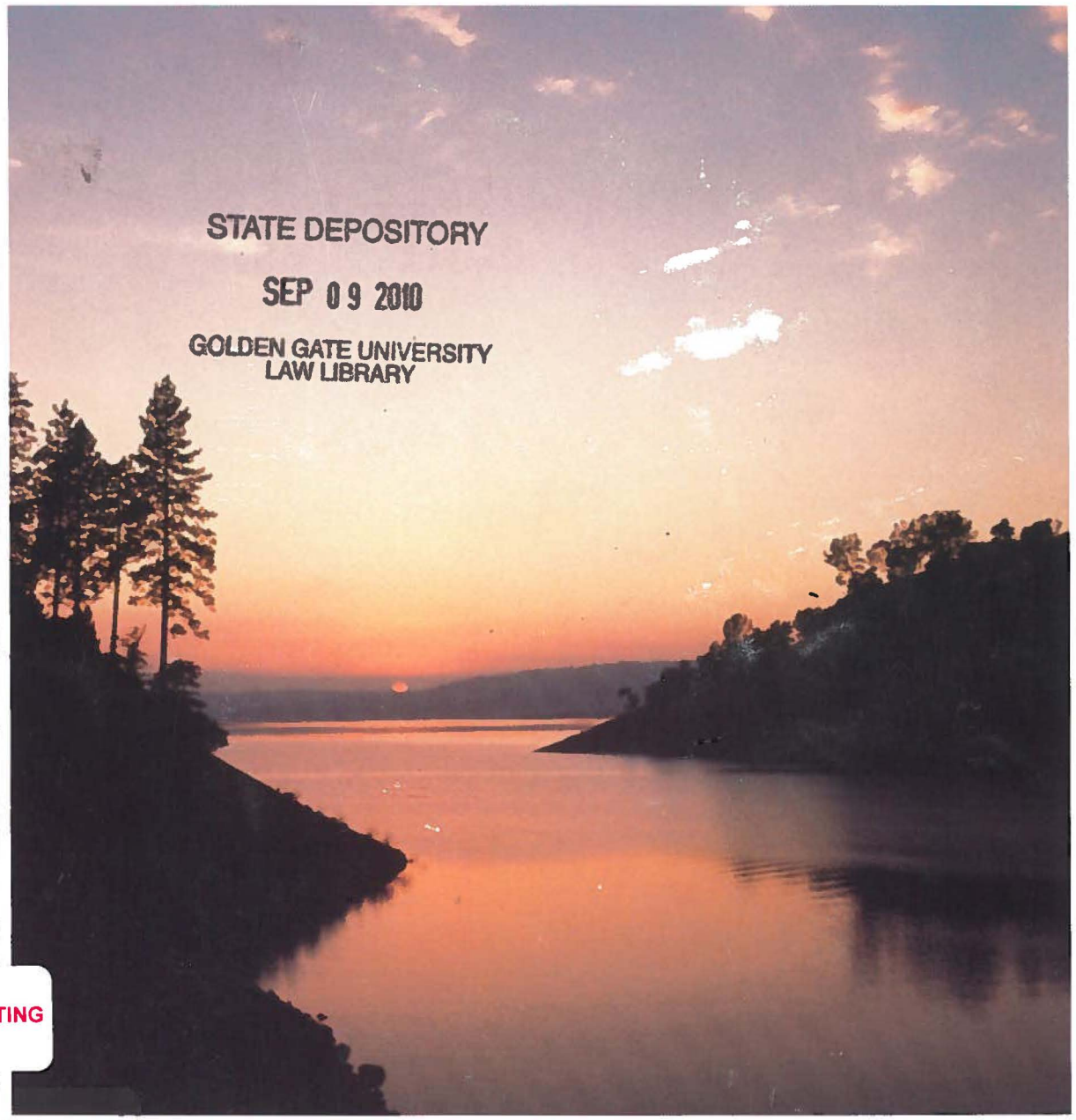
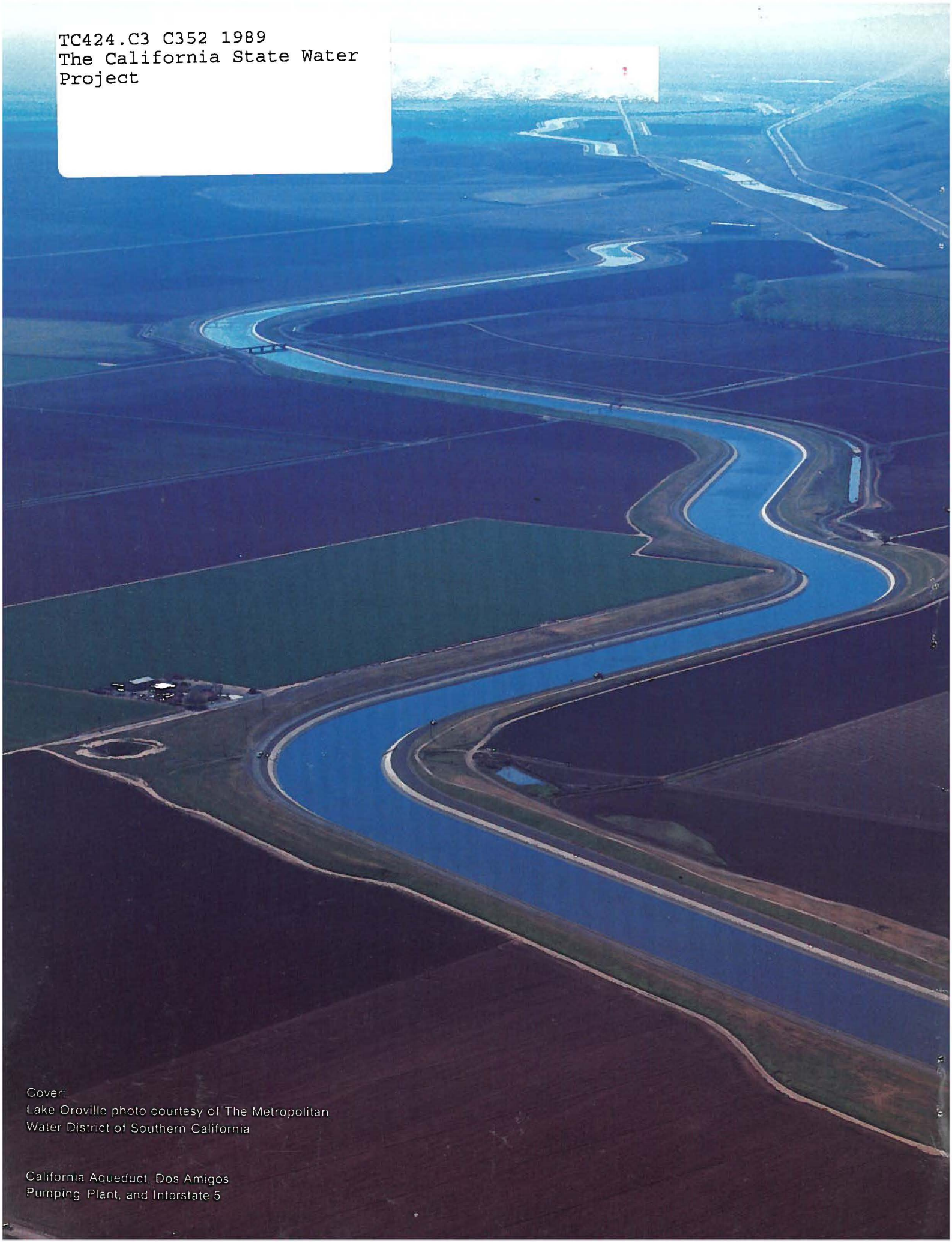
1989

The California State Water Project

Department of Water Resources

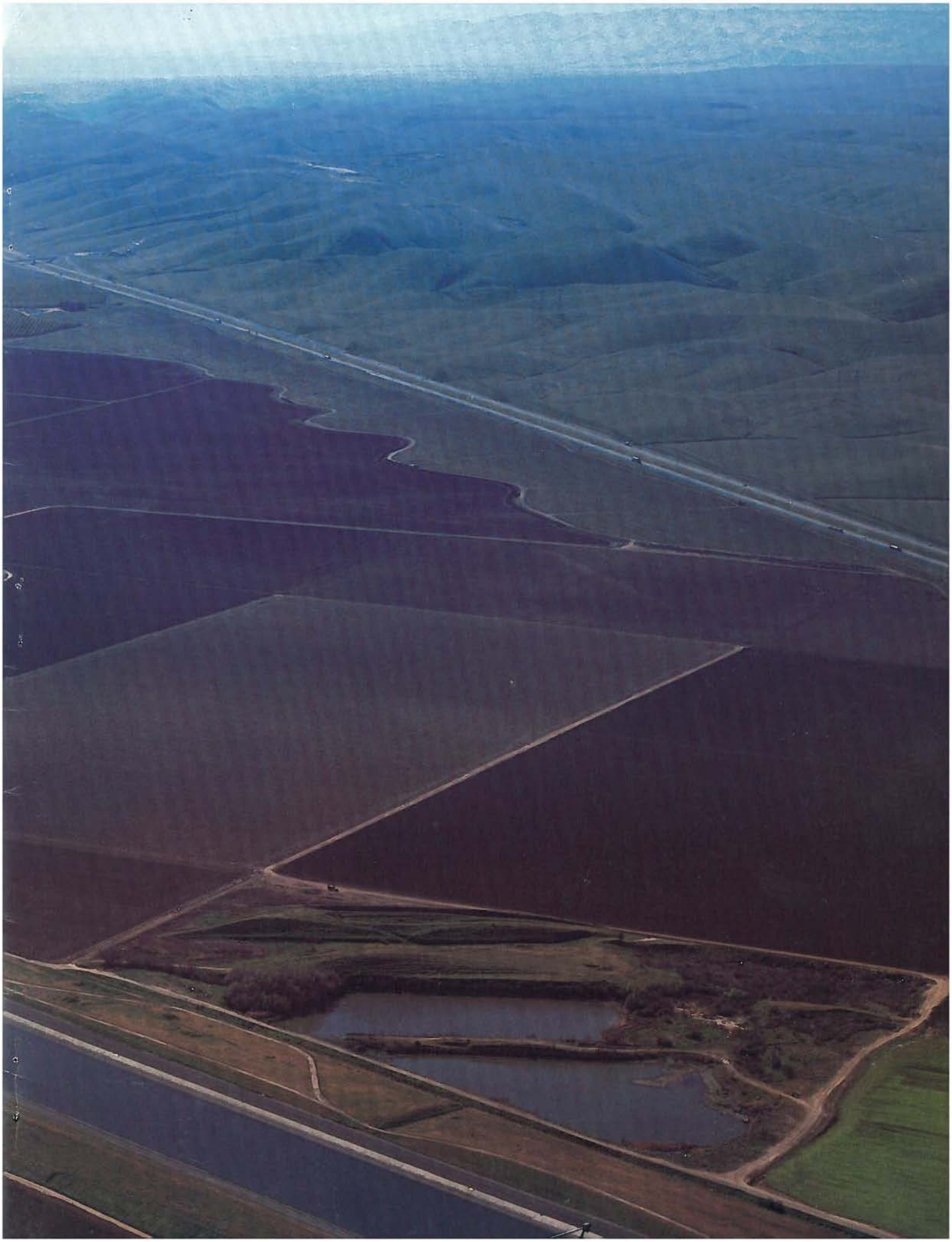
THE CALIFORNIA STATE WATER PROJECT





Cover:
Lake Oroville photo courtesy of The Metropolitan Water District of Southern California

California Aqueduct, Dos Amigos Pumping Plant, and Interstate 5



OVERVIEW - CALIFORNIA

The California State Water Project is a water storage and delivery system of reservoirs, aqueducts, powerplants and pumping plants. It extends for more than 600 miles—two-thirds the length of California. Planned, built and operated by the California Department of Water Resources, it is the largest state-built, multi-purpose water project in the country. The Project's main purpose is water supply — that is, to store surplus water during wet periods and distribute it to areas of need in Northern California, the San Francisco Bay Area, the San Joaquin Valley, and Southern California. Other project functions include flood control, power generation, recreation, and fish and wildlife enhancement.

