outflow, Check 21 (State)
59	547	3,875	4,973	4,625	2,829	18,752	Outflow, Check 21 (Fed.)
150	-7	-1,754	1,722	-1,259	17	-941	Change in Storage
1,848	4,038	-4,504	4,411	1,570	1,943	8,378	Computed Losses (-), Gains (+)
							SAN JOAQUIN FIELD DIVISION
							California Aqueduct, Check 21 to Buena Vista Pumping Plant
231,035	207,979	164,208	156,880	118,822	96,888	1,816,601	Inflow, Check 21 (State)
59	547	3,875	4,973	4,625	2,829	18,752	Inflow, Check 21 (Fed.)
231,094	208,526	168,083	161,853	123,447	99,717	1,835,353	Total Inflow, Check 21
0	0	0	0	0	0	0	Kern River Intertie
83,789	71,825	19,518	10,701	2,582	8,665	422,515	Deliveries to Contracting State Agencies
59	547	3,875	4,973	4,625	2,829	18,752	Deliveries to Fed. Customers
21,232	20,827	3,860	2,073	14,364	9,270	153,327	Friant CVP Inflow
147,537	139,049	138,887	138,276	126,178	93,059	1,412,019	Outflow, Buena Vista P.P.
14,898	13,177	8,801	3,766	1,828	2,154	87,173	Coastal Br. Diversion
-271	886	-167	136	203	-198	-308	Change in Storage
-6,314	-3,869	-1,029	-6,074	-2,395	-2,478	-48,529	Computed Losses (-), Gains (+)
							California Aqueduct, Buena Vista P.P. to Teerink Pumping Plant
147,537	139,049	138,887	138,276	126,178	93,059	1,412,019	Inflow, Buena Vista P.P.
15,946	12,052	5,353	3,522	1,814	1,136	85,611	Deliveries to Contracting State Agencies
153	90	65	0	0	0	638	W.R.M.W.S.D. Pumpback
136,004	130,891	136,920	139,633	129,347	95,106	1,367,272	Outflow, Teerink Pumping Plant
-136	39	-93	275	0	-68	19	Change in Storage
4,124	3,843	3,228	5,154	4,983	3,115	40,245	Computed Losses (-), Gains (+)
							California Aqueduct, Teerink Pumping Plant to Chrisman Pumping Plant
136,004	130,891	136,920	139,633	129,347	95,106	1,367,272	Inflow, Teerink Pumping Plant
6,859	4,310	2,950	2,346	341	214	31,192	Deliveries to Contracting State Agencies
126,853	125,358	131,881	136,412	128,164	93,184	1,319,234	Outflow, Chrisman Pumping Plant
-30	-11	-18	68	-47	28	35	Change in Storage
-2,322	-1,234	-2,107	-807	-889	-1,681	-16,811	Computed Losses (-), Gains (+)
							California Aqueduct, Chrisman Pumping Plant to Edmonston Pumping Plant
126,853	125,358	131,881	136,412	128,164	93,184	1,319,234	Inflow, Chrisman Pumping Plant
3,015	2,315	1,992	1,452	57	3	15,370	Deliveries to Contracting State Agencies
122,930	121,116	128,021	132,801	126,336	92,802	1,288,666	Outflow, Edmonston Pumping Plant
-34	-15	78	-63	118	-73	136	Change in Storage
-942	-1,942	-1,790	-2,222	-1,653	-452	-15,063	Computed Losses (-), Gains (+)
							Coastal Branch, California Aqueduct
14,898	13,177	8,801	3,766	1,828	2,154	87,173	Inflow, Las Perillas P.P.
0	0	0	0	0	0	0	B.M.W.S.D. Pumpback
14,709	13,419	8,896	3,961	1,822	2,209	87,915	Deliveries to Contracting State Agencies
0	0	0	0	0	0	0	Deliveries to Fed. Customers
14	8	-5	9	-1	1	13	Change in Storage
-176	250	90	204	-7	56	755	Computed Losses (-), Gains (+)

