

2. STATE WATER PROJECT

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2.1 INTRODUCTION

Funding for the SWP was authorized by the California Legislature in 1959 and approved by the voters in 1960 through the Burns-Porter Act. The Burns-Porter Act expressly authorized the State of California to enter into contracts for the sale, delivery, or use of water made available by the State Water Resources Development System (California Water Code [CWC] 12937(b)(4)). In return for the State financing, constructing, operating, and maintaining facilities needed to provide water service, the 29 public water agencies contractually agreed to repay all associated SWP capital and operating costs including the \$1.75 billion in bonds used to construct the SWP facilities. Construction of the SWP commenced in the 1960s and water was first delivered in 1962 through a portion of the South Bay Aqueduct to Alameda and Santa Clara counties. Large scale water deliveries began late in the 1960s.

Managed by the California Department of Water Resources (Department), the SWP is the largest state-built water storage and conveyance project in the United States. The multi-purpose SWP facilities deliver water supply under long term water supply contracts to 29 public water agencies throughout California. Collectively known as the SWP contractors, the 29 water agencies deliver water directly to agricultural and urban water users or to water wholesalers or retailers. The contractor's role is to take the water at their various points of delivery, use it within their respective service areas, and repay the capital and operations costs of the SWP. Approximately 24 million Californians receive a portion of their drinking water supply from the SWP, and about 750,000 acres of agricultural land, primarily in the San Joaquin Valley, is irrigated with SWP water. For all the contractors, the SWP water supply supplements water used within their service areas from other sources including ground water, local surface water, other imported water supplies, recycled water, and desalinated water.

In addition to operating and managing the SWP, the Department's mission includes managing the water resources of California in cooperation with other agencies to benefit the State's people, and to protect, restore, and enhance the natural and human environments. The Department plans, designs, constructs, and operates the SWP to deliver water, control floods, generate power, and provide recreational opportunities. The Department also provides enhancements for fish and wildlife.

In order to fulfill its mission, the Department has eight goals which include: (1) developing and assessing strategies for managing the State's water resources, including development of the California Water Plan Update; (2) planning, constructing, operating, and maintaining the SWP to achieve maximum flexibility, safety, and reliability; (3) protecting and improving the water resources and dependent ecosystems of statewide significance, including the Sacramento-San Joaquin Bay-Delta Estuary; (4) protecting lives and infrastructure as they relate to dams, floods, droughts, watersheds impacted by fire and disasters, and assisting in other emergencies; (5) providing policy direction and legislative guidance on water and energy issues and educating the public on the importance, hazards, and efficient use of water; (6) supporting local planning and integrated regional water management through technical and financial assistance; (7) performing efficiently all statutory, legal, and fiduciary responsibilities regarding management of State long-term power contracts and servicing of power revenue bonds; and (8) providing

professional, cost-effective, and timely services in support of the Department's programs, consistent with governmental regulatory and policy requirements.

2.2 COMPONENTS OF THE SWP

The SWP is a complex system of reservoirs, dams, power plants, pumping plants, pipelines, and aqueducts. Precipitation and watershed runoff is stored in SWP reservoirs and delivered via natural stream channels and SWP aqueducts to water agencies and districts in Southern California, the Central Coast, the San Joaquin Valley, portions of the San Francisco Bay area, and upper Feather River areas. The principal components of the SWP are shown in Figure 2-1.

Three small reservoirs—Lake Davis, Frenchman Lake, and Antelope Lake—are the northernmost SWP facilities. Situated on Feather River tributaries in Plumas County, these lakes are used primarily for recreation. Lake Davis also provides water to Plumas County Flood Control and Water Conservation District (FC&WCD) and local agencies that have water rights agreements with the Department.

Downstream from these three lakes is the Oroville-Thermalito Complex which includes: Lake Oroville and Oroville Dam; Hyatt Powerplant; Thermalito Diversion Dam and Powerplant; the Feather River Fish Hatchery; Thermalito Power Canal; Thermalito Forebay; Thermalito Pumping-Generating Plant; and Thermalito Afterbay.