Overall, nature provides enough water to meet California's present and future needs; but this supply varies widely from year to year, season to season, and area to area. Sometimes floods and droughts occur in the same year; the wettest areas are in Northern California, while most of California's people and irrigated lands are in the drier central and southern portions of the State. California's challenge is how best to conserve, control and deliver enough water to meet its needs where and when they occur.

Following World War II, traditional water development by local and federal governments was not keeping pace with the needs of California's expanding population. So, in 1951, the California Legislature authorized what is now the State Water Project. In 1960, California voters approved the Legislature's 1959 Water Resources Development Bond Act to help finance the Project.

All costs for water development, operation and maintenance, fish and wildlife preservation (mitigation), and power are repaid, with interest, by the water supply contractors. Costs for flood control are paid by the federal government and costs for recreation and fish and wildlife enhancement are paid by the State.

Oroville Reservoir

California Aqueduct

Water Supply

The State has contracts to supply up to 4.2 million acre-feet of water annually from the State Water Project to 30 public agencies. (An acre-foot is 325,851 gallons.) Approximately 30 percent of this water is used to irrigate farmland, and 70 percent will be used to meet the needs of the State's growing population.

Today, nearly 19 million people—more than two-thirds of all Californians—receive part of their water supply from the State Water Project. Project water is also supplied to more than 600,000 acres of irrigated farmland.

STATE WATER PROJECT

Flood Control

Much of California's development has occurred on low-lying lands that are subject to flooding under natural conditions. Where feasible, flood control provisions were incorporated into the Project to protect such areas. Storage space was provided in Oroville and Del Valle Lakes to capture flood flows. In Kern County an interconnection was built to divert Kern River flood flows into the California Aqueduct.

Recreation, Fish and Wildlife

The need for more and better opportunities for water-associated recreation parallels population growth. Preservation and enhancement of fish and wildlife habitat are also important. The State Water Project was designed and built with these needs in mind.

From the Feather River to Southern California, facilities for anglers, boaters, picnickers, campers, cyclists, and other visitors have been provided at Project lakes and waterways where appropriate. Approximately 98 million recreation-days of use were recorded at Project recreation facilities from 1962 through 1988. (A recreation-day is the visit of one person to a recreation area for any part of one day.)

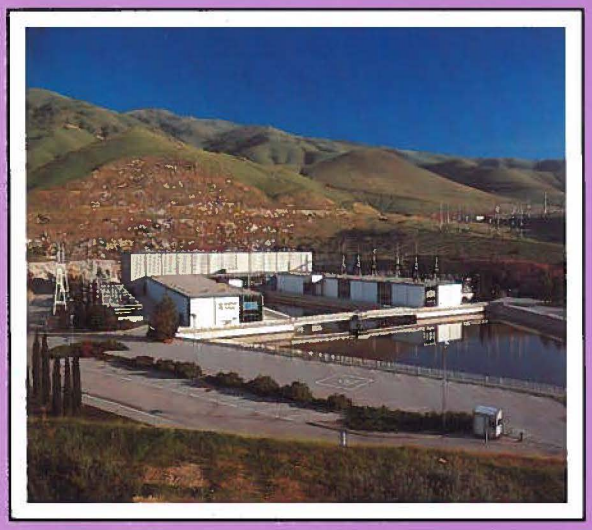
Stream flow maintenance, fish hatcheries, fish screens, mitigation agreements, and salinity control gates are among the provisions for fish and wildlife. In addition, the California Department of Fish and Game operates an annual fish stocking program at Project reservoirs and lakes.

Power

Great quantities of electrical energy are needeeded to transport water long distances and pump it over hilly terrain to serve the water contractors. To help generate this power, eight hydroelectric power plants have been built as part of the Project. These produce nearly half of the energy needed by the Project for pumping. The remaining energy comes from other sources, including coal-fired and geothermal plants built by the Project.

Salinity Control

The State Water Project, in cooperation with the federal Central Valley Project, is operated to limit salinity intrusion into the Sacramento-San Joaquin Delta and Suisun Marsh. □



Edmonston Pumping Plant

Lake Del Valle

COORDINATION WITH

The federal Central Valley Project is a large multi-purpose water project. It includes 20 reservoirs, 500 miles of canals, and other facilities. Its primary purpose is to provide water for irrigation throughout California's great Central Valley. Other functions include urban water supply, water quality, flood control, power, recreation, and fish and wildlife enhancement.

Some facilities of the Central Valley Project and the California State Water Project were developed to be used jointly by both projects. These include San Luis Reservoir, O'Neill Forebay, more than 100 miles of the California Aqueduct, and related pumping facilities. Costs and facilities are shared approximately 55 percent State and 45 percent federal.

San Luis Reservoir stores surplus water pumped from the Sacramento–San Joaquin Delta through the California Aqueduct (State) and the Delta–Mendota Canal (federal) during periods of heavy precipitation and snowmelt. Later in the year, the stored water is released for distribution to State and federal service areas.

More recently, the federal government participated in the funding of the State-constructed Suisun Marsh protection facilities.

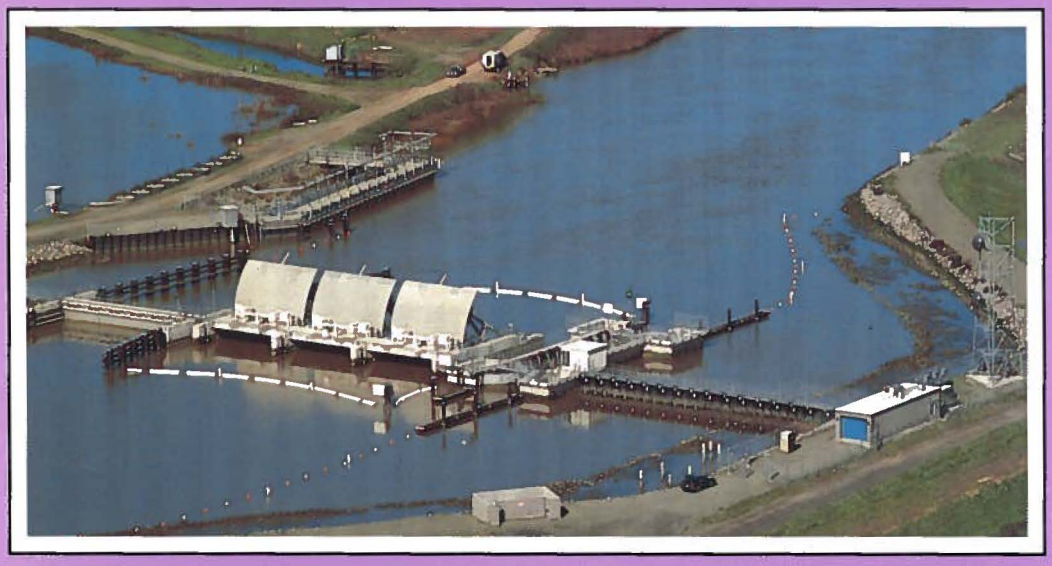
In addition to the joint-use facilities, operation of the two projects is coordinated to manage available supplies efficiently and economically.

CENTRAL VALLEY PROJECT

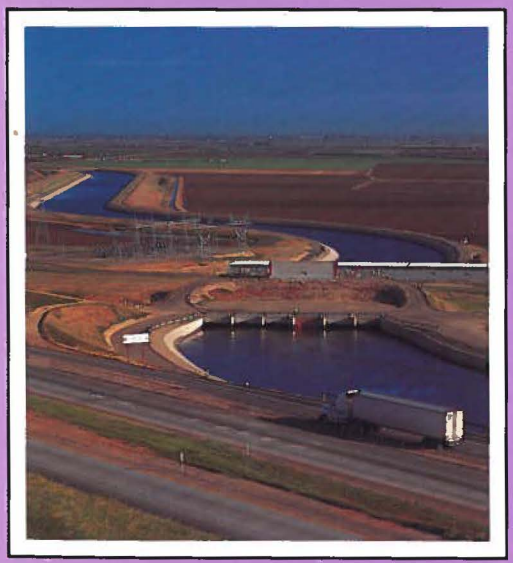
During periods of controlled flow (summer, fall, and dry years) coordinated operation focuses on the Delta. Releases from reservoirs to natural river channels must be carefully balanced to satisfy in-basin needs for water supply, navigation, and fisheries; in-Delta irrigation needs; Delta salinity control standards; and Delta diversion requirements of the State and federal projects.

In November 1986, officials of the two projects signed a Coordinated Operation Agreement. This signing followed Congressional authorization of the agreement in October 1986. In addition to formalizing the previous annual operational arrangements, this agreement permits increased operational efficiency of both projects, ensures that each project receives an equitable share of available surplus water, and provides for sharing responsibilities in meeting present Delta water quality standards.

The agreement also requires that the parties negotiate a contract for the State Project to transport water for the federal project through the California Aqueduct, and for the federal project to sell an equal amount of water to the State Project. □