**Table 22. Summary of California Aqueduct Operation
2001**

(in acre-feet)

Description	Jan	Feb	Mar	Apr	May	Jun
SOUTHERN FIELD DIVISION						
California Aqueduct, Edmonston Pumping Plant to Junction of West Branch						
Inflow, Edmonston Pumping Plant	98,632	51,050	79,541	83,772	141,622	110,043
Outflow, West Branch	50,679	19,023	22,244	26,835	69,476	40,283
Outflow, East Branch	47,939	32,020	57,269	56,905	72,030	69,651
Change in Storage	1	-4	3	0	16	-6
Computed Losses (-), Gains (+)	-13	-11	-25	-32	-100	-115
California Aqueduct, Junction of West Branch to Pearblossom P.P.						
Inflow (Aqueduct)	47,939	32,020	57,269	56,905	72,030	69,651
Inflow (L.A.D.W.P.)	0	0	0	0	0	0
Deliveries to Contracting State Agencies	3,684	2,417	2,880	3,956	7,509	9,810
Outflow, Pearblossom P.P.	43,294	28,706	52,361	50,614	62,299	57,132
Change in Storage	21	121	155	-53	-212	-88
Computed Losses (-), Gains (+)	-940	-776	-1,873	-2,388	-2,434	-2,797
California Aqueduct, Pearblossom P.P. to Silverwood Lake						
Inflow, Pearblossom P.P.	43,294	28,706	52,361	50,614	62,299	57,132
Deliveries (Exchange of Natural Inflow)	84	20	577	280	655	256
Exchange of Natural Inflow (Los Flores T.O.)	84	285	1,321	765	649	189
Outflow to Silverwood Lake	45,612	29,008	51,974	50,907	62,860	58,370
Change in Storage	-336	164	-234	411	-389	61
Computed Losses (-), Gains (+)	2,150	771	1,277	1,749	1,476	1,744
Silverwood Lake Operation						
Inflow, Project	45,612	29,008	51,974	50,907	62,860	58,370
Inflow, Natural	142	2,036	2,003	1,094	347	56
Deliveries to Contracting State Agencies	112	100	98	97	132	160
Recreation Deliveries	2	2	1	4	10	10
Outflow, Natural Inflow Released	12	607	641	75	13	12
Outflow, At San Bernardino Tunnel	47,723	33,923	50,296	54,736	59,560	61,832
Change in storage	-1,516	-2,189	2,959	-2,193	3,429	-3,709
Computed Losses (-), Gains (+)	579	1,399	18	718	-63	-121
California Aqueduct, Silverwood Lake to Lake Perris						
Inflow, SBMWD Reverse Flow	0	0	0	0	0	0
Inflow, San Bernardino Tunnel	47,723	33,923	50,296	54,736	59,560	61,832
Inflow, From 28J	0	0	0	0	0	0
Deliveries to Contracting State Agencies	44,084	33,543	41,839	37,501	56,354	59,792
Outflow to Lake Perris	4,386	926	9,630	19,739	3,878	2,698
Change in Storage	119	-153	124	66	-64	-100
Operational Losses (-), Gains (+)	866	393	1,297	2,570	608	558
Lake Perris Operation						
Inflow	4,386	926	9,630	19,739	3,878	2,698
Deliveries to Contracting State Agencies	14,040	490	1,089	9,980	907	266
Recreation Deliveries	26	13	13	21	41	37
Outflow (Reverse Flow)	0	0	0	0	0	0
Change in Storage	-10,490	314	7,115	6,698	1,054	396
Computed Losses (-), Gains (+)	-810	-109	-1,413	-3,040	-1,876	-1,999

**Table 22. Summary of California Aqueduct Operations
2001**

(in acre-feet)