The Oroville-Thermalito Complex was designed as an efficient water and power system. Lake Oroville has a storage capacity of approximately 3.5 million acre-feet (AF) and it stores winter runoff and spring snowmelt from the Feather River drainage for later downstream release. Power is generated from releases made through Hyatt Powerplant and two other Thermalito power plants. Water stored in the Thermalito Forebay and Afterbay can also be pumped back into the reservoir when feasible for subsequent power generation. A special fish barrier dam was built to lead salmon and steelhead, returning to spawn, into the Feather River Fish Hatchery. Salmon and steelhead raised at the hatchery are transported and released in the Feather and Sacramento rivers, or in the Delta near the San Francisco Bay area.

Releases from Lake Oroville flow down the Feather River then merge with the Sacramento River. The Sacramento River flows into the Sacramento-San Joaquin Delta which is comprised of 738,000 acres of land interlaced with channels that receive runoff from approximately 40 percent of the state's land area.

The Department completed the Barker Slough Pumping Plant in 1988 to divert water for delivery from the northern Delta to Napa and Solano counties through the North Bay Aqueduct. In the southern Delta, the SWP diverts water into Clifton Court Forebay for delivery south of the Delta. From Clifton Court Forebay, the Skinner Fish Facility diverts an average of 15 million fish each year away from the Delta pumps. Two miles downstream from Skinner Fish Facility, the Harvey O. Banks Delta (Banks) Pumping Plant lifts water into the California Aqueduct, which then flows to Bethany Reservoir.

From Bethany Reservoir, the South Bay Pumping Plant lifts water into the South Bay Aqueduct to supply portions of Alameda and Santa Clara counties. The South Bay Aqueduct provided initial deliveries in 1962 and has been fully operational since 1965. South Bay Aqueduct facilities include Lake Del Valle, a regulatory, flood control, and water supply reservoir for the aqueduct, and Patterson Reservoir.



FIGURE 2-1
Major Components of the State Water Project

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The remaining water delivered to Bethany Reservoir continues south in the California Aqueduct. This 444-mile-long main aqueduct conveys water to the primarily agricultural lands of the San Joaquin Valley and the mainly urban regions of Southern California. The first SWP deliveries to San Joaquin Valley contractors began in 1968. The first SWP deliveries to southern California began in 1972.

The California Aqueduct winds along the west side of the San Joaquin Valley. It transports water to O'Neill Forebay. Water in the Forebay can be released to the San Luis Canal or pumped into San Luis Reservoir by the Gianelli Pumping Plant. San Luis Reservoir has a storage capacity of more than two million AF and is jointly owned by the Department and U.S. Bureau of Reclamation (Reclamation). The SWP's share of the reservoir's gross storage is about 1,062,180 AF. The Department generally pumps water through the Gianelli Pumping-Generating Plant into San Luis Reservoir during late fall through early spring for temporary storage until the Department releases the water back into the O'Neill Forebay and the California Aqueduct to meet late spring and summer peaking demands of SWP contractors.

SWP water pumped directly from the Delta and water eventually released from San Luis Reservoir continues to flow south in the San Luis Canal, a portion of the California Aqueduct jointly owned by the Department and Reclamation. The Central Valley Project (CVP) joint ownership ends near Kettleman City, and the SWP portion of the California Aqueduct continues. As the water flows through the San Joaquin Valley, numerous turnouts convey the water to farmlands within the service areas of the SWP and CVP. Along its journey, four pumping plants—Dos Amigos, Buena Vista, Teerink, and Chrisman—lift the water more than 1,000 feet before it reaches the foot of the Tehachapi Mountains.

In the San Joaquin Valley near Kettleman City, Phase I of the Coastal Branch Aqueduct serves agricultural areas west of the California Aqueduct. The Coastal Branch's Phase II extended the conveyance facility to serve municipal and industrial water users in San Luis Obispo and Santa Barbara counties. Phase II became operational in 1997.