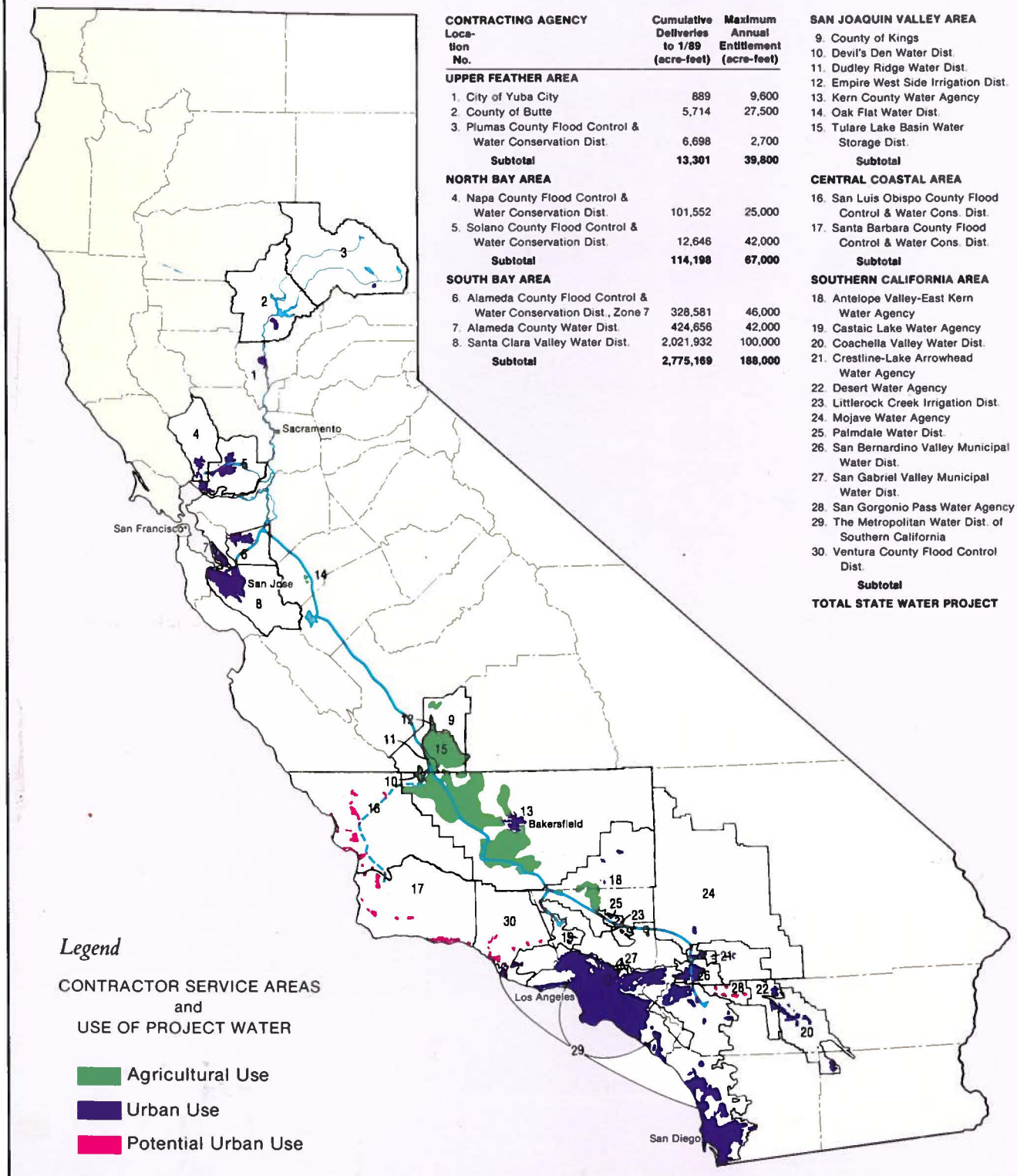
Suisun Marsh
Salinity Control Gates



Dos Amigos Pumping Plant

San Luis Reservoir

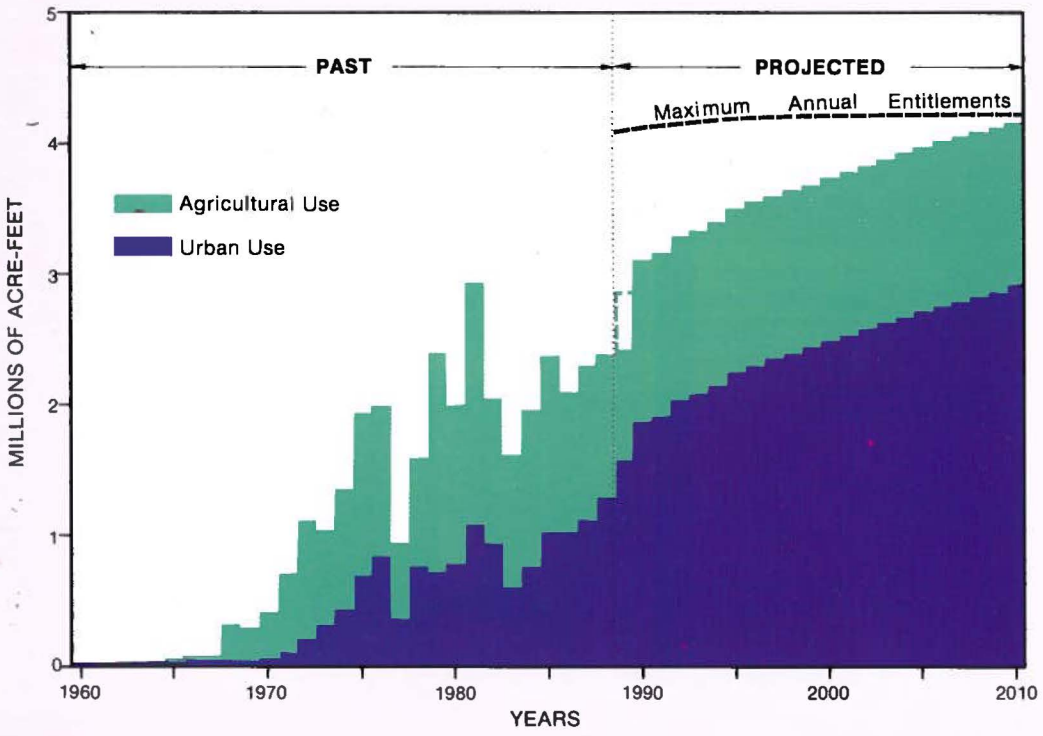
WATER CONTRACTORS AND SERVICE AREAS



Location No.	CONTRACTING AGENCY	Cumulative Deliveries to 1/89 (acre-feet)	Maximum Annual Entitlement (acre-feet)
	UPPER FEATHER AREA		
1.	City of Yuba City	889	9,600
2.	County of Butte	5,714	27,500
3.	Plumas County Flood Control & Water Conservation Dist.	6,698	2,700
	Subtotal	**13,301**	**39,800**
	NORTH BAY AREA		
4.	Napa County Flood Control & Water Conservation Dist.	101,552	25,000
5.	Solano County Flood Control & Water Conservation Dist.	12,646	42,000
	Subtotal	**114,198**	**67,000**
	SOUTH BAY AREA		
6.	Alameda County Flood Control & Water Conservation Dist., Zone 7	328,581	46,000
7.	Alameda County Water Dist.	424,656	42,000
8.	Santa Clara Valley Water Dist.	2,021,932	100,000
	Subtotal	**2,775,169**	**188,000**
	SAN JOAQUIN VALLEY AREA		
9.	County of Kings	45,900	4,000
10.	Devil's Den Water Dist.	318,146	12,700
11.	Dudley Ridge Water Dist.	1,128,792	57,700
12.	Empire West Side Irrigation Dist.	71,972	3,000
13.	Kern County Water Agency	15,514,754	1,153,400
14.	Oak Flat Water Dist.	119,171	5,700
15.	Tulare Lake Basin Water Storage Dist.	2,337,185	118,500
	Subtotal	**19,535,920**	**1,355,000**
	CENTRAL COASTAL AREA		
16.	San Luis Obispo County Flood Control & Water Cons. Dist.	0	25,000
17.	Santa Barbara County Flood Control & Water Cons. Dist.	0	45,486
	Subtotal	**0**	**70,486**
	SOUTHERN CALIFORNIA AREA		
18.	Antelope Valley-East Kern Water Agency	580,443	138,400
19.	Castaic Lake Water Agency	98,847	41,500
20.	Coachella Valley Water Dist.	188,859	23,100
21.	Crestline-Lake Arrowhead Water Agency	19,669	5,800
22.	Desert Water Agency	298,800	38,100
23.	Littlerock Creek Irrigation Dist.	6,506	2,300
24.	Mojave Water Agency	57,615	50,800
25.	Palmdale Water Dist.	11,803	17,300
26.	San Bernardino Valley Municipal Water Dist.	195,278	102,600
27.	San Gabriel Valley Municipal Water Dist.	88,943	28,800
28.	San Gorgonio Pass Water Agency	0	17,300
29.	The Metropolitan Water Dist. of Southern California	8,789,466	2,011,500
30.	Ventura County Flood Control Dist.	0	20,000
	Subtotal	**10,336,229**	**2,497,500**
	TOTAL STATE WATER PROJECT	**32,774,817**	**4,217,786**

WATER ENTITLEMENTS AND WATER DELIVERIES

STATE WATER PROJECT ANNUAL WATER DELIVERIES



Contracting Agencies, Water Entitlements, and Deliveries

Thirty public agencies have long-term water supply contracts with the State Water Project for an ultimate total of 4,217,786 acre-feet a year. In most cases, Project water supplements local or other imported supplies.

In the southern San Joaquin Valley, Project water is mostly used for irrigated agriculture, while in the other service areas, Project water satisfies mostly urban needs. The map on the facing page shows the agencies' locations and the areas receiving (directly or indirectly) at least part of their water from the Project. The type of use is also shown. Potential use is shown for contractors that have not yet started receiving water.

The basic provisions in all the water supply contracts are essentially uniform. The contracts run until 2035. Each contract contains a schedule of the amount of water the agency is entitled to receive each year. For most contracts, the amounts increase yearly up to the maximum annual entitlement. The table on the facing page lists the agencies and shows total water deliveries to January 1989, and the maximum annual entitlement of each agency.

Originally, it was estimated that all contractors would need their maximum entitlements by about 1990. While this held true for agricultural contractors, slower population growth and increased conservation measures now indicate that the maximum entitlement deliveries for urban contractors will not be needed until after 2010.

The contracts also contain provisions for water shortages. Agricultural deliveries are cut first by up to 50 percent in any one year (or 100 percent in any seven consecutive years). Beyond that initial reduction, both agricultural and urban deliveries are reduced by the same percentage. For example, in the drought year 1977, agricultural deliveries were reduced 60 percent and urban deliveries were cut 10 percent.

The chart above shows both past and projected water deliveries to the year 2010. As we entered 1989 following a two-year dry period, a 40 percent reduction in agricultural deliveries was projected for 1989, as shown on the chart. □

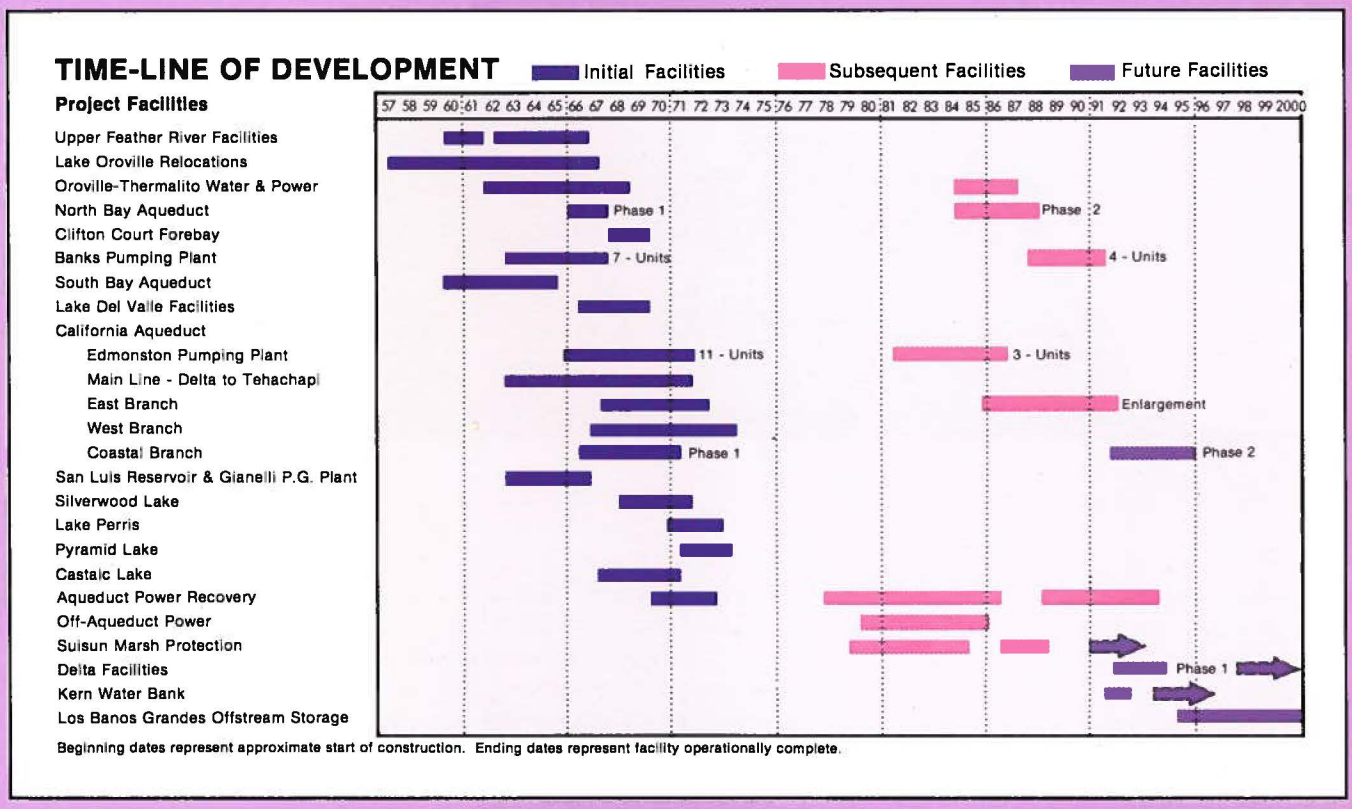
TIME-LINE OF PROJECT DEVELOPMENT

The State Water Project is being built in stages. Scheduling emphasized urgently needed flood control and early delivery of water to areas of pressing need.

was able to deliver water in the San Joaquin Valley. By 1973, the initial facilities were completed, allowing water delivery to Lake Perris, the Project's southernmost point.

the Suisun Resource Conservation District.