Jul	Aug	Sep	Oct	Nov	Dec	Total	Description
							SOUTHERN FIELD DIVISION
							California Aqueduct, Edmonston Pumping Plant to Junction of West Branch
122,930	121,116	128,021	132,801	126,336	92,802	1,288,666	Inflow, Edmonston Pumping Plant
45,324	45,538	60,052	63,717	64,924	41,453	549,548	Outflow, West Branch
77,563	75,536	67,957	69,044	61,399	51,338	738,651	Outflow, East Branch
-1	-1	-3	4	1	-4	6	Change in Storage
-44	-43	-15	-36	-12	-15	-461	Computed Losses (-), Gains (+)
							California Aqueduct, Junction of West Branch to Pearblossom P.P.
77,563	75,536	67,957	69,044	61,399	51,338	738,651	Inflow (Aqueduct)
0	0	0	0	0	0	0	Inflow (L.A.D.W.P.)
10,803	10,825	8,833	7,143	3,927	2,730	74,517	Deliveries to Contracting State Agencies
63,657	61,104	58,068	58,907	56,955	47,207	640,304	Outflow, Pearblossom P.P.
-165	433	-54	310	-386	279	361	Change in Storage
-3,268	-3,174	-1,110	-2,684	-903	-1,122	-23,469	Computed Losses (-), Gains (+)
							California Aqueduct, Pearblossom P.P. to Silverwood Lake
63,657	61,104	58,068	58,907	56,955	47,207	640,304	Inflow, Pearblossom P.P.
105	250	190	330	234	67	3,048	Deliveries (Exchange of Natural Inflow)
64	58	75	86	52	0	3,628	Exchange of Natural Inflow (Los Flores T.O.)
65,753	62,522	58,999	60,837	56,199	47,294	650,335	Outflow to Silverwood Lake
-86	260	-29	-276	548	-13	81	Change in Storage
2,179	1,986	1,167	2,070	78	141	16,788	Computed Losses (-), Gains (+)
							Silverwood Lake Operation
65,753	62,522	58,999	60,837	56,199	47,294	650,335	Inflow, Project
0	0	0	0	0	16	5,694	Inflow, Natural
180	209	182	167	118	102	1,657	Deliveries to Contracting State Agencies
13	12	11	8	3	2	78	Recreation Deliveries
12	12	11	12	11	11	1,429	Outflow, Natural Inflow Released
64,082	63,199	56,590	59,134	56,541	47,610	655,226	Outflow, At San Bernardino Tunnel
1,014	-1,332	2,572	917	19	-411	-440	Change in storage
-452	-422	367	-599	493	4	1,921	Computed Losses (-), Gains (+)
							California Aqueduct, Silverwood Lake to Lake Perris
0	0	0	0	0	0	0	Inflow, SBMWD Reverse Flow
64,082	63,199	56,590	59,134	56,541	47,610	655,226	Inflow, San Bernardino Tunnel
0	0	0	0	0	0	0	Inflow, From 28J
59,090	58,436	52,737	57,158	56,160	41,255	597,949	Deliveries to Contracting State Agencies
5,901	5,712	4,733	2,647	892	7,753	68,895	Outflow to Lake Perris
-13	25	-95	66	19	468	462	Change in Storage
896	974	785	737	530	1,866	12,080	Operational Losses (-), Gains (+)
							Lake Perris Operation
5,901	5,712	4,733	2,647	892	7,753	68,895	Inflow
278	443	286	300	325	10,992	39,396	Deliveries to Contracting State Agencies
47	52	41	36	27	20	374	Recreation Deliveries
0	0	0	0	0	0	0	Outflow (Reverse Flow)
3,296	2,568	2,272	656	-701	-4,995	8,183	Change in Storage
-2,280	-2,649	-2,134	-1,655	-1,241	-1,736	-20,942	Computed Losses (-), Gains (+)