The remaining water conveyed by the California Aqueduct is delivered to Southern California, home to about one-half of California's total population. Before this water can be delivered, the water must first cross the Tehachapi Mountains. Pumps at Edmonston Pumping Plant, situated at the foot of the mountains, raise the water 1,926 feet—the highest single lift of any pumping plant in the world. From there, the water enters about eight miles of tunnels and siphons as it flows into Antelope Valley, where the California Aqueduct divides into two branches; the East Branch and the West Branch.

The East Branch carries water through the Tehachapi East Afterbay, Alamo Powerplant, Pearblossom Pumping Plant, and Mojave Siphon Powerplant into Silverwood Lake in the San Bernardino Mountains. From Silverwood Lake, water flows through the San Bernardino Tunnel into Devil Canyon Powerplant. Water continues down the East Branch to Lake Perris, the terminus of the East Branch. Lake Perris lies just east of Riverside, has a capacity of 131,500 AF and serves as a regulatory and emergency water supply facility for the East Branch.

Phase I of the East Branch Extension of the California Aqueduct was completed in 2003 and provides conveyance facilities to deliver SWP water to San Geronio Pass Water Agency (WA), and to the eastern portion of the San Bernardino Valley Municipal Water District (MWD) -- which will deliver water to areas such as Yucaipa, Calimesa, Beaumont, Banning, and other communities. The East Branch Extension is comprised of a combination of existing San Bernardino Valley MWD facilities and newly constructed SWP facilities. While the new pipelines

were designed for the ultimate conveyance capacity, the installed Phase I pumping capacity is less than one-half the ultimate capacity - enough to meet the immediate foreseeable demand for SWP water. Phase II will bring the extension to its ultimate storage and conveyance capacity with new pipelines, pumping, and storage facilities. Currently, the Department is in the planning stages of Phase II. A feasibility study and a Phase II Project Environmental Impact Report are concurrently being worked on and will take approximately 24 months to complete.

At the bifurcation of the California Aqueduct in Antelope Valley, the West Branch carries water through Oso Pumping Plant, Quail Lake, Lower Quail Canal, and William E. Warne Powerplant into Pyramid Lake in Los Angeles County. From there, water flows through the Angeles Tunnel, Castaic Powerplant, Elderberry Forebay, and Castaic Lake, terminus of the West Branch. Castaic Lake is located north of Santa Clarita, has a capacity of 324,000 AF, and is a regulatory and emergency water supply facility for the West Branch. Castaic Powerplant is operated by the Los Angeles Department of Water and Power.

The energy needed to operate the SWP, the single largest consumer of electrical power in California, comes from a combination of its own hydroelectric facilities, a coal-fired generation plant, and power purchased from other utilities. The coal-fired plant and the SWP's eight hydroelectric power plants, including three pumping-generating plants, produce enough electricity in a normal year to supply about two-thirds of the SWP's necessary operating power.

Tables 2-1 and 2-2 show statistical information for the SWP's primary reservoirs and aqueducts.

Facility	Gross Capacity (Acre-feet)	Surface Area (Acres)	Shoreline (Miles)
Antelope Lake	22,600	930	15
Frenchman Lake	55,500	1,580	21
Lake Davis	84,400	4,030	32
Lake Oroville	3,537,600	15,800	167
Thermalito Forebay	11,800	630	10
Thermalito Afterbay	57,000	4,300	26
Thermalito Diversion Pool	13,400	320	10
Clifton Court Forebay	31,300	2,180	8
Bethany Reservoir	5,100	180	6
Lake Del Valle	77,100	1,060	16
San Luis Reservoir	2,027,800 (SWP storage 1,062,183)	12,520	65
O'Neill Forebay	56,400 (SWP storage 29,500)	2,700	12
Pyramid Lake	171,200	1,300	21
Elderberry Forebay	32,500	500	7
Castaic Lake	323,700	2,240	29
Silverwood Lake	75,000	980	13
Lake Perris	131,500	2,320	10

Source: California Department of Water Resources, Bulletin 132-02:6, January 2004.