In the 1990s, development will focus on authorized facilities to bring water to



Project construction began in 1957 with the start of relocation of the Western Pacific Railroad and Highway 70 near Oroville. In 1962, the first water deliveries were made from the partially completed South Bay Aqueduct, and work started on Oroville Dam and the joint-use San Luis facilities.

In 1963, work began on the California Aqueduct, and by 1968, the Project

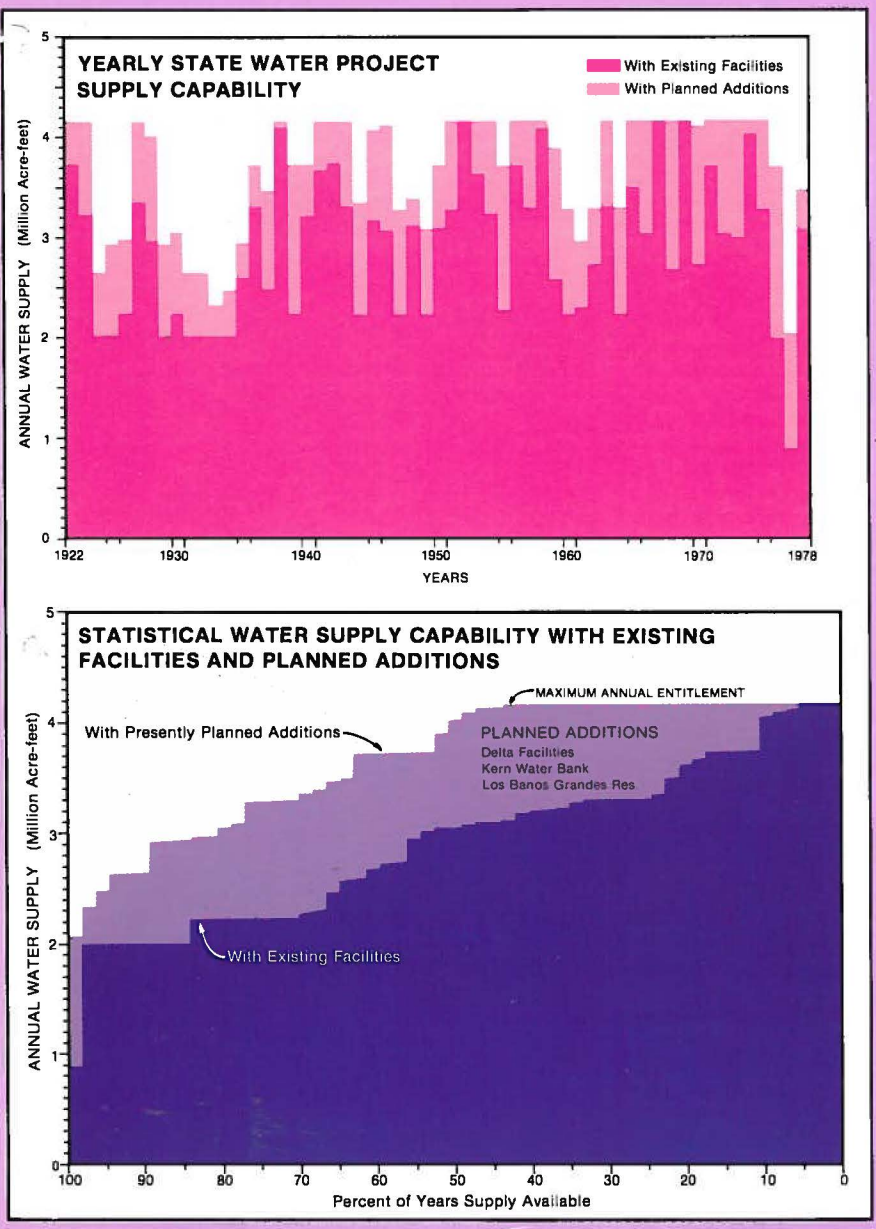
Since the late 1970s, development efforts have centered on adding pumping units that were initially deferred, building power plants where economically justified, enlarging or extending aqueduct reaches, and constructing facilities to protect water quality in the Suisun Marsh. The marsh facilities were constructed by the State under a joint agreement with the U. S. Bureau of Reclamation and

San Luis Obispo and Santa Barbara counties and to augment Project water supply capability. Planning and environmental impact studies are in progress for these future facilities. □

WATER SUPPLY CAPABILITY, YIELD

The water supply capability of the State Water Project depends on probabilities of rainfall, snowpack, runoff, pumping capacity from the Delta, and legal constraints on Project operation.

The water supply contracts call for an ultimate firm yield of 4.2 million acre-feet per year. Firm yield is the dependable annual water supply that could be made available in all years, without exceeding specified shortages in agricultural deliveries during droughts.



The calculated firm yield from existing Project facilities is about 2.4 million acre-feet per year. About half of this water comes from Lake Oroville and the rest from surplus flow in the Delta, some of which is temporarily stored in San Luis Reservoir.

Since contractor requests for water now exceed dependable supplies, current operation is based on risk analysis using the concept of probabilities. This procedure permits higher deliveries in most years, but at the expense of reduced deliveries in the driest years. The upper chart illustrates this type of operation using historic water supply from 1922 — 1978, adjusted for future conditions of water use.

As shown on the lower chart, there is a 50 percent chance the Project can deliver 3 million acre-feet and a 98 percent chance of delivering 2 million acre-feet in any given year with existing facilities. With Project additions—Delta facilities, Kern Water Bank, and Los Banos Grandes—planned to be in place by the turn of the century, delivery capability would be increased to a 50 percent chance of 4 million acre-feet and an 85 percent chance of 3 million acre-feet.

The long-term average annual supply available from existing facilities and with planned additions is estimated to be 2.9 and 3.7 million acre-feet, respectively. □

STATE WATER

PUMPING PLANTS

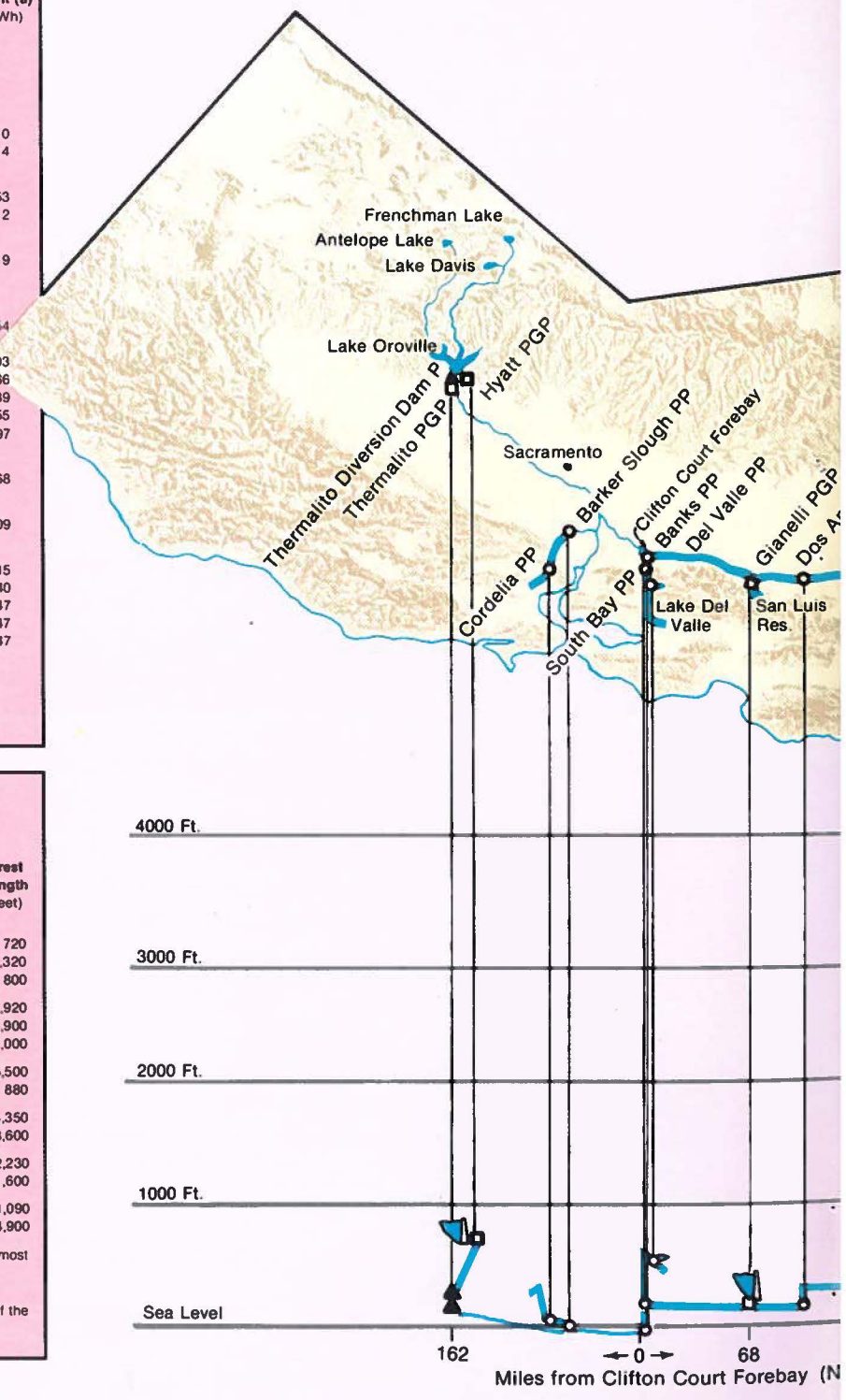
Name	Number of Units	Normal Static Head (feet)	Total Motor Rating (hp)	Annual Energy Requirement (a) (million kWh)
Oroville Complex				
Hyatt Pumping-Generating Plant	3	500-600	519,000	(b)
Thermalito Pumping-Generating Plant	3	85-102	120,000	(b)
North Bay Aqueduct				
Barker Slough	10(c)	120	4,800	10
Cordelia	11	100-380	5,600	14
South Bay Aqueduct				
South Bay	9	545-566	27,750	153
Del Valle	4	0-38	1,000	2
California Aqueduct				
Banks	11	244	333,000	1,119
San Luis joint-use Facilities				
Gianelli Pumping-Generating Plant	8	99-327	504,000	
SWP Share			264,000	254
Dos Amigos	6	113	240,000	
SWP Share			130,000	493
Buena Vista	10(c)	205	144,500	566
Wheeler Ridge	9(c)	233	150,000	639
Chrisman	9(c)	518	330,000	1,355
Edmonston	14(c)	1,926	1,120,000	4,697
East Branch				
Pearblossom	11	542	263,000	868
West Branch				
Oso	8	231	93,800	209
Coastal Branch				
Las Perillas	6	55	4,050	15
Badger Hill	6	151	11,750	40
Devil's Den (d)	5(c)	547	10,000	47
Bluestone (d)	5(c)	547	10,000	47
Polonio (d)	5(c)	547	10,000	47

(a) Based on projected water deliveries in year 2000.
(b) Pumped-storage capability used only when economically favorable.
(c) Includes spare unit.
(d) Tentative data for future facility.