**Table 22. Summary of California Aqueduct Operation
2001
(in acre-feet)**

Description	Jan	Feb	Mar	Apr	May	Jun
SOUTHERN FIELD DIVISION (Cont.)						
West Branch California Aqueduct Tehachapi Afterbay to Oso P.P.						
Inflow	50,679	19,023	22,244	26,835	69,476	40,283
Outflow, Oso Pumping Plant	50,638	19,002	22,157	26,737	69,438	40,247
Change in Storage	3	-12	9	-1	5	-2
Computed Losses (-), Gains (+)	-38	-33	-78	-99	-33	-38
West Branch California Aqueduct Oso P.P. to Pyramid Lake						
Inflow, Oso P.P.	50,638	19,002	22,157	26,737	69,438	40,247
Deliveries to Contracting State Agencies	0	0	0	0	0	0
Outflow Through Warne to Pyramid Lake	50,451	20,181	20,765	26,458	68,904	39,148
Change in Storage	-52	-1,120	1,160	-204	-437	1
Operational Losses (-), Gains (+)	-239	59	-232	-483	-971	-1,098
Pyramid Lake Operation						
Inflow, Project	50,451	20,181	20,765	26,458	68,904	39,148
Inflow, Natural	1,206	2,828	28,765	6,309	2,644	876
Inflow, Pumpback from Elderberry Forebay	76,404	71,827	82,745	90,625	123,063	108,965
Deliveries (Fish Enhancement)	0	0	0	0	0	0
Deliveries to Contracting State Agencies	0	0	0	0	0	0
Deliveries to Dept. of Parks and Rec. (State)	0	0	0	0	2	1
Outflow, Pyramid Diversion	331	296	30,257	3,490	1,537	1,546
Outflow, Angeles Tunnel	134,847	92,948	96,868	122,508	195,867	148,111
Change in Storage	-7,562	2,159	7,038	-3,828	-6,047	-2,537
Computed Losses (-), Gains (+)	-445	567	1,888	-1,222	-3,252	-1,868
Elderberry Forebay Operation						
Inflow, Project through Castaic P-G Plant	134,847	92,948	96,868	122,508	195,867	148,111
Inflow, Natural	260	3,540	4,458	802	164	9
Outflow, Pumpback to Pyramid Lake	76,404	71,827	82,745	90,625	123,063	108,965
Outflow, Released to Castaic Lake /1	54,365	31,957	24,621	28,153	69,850	35,228
Change in Storage	4,365	-814	-6,068	4,131	2,684	4,158
Computed Losses (-), Gains (+)	27	6,482	-28	-401	-434	231
Castaic Lake Operation						
Inflow, /1	54,365	31,957	24,621	28,153	69,850	35,228
Inflow, Natural	230	1,870	1,508	628	170	23
Deliveries to Contracting State Agencies	39,210	27,261	37,018	64,459	42,036	43,768
Deliveries to Recreation /2	16	8	6	15	28	31
Outflow, (LADWP)	0	0	0	0	0	0
Outflow, Project to Castaic Lagoon	292	762	1,367	978	313	179
Change in Storage	14,971	1,272	-11,647	-35,573	28,560	-9,774
Computed Losses (-), Gains (+)	-106	-4,524	615	1,098	917	-1,047
Castaic Lagoon Operation						
Inflow (Recreation Deliveries)	0	0	0	0	0	179
Inflow, Project	292	762	1,367	978	313	0
Inflow, Non-project	0	0	0	0	0	0
Outflow	53	445	1,278	927	283	124
Deliveries to Recreation (State)	52	49	75	61	73	147
Change in Storage	187	268	14	-10	-43	-92
Computed Losses (-), Gains (+)	0	0	0	0	0	0

**Table 22. Summary of California Aqueduct Operations
2001**

(in acre-feet)