TABLE 2-2					
TOTAL MILES OF AQUEDUCTS					
Facility	Channel and Reservoir	Canal	Pipeline	Tunnel	Total
North Bay Aqueduct	0.0	0.0	27.4	0.0	27.4
South Bay Aqueduct	0.0	8.4	32.9	1.6	42.9
California Aqueduct					
Delta to O'Neill Forebay	1.4	67.0	0.0	0.0	68.4
O'Neill Forebay to Kettleman City	2.2	103.5	0.0	0.0	105.7
Kettleman City to Edmonston Pumping Plant	0.0	120.9	0.0	0.0	120.9
Edmonston Pumping Plant to Tehachapi Afterbay	0.0	0.2	2.5	7.9	10.6
Tehachapi Afterbay to Lake Perris	2.9	93.4	38.3	3.8	138.4
Subtotal	6.5	385.0	40.8	11.7	444.0
California Aqueduct Branches					
West Branch	9.2	9.1	6.4	7.2	31.9
Coastal Branch	0.0	15.0	97.9	2.7	115.6
East Branch Extension, Phase I	0.0	0.0	13.0	0.0	13.0
Total	15.7	417.5	218.4	23.2	674.8

Source: California Department of Water Resources, Bulletin 132-04, September 2005, page 8.

2.3 SWP OPERATIONS

Operations at Oroville-Thermalito Complex alter seasonal flows in the Feather River by retaining a portion of the winter and spring runoff for release during the summer and fall. Flood control operations begin in mid-September and end in June and help lessen extreme flood peaks down the Feather River.

Water released from Lake Oroville, and other water in the Delta, can be diverted into the North Bay and California Aqueducts through the Barker Slough and Banks Pumping Plants, respectively. State and Federal laws protect water rights, water quality, wetlands, anadromous and native fisheries, migratory birds, and threatened and endangered species in the Delta, which is both an estuary and a navigable waterway. These factors as well as operational factors limit the volume of water that the Department can divert from the Delta.

Once SWP water is pumped from the Delta, it flows down the California Aqueduct which is divided into a series of interconnected pools of water separated by gated check structures. This system of "mini-reservoirs" allows for control of water levels and flow in an aqueduct which is significant in length and minimal in slope.

Each year by the first of October, contractors submit monthly water requests to the Department for the subsequent calendar year. The Department then estimates the amount of water available to the contractors based on reservoir storages and hydrologic conditions and incorporates these monthly delivery requests in order to determine how much supply is available to be allocated for delivery to the contractors. Beginning in late December or January, contractors may submit updated weekly or monthly requests. The Department uses these requests to make water deliveries and adjust SWP operational plans. As winter progresses, the Department relies on updated rainfall and snowpack values to refine its total water supply availability projections, and allocations to contractors are adjusted accordingly.

2.4 SWP DELIVERIES

Hydrologic conditions vary widely within California—from place to place, from season to season, and from year to year. The amount of water available to the SWP fluctuates because of this variability, and because of flood management needs, capacity of SWP storage and conveyance facilities, changing weather-temperature conditions, water quality, and environmental requirements. These are all factors that affect the amount of water that can be delivered annually to SWP contractors.