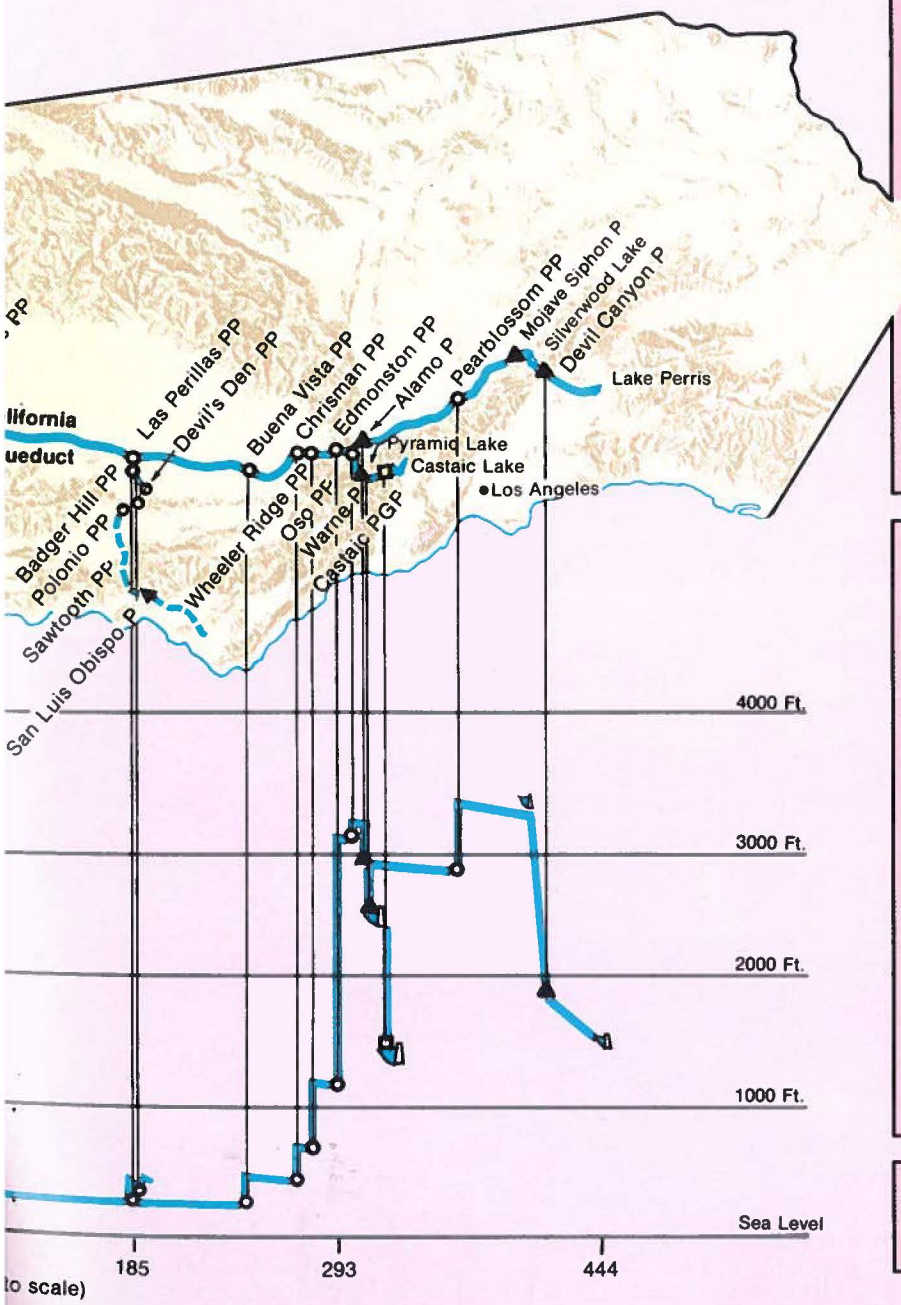
PRINCIPAL DAMS AND RESERVOIRS

Name of Reservoir	Reservoirs (a) Capacity (acre-feet)	Reservoirs (a) Surface Area (acres)	Dams Structural Height (feet)	Dams Crest Length (feet)
Frenchman Lake	55,500	1,580	139	720
Antelope Lake	22,600	930	120	1,320
Lake Davis	84,400	4,030	132	800
Lake Oroville	3,540,000	15,800	770	6,920
Thermalito Forebay	11,700	630	91	15,900
Thermalito Afterbay	57,000	4,300	39	42,000
Clifton Court Forebay	28,700	2,110	30	36,500
Lake Del Valle	77,100	1,060	235	880
O'Neill Forebay	29,560(b)	2,700	88	14,350
San Luis (Sisk Dam)	1,070,000(c)	12,700	385	18,600
Silverwood Lake	75,000	980	249	2,230
Lake Perris	131,000	2,320	128	11,600
Pyramid Lake	171,000	1,300	400	1,090
Castaic Lake	324,000	2,240	425	4,900

(a) Reservoir data represents design elevation, generally spillway crest. In most cases, maximum operational levels are set 1 or 2 feet lower.
(b) State Water Project share of this 56,430 acre-feet joint-use facility.
(c) State Water Project share of this 2,040,000 acre-feet joint-use facility of the State Water Project and the federal Central Valley Project.



PROJECT FACILITIES



POWERPLANTS

Name	Number of Units	Normal Static Head (feet)	Total Generator Rating (Kw)	Annual Energy Output(a) (million kWh)
Hydroelectric				
Oroville Complex				
Hyatt	6	410-676	678,750	1,938
Thermalito Diversion Dam	1	70-77	3,000	24
Thermalito	4	85-102	119,600	240
California Aqueduct				
San Luis joint-use Facilities				
Gianelli P-G Plant	8	99-327	424,000	
SWP Share			222,100	188
East Branch				
Alamo (b)	1	138-144	17,000	114
Mojave Siphon (c)	3	144	29,000	97
Devil Canyon	4	1,368-1,433	272,000	1,366
West Branch				
Warne	2	719-739	78,500	472
Castaic (Cooperative Venture)	7	830-1,089	1,250,000	
SWP Share			214,000	719
Coastal Branch				
San Luis Obispo (c)	1	781	5,200	46
Coal				
Reid Gardner Unit No. 4	1		260,000	
SWP Share			169,500	1,084
Geothermal				
Bottle Rock	1		55,000	339
South Geysers (d)	1		55,000	(d)

(a) Based on projected water deliveries in year 2000.
(b) Unit 2 deferred
(c) Tentative data for future facility.
(d) Schedule for completion deferred.

AQUEDUCTS

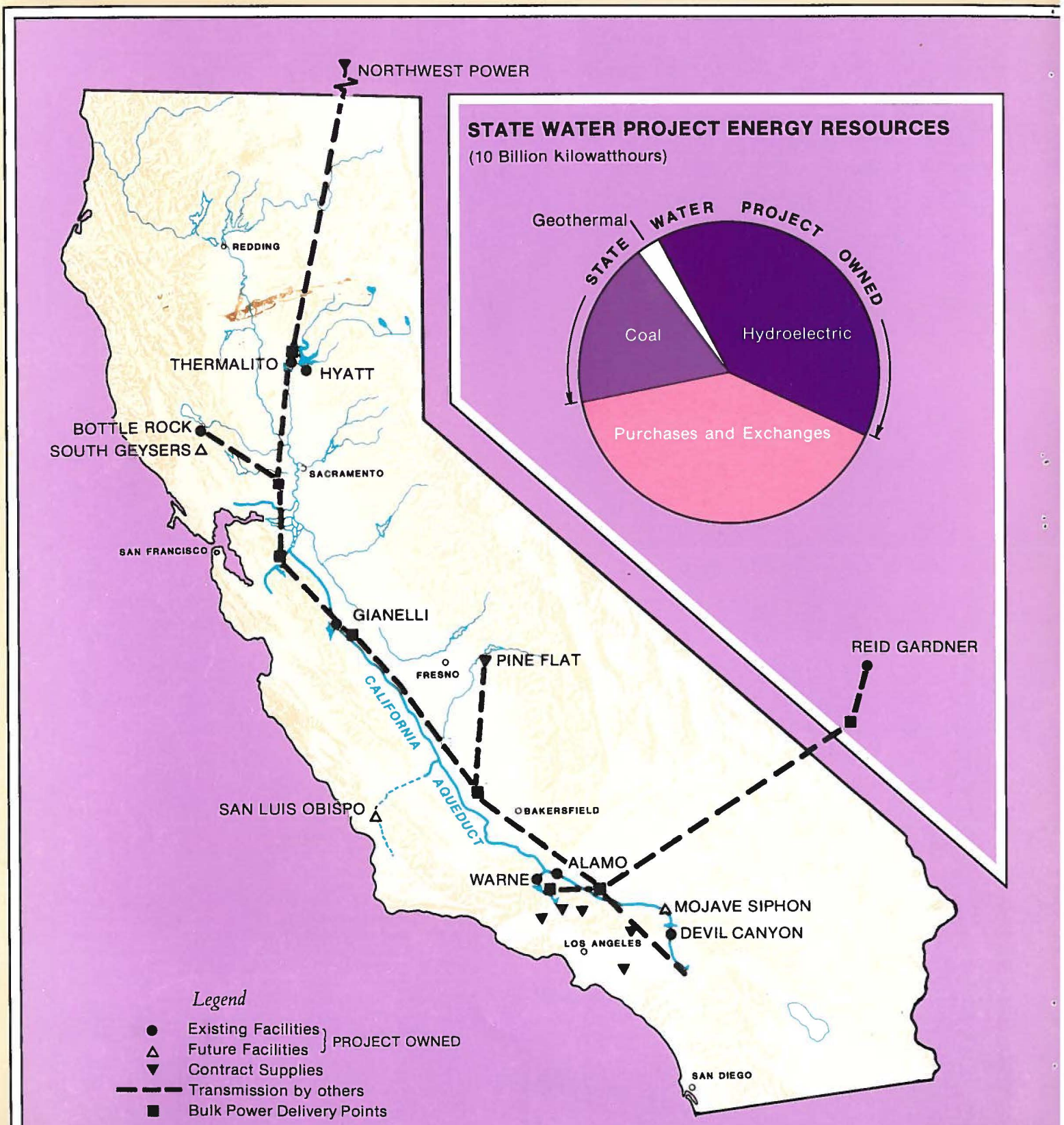
Name	Length (Miles)
North Bay Aqueduct	27.4
South Bay Aqueduct	42.9
Subtotal	**70.3**
California Aqueduct (main line)	
Delta to O'Neill Forebay	68.4
O'Neill Forebay to Kettleman City (San Luis Canal) (a)	105.7
Kettleman City to Edmonston Pumping Plant	120.9
Edmonston Pumping Plant to Tehachapi Afterbay	10.6
Subtotal, main line	**305.6**
California Aqueduct (Branches)	
East Branch (b)	138.4
West Branch	31.9
Coastal Branch	
Phase 1 (Existing)	14.8
Phase 2 (Planned addition)	86.0(c)
Subtotal, branches	**271.1**
Total	**647.0**

(a) This reach is a part of the joint-use facilities of the California State Water Project and the federal Central Valley Project.
(b) Officially this is part of the main line, but is popularly called the East Branch.
(c) Tentative value based on current plans for this future facility.