Jul	Aug	Sep	Oct	Nov	Dec	Total	Description
							SOUTHERN FIELD DIVISION (Cont.)
							West Branch California Aqueduct Tehachapi Afterbay to Oso P.P.
45,324	45,538	60,052	63,717	64,924	41,453	549,548	Inflow
45,193	45,408	60,015	63,593	64,884	41,418	548,730	Outflow, Oso Pumping Plant
-4	-2	-9	12	3	-12	-10	Change in Storage
-135	-132	-46	-112	-37	-47	-828	Computed Losses (-), Gains (+)
							West Branch California Aqueduct Oso P.P. to Pyramid Lake
45,193	45,408	60,015	63,593	64,884	41,418	548,730	Inflow, Oso P.P.
0	0	0	0	0	0	0	Deliveries to Contracting State Agencies
43,968	45,132	58,706	64,214	62,928	41,546	542,401	Outflow Through Warne to Pyramid Lake
196	-424	722	-1,080	1,714	-347	129	Change in Storage
-1,029	-700	-587	-459	-242	-219	-6,200	Operational Losses (-), Gains (+)
							Pyramid Lake Operation
43,968	45,132	58,706	64,214	62,928	41,546	542,401	Inflow, Project
687	449	514	540	755	816	46,389	Inflow, Natural
114,674	112,144	100,419	64,190	54,042	52,425	1,051,523	Inflow, Pumpback from Elderberry Forebay
0	0	0	0	0	0	0	Deliveries (Fish Enhancement)
0	0	0	0	0	0	0	Deliveries to Contracting State Agencies
3	2	2	2	1	0	13	Deliveries to Dept. of Parks and Rec. (State)
1,620	1,613	1,050	408	362	377	42,887	Outflow, Pyramid Diversion
147,001	156,900	148,844	126,034	122,566	83,784	1,576,278	Outflow, Angeles Tunnel
5,299	-4,994	6,105	-350	-6,425	8,924	-2,218	Change in Storage
-5,406	-4,204	-3,638	-2,850	-1,221	-1,702	-23,353	Computed Losses (-), Gains (+)
							Elderberry Forebay Operation
147,001	156,900	148,844	126,034	122,566	83,784	1,576,278	Inflow, Project through Castaic P-G Plant
0	0	0	0	0	11	9,244	Inflow, Natural
114,674	112,144	100,419	64,190	54,042	52,425	1,051,523	Outflow, Pumpback to Pyramid Lake
38,570	40,075	57,266	59,124	62,806	36,277	538,292	Outflow, Released to Castaic Lake /1
-4,992	3,846	-8,338	2,241	5,050	-5,435	828	Change in Storage
1,251	-835	503	-479	-668	-528	5,121	Computed Losses (-), Gains (+)
							Castaic Lake Operation
38,570	40,075	57,266	59,124	62,806	36,277	538,292	Inflow, 1/
0	0	0	0	17	82	4,528	Inflow, Natural
47,418	40,251	40,529	71,469	52,605	40,522	546,546	Deliveries to Contracting State Agencies
43	56	40	30	6	10	289	Deliveries to Recreation 2/
0	0	0	0	0	0	0	Outflow, (LADWP)
192	394	190	0	0	0	4,667	Outflow, Project to Castaic Lagoon
-6,973	623	16,997	-11,867	10,018	-3,802	-7,195	Change in Storage
2,110	1,249	490	508	-194	371	1,487	Computed Losses (-), Gains (+)
							Castaic Lagoon Operation
192	394	190	0	0	0	955	Inflow (Recreation Deliveries)
0	0	0	0	0	0	3,712	Inflow, Project
0	0	0	0	0	0	0	Inflow, Non-project
149	176	75	89	122	86	3,807	Outflow
0	0	0	0	0	0	457	Deliveries to Recreation (State)
-96	72	-10	-246	-172	-130	-258	Change in Storage
-139	-146	-125	-157	-50	-44	-661	Computed Losses (-), Gains (+)

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).

groundwater - 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.

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

groundwater 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.

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

groundwater 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.