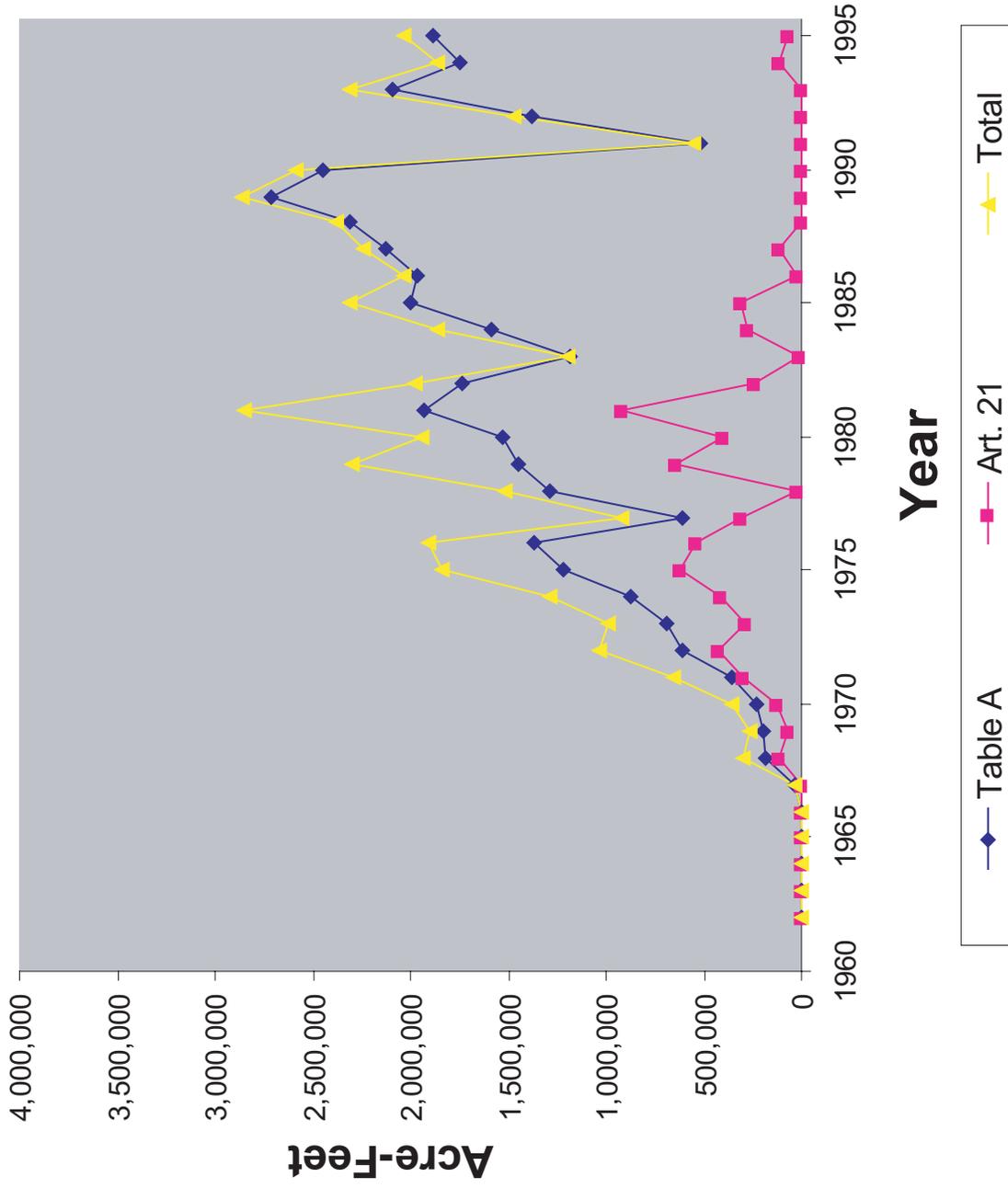
Table 2-3 and Figure 2-2 show SWP water deliveries and other water delivered to SWP contractors annually from 1970 to 1995, the years before the Monterey Amendment was implemented. Figure 2-2 shows a generally rising trend in deliveries that corresponds with increasing water demand in the contractors' service areas. The rising trend in deliveries was interrupted in years when the SWP had insufficient water to meet contractors' requests.