Metric Conversion Factors

1 Foot = 0.3048 metres
1 mile = 1.6093 kilometres
1 HP = 0.746 kilowatts
1 Acre-Feet = 1.2335 cubic dekametres
1 Acre = 040469 hectares

POWER REQUIREMENTS



AND POWER RESOURCES

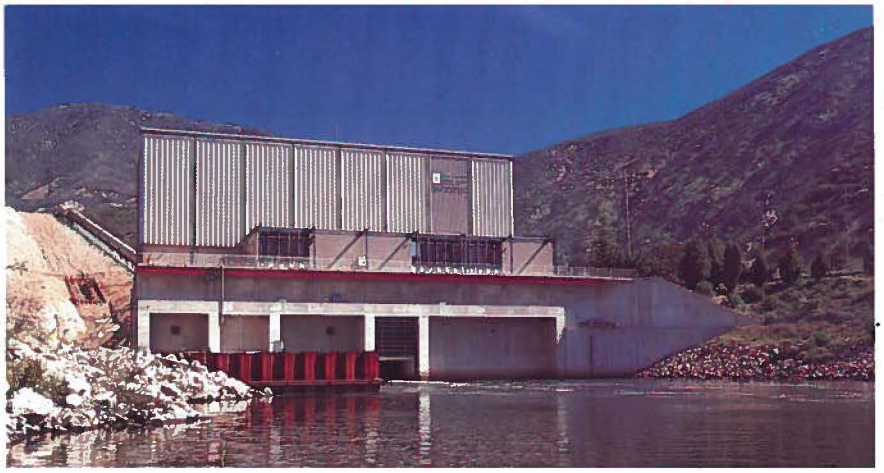
When the State Water Project is operating at full capacity, it will consume nearly 13 billion kilowatthours of electrical energy per year. In an average year, existing and planned hydroelectric powerplants will produce about 5.5 billion kilowatthours per year. Energy to meet the remaining needs will come from a variety of sources, including State-constructed coal-fired and geothermal plants and by purchases and exchanges with other utilities.

Based on contractor requests for water, present normal annual energy requirements are about 8 billion kilowatthours, and by the year 2000 they are expected to average nearly 11 billion. Available resources now total approximately 10 billion kilowatthours — 60 percent from Project-owned facilities and 40 percent by purchases or exchanges.

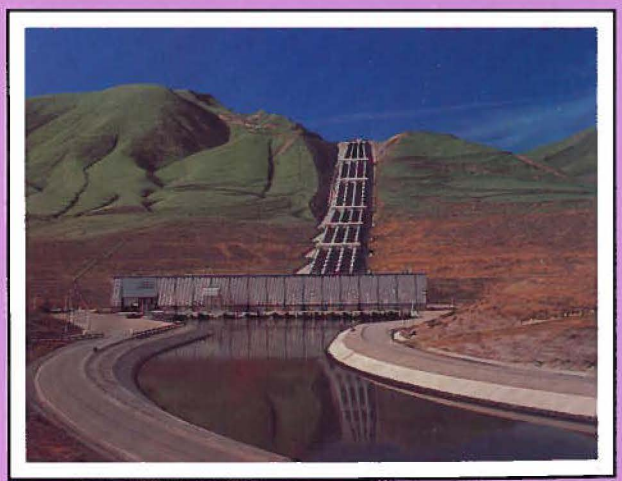
The Department of Water Resources contracts with many electric utility companies to buy or make exchanges for needed power supplies and to provide a market to sell power in excess of Project needs. In a given year, surpluses may develop due to reduced water demand, an abundance of hydroelectric energy from Project facilities, or other reasons.

The Project has significant operational flexibility in managing its pumping requirements, allowing the Department, as a wholesale utility, to minimize net operating costs. Operating revenues are maximized by selling surplus energy during on-peak hours when the value of energy is highest in the markets. Project operating costs are minimized by buying lower cost off-peak energy. Thus the Project's maximum pumping is done at night and during weekends and holidays. □

Devil Canyon Powerplant



Hyatt Powerplant



Chrisman Pumping Plant

CAPITAL EXPENDITURES AND FINANCING

Expenditures

By the end of 1988, about $3.7 billion had been spent for construction of State Water Project facilities. Another $370 million will be spent to complete facilities now under construction. These expenditures include the cost of planning, design, financing, relocations, and land acquisition as well as actual construction. Annual construction expenditures are shown on the chart to the right.

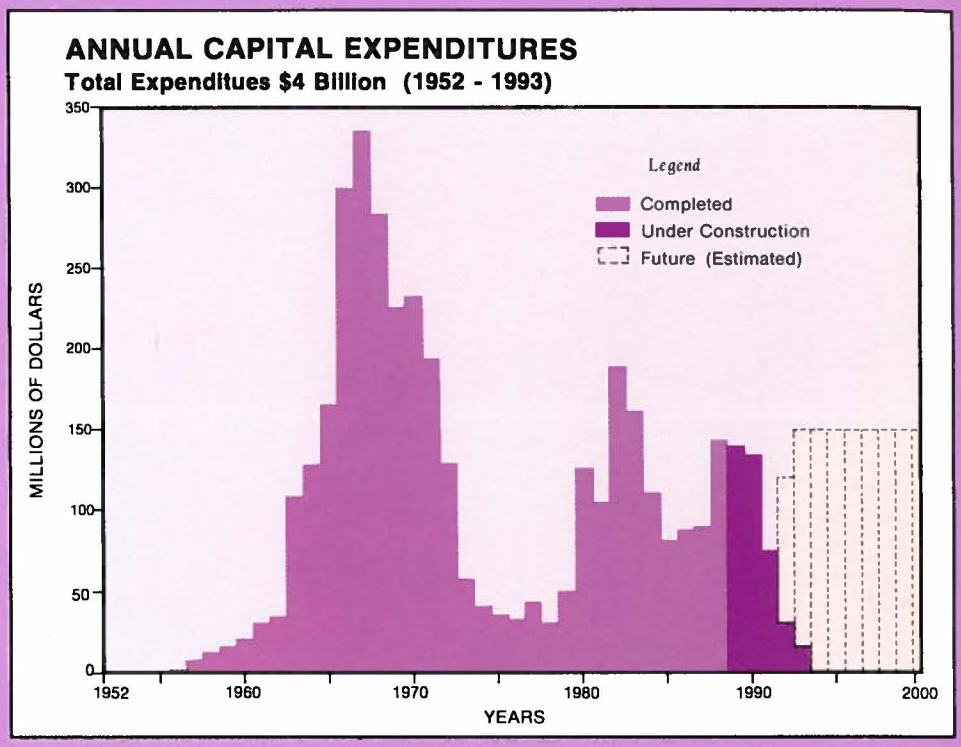
Beginning in the early 1990s, construction of currently planned facilities will require average annual expenditures of about $150 million per year through the year 2000. These facilities are needed to develop a more dependable water supply for meeting current and future water needs, and to initiate service to contractors who have not yet received Project water.

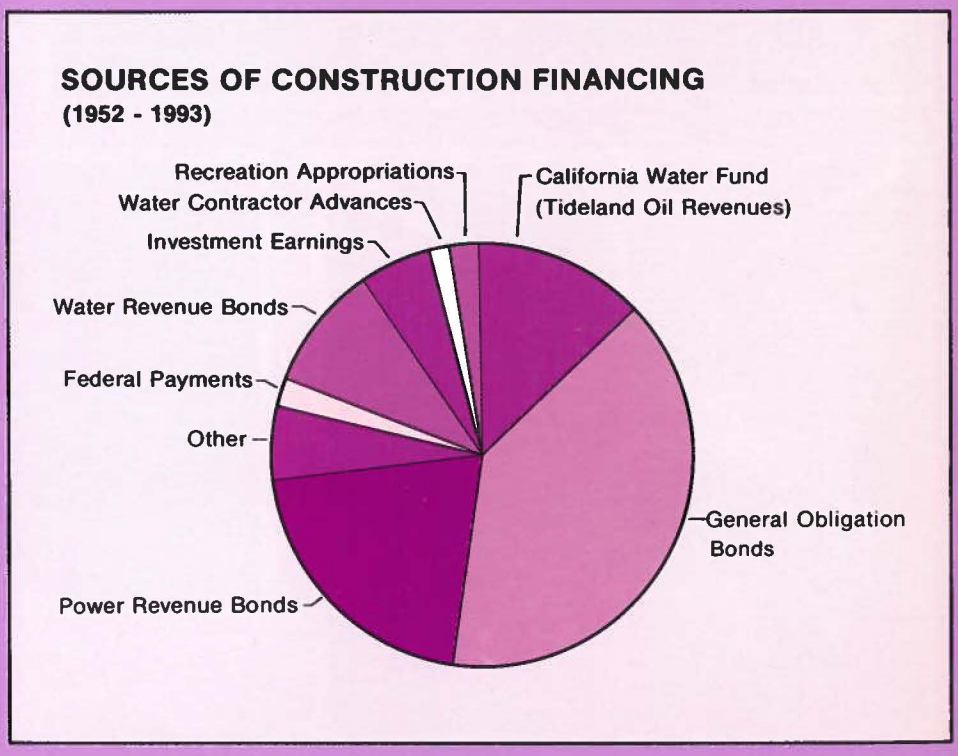
Financing

Funds from the sale of general obligation and revenue bonds have provided the major source of financing for construction of the State Water Project. Full repayment of these bond funds is being made by Project beneficiaries rather than by the general taxpayer.

Other funding sources have included tideland oil revenues, investment earnings, legislative appropriations for recreation, federal flood control payments, and water contractor advances. The relative amounts of these sources are shown on the pie chart. The portion labeled "other" includes legislative appropriations prior to the 1959 Bond Act, payment for the non-Project share of Castaic Powerplant, and excess operating revenues to be used for Project construction.

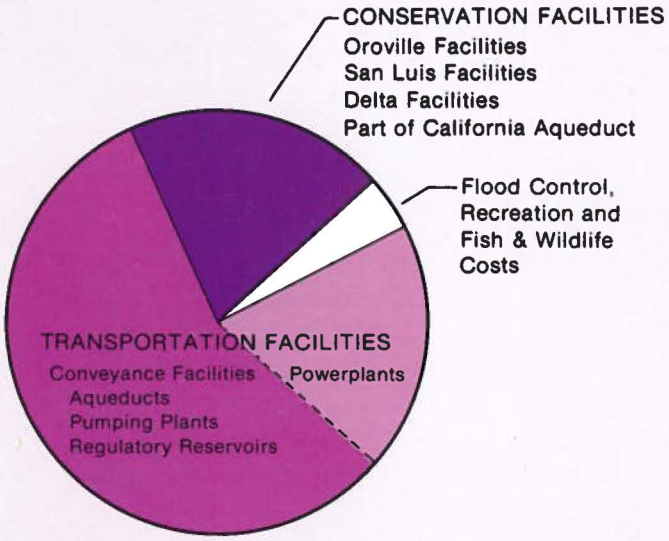
Revenue bonds are expected to be the main financing source for future Project facilities. □





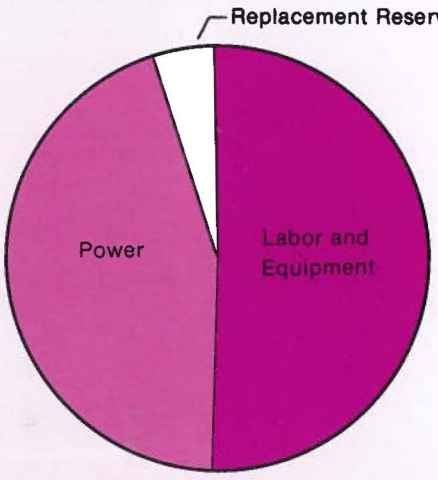
REPAYMENT AND OPERATING COSTS

REPAYMENT OF CAPITAL EXPENDITURES
(Percentages based on 1952 - 1993 costs)



CURRENT ANNUAL OPERATION, MAINTENANCE, POWER, AND REPLACEMENT COSTS

Approximately $200 Million



Repayment

The 30 contracting agencies repay, with interest, about 96 percent of all funds expended to construct the Project. All contractors pay the same unit rate for conservation facilities, that is, the cost of developing Project water supply. Each contractor pays its own "transportation charge", which contains a capital cost component to pay for construction of facilities to deliver water to its service area. Thus, the more distant contractors pay a higher transportation charge than those near the source.

Some contractors do not plan to request water until the 1990s, but are paying their share so that facilities and water will be available for them when needed.

The federal government pays for flood control provided by the Project. Recreation, fish and wildlife enhancements are paid the by State.

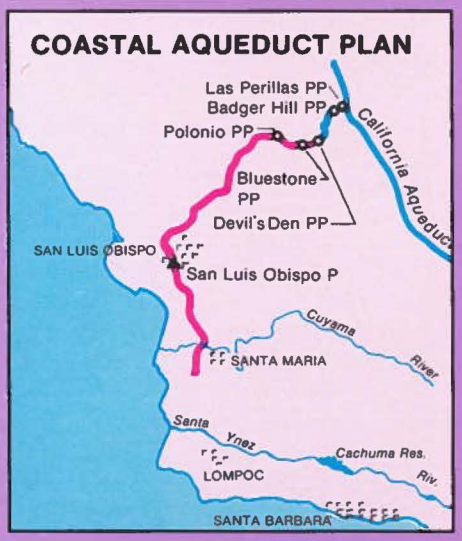
Operation and Maintenance

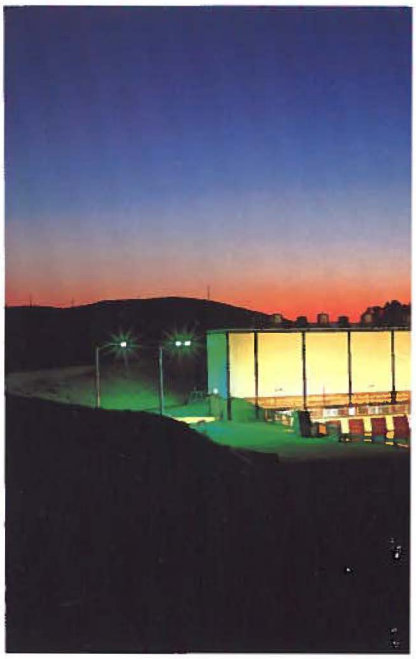
Successful Project operation requires a diversified team of engineers and other specialists in water movement and power generation. Power purchases, exchanges and sales must be negotiated. Dams, reservoirs, aqueducts, pumping plants and powerplants must be operated and maintained in good working order.

The current (1988) net cost of these and other activities is more than $200 million a year. Labor and equipment account for 51 percent. The net cost of power (purchases minus generation and sales) amounts to 45 percent. The remaining 4 percent includes deposits for replacement reserves and insurance costs.

Water contractors pay about 96 percent of these expenses through the conservation and transportation charges. Other beneficiaries pay about 4 percent. □

PLANS FOR FUTURE





Coastal Aqueduct

All the initially planned aqueduct systems have been built except for the Coastal Branch of the California Aqueduct. The Coastal Branch was planned to be built in two phases because of the different timing of service area water needs.

Phase 1 facilities were completed in 1968 to serve agricultural water contractors in northwestern Kern County. The facilities include a 15-mile canal and two pumping plants.

Phase 2 will deliver water for urban needs in San Luis Obispo and Santa Barbara counties via an 86-mile subsurface pipeline. Three additional pumping plants will lift the water over the Coast Range and one power plant will recover a portion of the pumping energy. Detailed planning and environmental studies are in progress. Construction could start in the early 1990s if the two counties decide to go ahead with Phase 2.

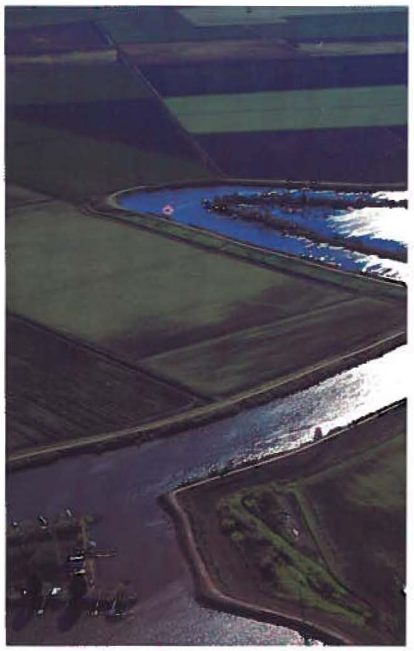
Enlarging Cachuma Reservoir is an alternative for serving more water to Santa Barbara's south coastal area. □

Water Supply Facilities

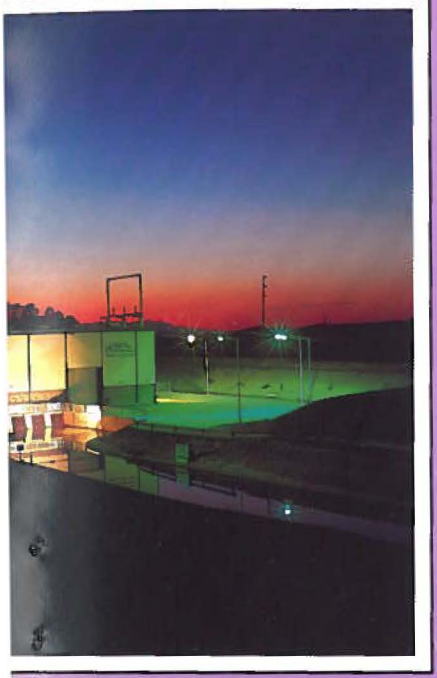
A larger dependable supply is needed to meet current and future water needs. Planned additions include the Los Banos Grandes offstream storage plan, the Kern Water Bank, and Delta facilities.

Los Banos Grandes. The proposed Los Banos Grandes Reservoir site is on Los Banos Creek, six miles west of the California Aqueduct and south of San Luis Reservoir. Excess water would be pumped from the Delta through the Aqueduct during wet months. Water would be pumped into Los Banos Grandes for storage. When stored water is released for Project use, the plants would generate power.

Planning and environmental studies suggest that a reservoir of 1.2 to 1.8 million acre-feet capacity would be the most practical. This reservoir would increase the dependable annual supply of the Project by about 200,000 to 300,000 acre-feet.

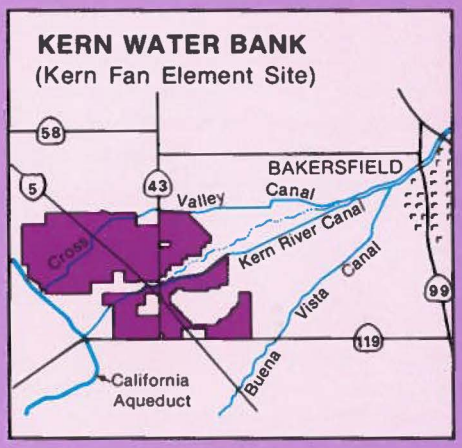


DEVELOPMENT



Badger Hill Pumping Plant

Delta Channels

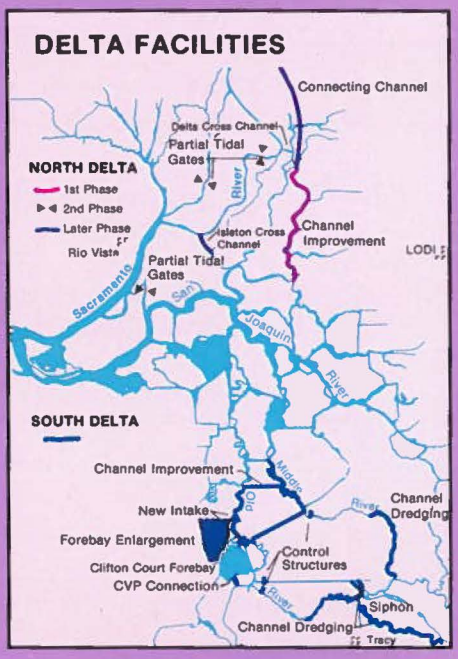


Kern Water Bank. The Kern Water Bank is a planned ground water storage program in Kern County. It consists of several proposed elements.

The Kern Fan Element involves using land recently acquired and building recharge ponds, extraction wells and related works. Project water from the Aqueduct will be released and stored underground in years of abundant supply, increasing ground water storage by up to one million acre-feet. In time of need, the stored water will be pumped out and delivered to Project contractors. This element is expected to increase the dependable annual supply of the Project by about 145,000 acre-feet.

Other elements are mostly in-lieu recharge proposals by local districts. In wet years, Project water would be provided to these elements in lieu of pumping ground water, potentially storing 2 to 4 million acre-feet. In dry years, when less Project water is available, local users would pump more ground water.

Delta Facilities. The Delta is pivotal in State Water Project operations. The Project uses existing channels to move water across the Delta. However, lack of sufficient carrying capacity in some channels makes Project operation inefficient, reduces Project water supplies, and aggravates local water supply, water quality, and fishery problems.

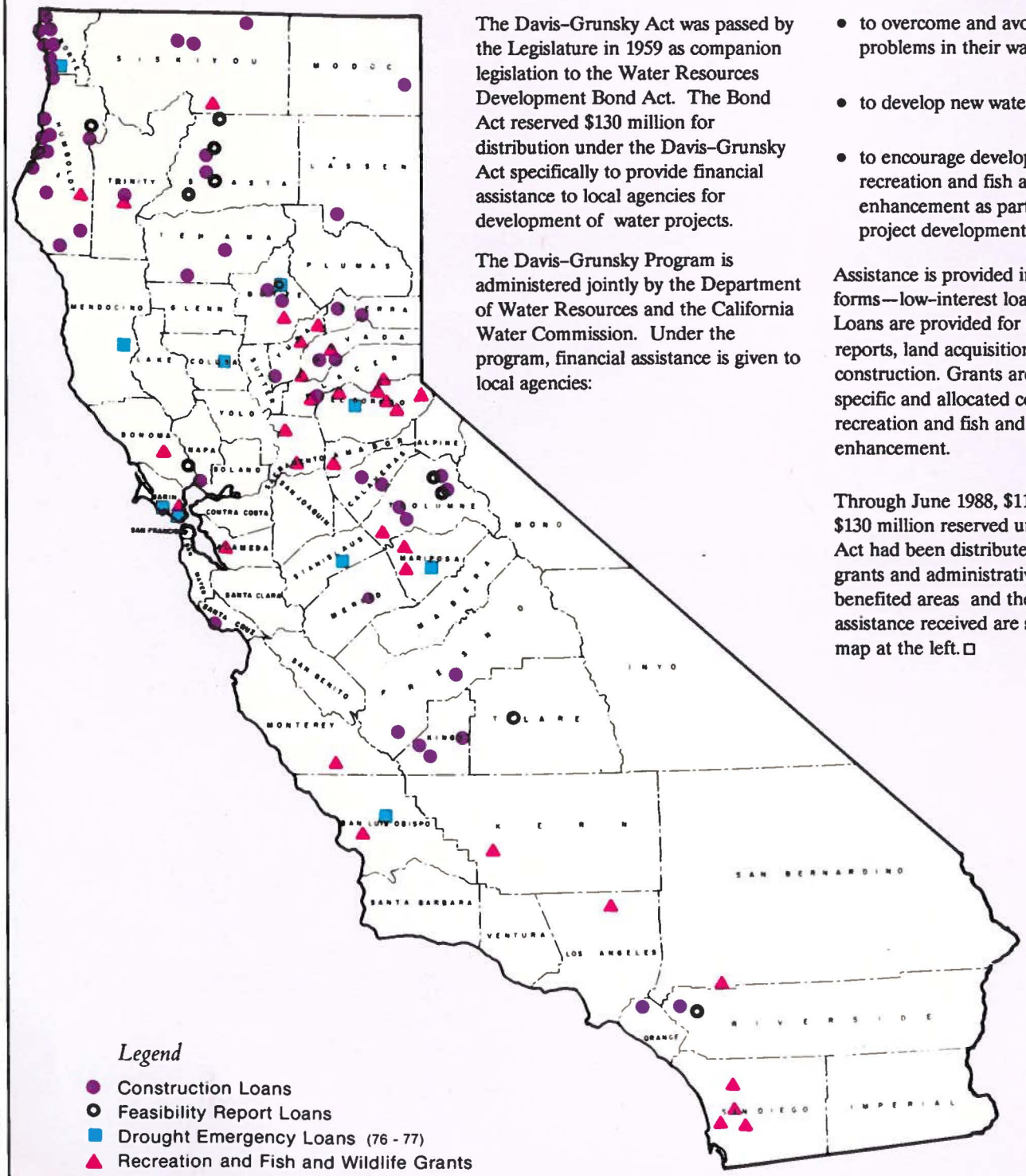


An improved water transfer system would lessen or eliminate these problems and increase the annual water supply of the Project by up to 400,000 acre-feet. Planning and environmental studies for Delta facilities are in progress.

Improvements in the north Delta would provide more efficient salinity control, improve fishery habitat in the west Delta, improve water supply reliability, and alleviate flooding along the lower Mokelumne River. Work in the south Delta would improve summer water levels, improve water circulation and quality, and make possible increased winter exports for storage south of the Delta.

North and south Delta facilities can be built together or separately. □

DAVIS-GRUNSKY PROGRAM



Legend

- Construction Loans
- Feasibility Report Loans
- Drought Emergency Loans (76 - 77)
- Recreation and Fish and Wildlife Grants

The Davis-Grunsky Act was passed by the Legislature in 1959 as companion legislation to the Water Resources Development Bond Act. The Bond Act reserved $130 million for distribution under the Davis-Grunsky Act specifically to provide financial assistance to local agencies for development of water projects.

The Davis-Grunsky Program is administered jointly by the Department of Water Resources and the California Water Commission. Under the program, financial assistance is given to local agencies:

- to overcome and avoid public health problems in their water supplies;
- to develop new water supplies;
- to encourage development of public recreation and fish and wildlife enhancement as part of local water project development.

Assistance is provided in two forms—low-interest loans and grants. Loans are provided for feasibility reports, land acquisition, and project construction. Grants are provided for specific and allocated costs of recreation and fish and wildlife enhancement.

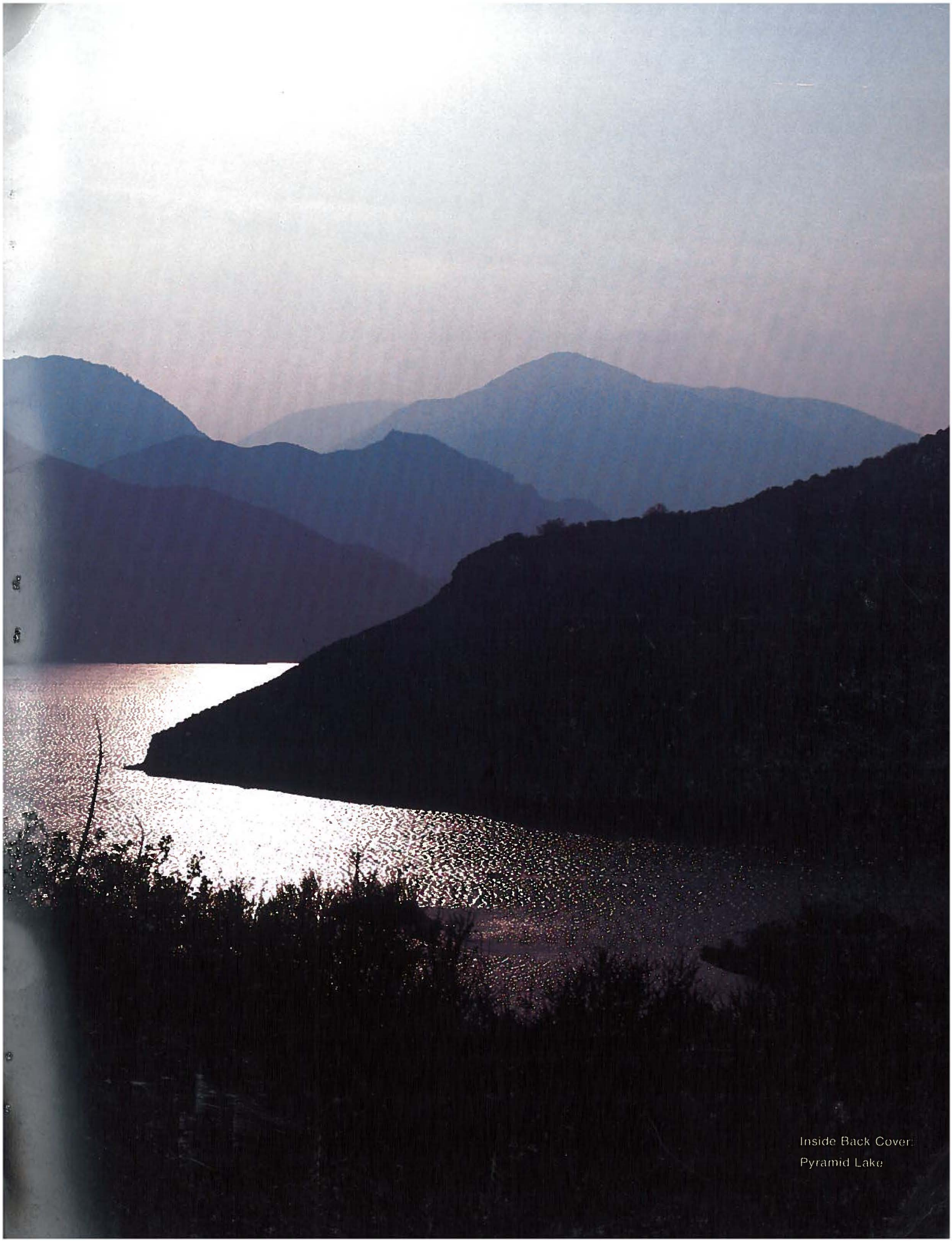
Through June 1988, $119 million of the $130 million reserved under the Bond Act had been distributed for loans, grants and administrative costs. The benefited areas and the type of assistance received are shown on the map at the left. □

NAMING OF PROJECT FACILITIES

Many of the facilities of the State Water Project are named to honor prominent people who exhibited outstanding leadership in planning, establishing the fiscal and political framework, and constructing and operating the Project. These facility names have been shortened for readability throughout this brochure, but are listed here to acknowledge the prominent role of the people for whom the facilities are named.

Abbreviated Name of Facility	Complete Name of Facility	Name and Position of Honoree
Banks Pumping Plant	Harvey O. Banks Delta Pumping Plant	**Harvey O. Banks,** first Director of California Department of Water Resources, 1956–1960.
California Aqueduct	Governor Edmund G. Brown California Aqueduct	**Edmund G. (Pat) Brown,** Governor of California 1959–1966, under whose leadership the Legislature authorized, and the voters approved, the State Water Project.
Chrisman Pumping Plant	Ira J. Chrisman Wind Gap Pumping Plant	**Ira J. Chrisman,** Member of the California Water Commission 1960–1976 (Chairman 1967–1976).
Edmonston Pumping Plant	A. D. Edmonston Pumping Plant	**A. D. Edmonston,** State Engineer, Division of Water Resources, Department of Public Works, 1950–1955.
Gianelli Pumping—Generating Plant	William R. Gianelli Pumping-Generating Plant*	**William R. Gianelli,** Director of California Department of Water Resources, 1967–1973, and Assistant Secretary of the Army for Civil Works, 1981–1984.
Hyatt Powerplant	Edward Hyatt Powerplant	**Edward Hyatt,** State Engineer, Division of Water Resources, Department of Public Works, 1927–1950.
Lake Davis	Lake Davis	Assemblyman **Lester Thomas Davis,** California Legislature, 1947–1952, and Assemblywoman **Pauline L. Davis,** California Legislature, 1953–1972. Husband and wife were active in legislative water matters. Mrs. Davis coauthored the Davis–Grunsky and Davis–Dolwig Acts.
O'Neill Forebay	O'Neill Forebay*	**Jack Edward O'Neill,** a pioneer farmer in the San Joaquin Valley who worked for authorization of the San Luis Division of the federal Central Valley Project.
Porter Tunnel	Carley V. Porter Tunnel	Assemblyman **Carley V. Porter,** California Legislature, 1949–1972, co–author of 1959 Water Resources Development Bond Act to help finance the State Water Project.
Silverwood Lake	Silverwood Lake	**W. E. "Ted" Silverwood,** a resident of Riverside County who worked unceasingly to promote the State Water Project.
Sisk Dam	B. F. Sisk San Luis Dam*	Congressman **B. F. Sisk,** U. S. Congress, 1955–1979, introduced legislation authorizing the San Luis Unit of the federal Central Valley Project.
Skinner Fish Facility	John E. Skinner Delta Fish Protective Facility	**John E. Skinner,** California Department of Fish and Game,1954–1978, supervised the evaluation and improvements of the Fish Protective Facility.
Warne Powerplant	William E. Warne Powerplant	**William E. Warne,** Director of California Department of Water Resources, 1961–1966.

*A joint use facility of the California State Water Project and the federal Central Valley Project



Inside Back Cover:
Pyramid Lake