Year	Initial Requests (AF)	Final Allocation Percentage (M&I / Ag)	Total Deliveries^c (AF)	SWP Water deliveries^a (AF)	Other Water deliveries to SWP Contractors^b (AF)
1970	322,600	100	390,066	365,841	24,225
1971	375,590	100	669,893	651,921	17,972
1972	594,094	100	1,041,537	1,034,123	7,414
1973	923,954	100	1,007,041	987,804	19,237
1974	1,146,650	100	1,307,291	1,286,528	20,763
1975	1,311,260	100	1,872,509	1,844,675	27,834
1976	1,488,470	100	1,933,221	1,924,687	8,534
1977	1,660,538	90 / 40	944,740	926,126	18,614
1978	1,828,624	100	1,551,058	1,501,844	49,214
1979	1,855,003	100	2,374,503	2,356,726	17,777
1980	1,880,386	100	1,962,139	1,931,166	30,973
1981	1,876,707	100	2,864,748	2,838,590	26,158
1982	2,342,576	100	2,019,920	1,990,695	29,225
1983	2,365,818	100	1,283,607	1,198,493	85,114
1984	1,563,620	100	1,887,185	1,859,636	27,549
1985	1,862,709	100	2,344,491	2,308,430	36,061
1986	2,364,193	100	2,066,373	2,040,206	26,167
1987	2,717,215	100	2,262,257	2,234,993	27,264
1988	2,625,328	100	2,391,916	2,376,373	15,543
1989	2,999,451	100	2,931,169	2,853,747	77,422
1990	3,218,790	100 / 50	2,802,630	2,732,241	70,389
1991	3,484,687	30 / 0	1,074,913	552,634	522,279
1992	3,630,618	45 / 45	1,573,723	1,472,610	101,113
1993	3,846,195	100	2,335,144	2,315,235	19,909
1994	3,841,096	50 / 50	1,959,254	1,861,976	97,278
1995	3,163,780	100	2,062,387	2,031,423	30,964

Notes:

- Includes Table A, Article 12(d), Article 14(b), Article 21, wet weather water, Carryover water prior to Article 12(e), and Article 12(e).
- Includes other non-SWP water delivered to SWP contractors.
- Total water deliveries to SWP contractors.

Historical Table A & Art 21 Deliveries



Source: PB&J, 2006.



FIGURE 2-2
SWP Water Delivered to Contractors 1970 - 1994

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The Table A amounts in most SWP contractors' contracts reached a maximum in the early 1990's. However, many did not request those amounts until the early 2000's. As can be seen in Table 2-3, the SWP has had sufficient water to meet the contractors' requests in most years, but has had to reduce SWP water supplies during individual dry years or extended dry periods. Nonetheless, the Department has been able to make up some of the shortages through water purchases and transfers. In 1982 Legislation was passed which provided a means for the Department to acquire supplemental water supplies, and directed the Department to establish an ongoing program to facilitate voluntary exchange or transfer of water (CWC §480).

SWP contractors also supplement their water supplies through use of local surface or groundwater supplies, conservation techniques/incentives, or by the purchase of supplemental water supplies. Most water users in California live in areas that rely on multiple sources of water supply and local water providers have worked to improve the efficiency of local uses and their water management systems, as well as having drought contingency plans. Since its formulation the SWP was to be a source of supplemental water, not a sole source of water supply for the SWP contractors.

2.5 LONG-TERM WATER SUPPLY CONTRACT WATER SERVICE PROVISIONS PRIOR TO THE MONTEREY AMENDMENT

The Department has a long-term water supply contract with each of the 29 agricultural and municipal and industrial (M&I) water supply agencies. The contractors receive SWP water and retail it to customers or wholesale it to other water agencies. The M&I contractors are located throughout the state, while the agricultural contractors are located primarily in the San Joaquin Valley. The service areas of the contractors are shown in Figure 2-3.

The long-term water supply contracts were originally executed in the 1960's and are substantially the same for each contractor. Contract provisions reflected the Department's expectations at that time with respect to future water demand and the construction schedule of SWP components. The Department and the contractors made many amendments to the contracts to resolve disagreements and address matters that arose over a 30-year period, but most of the contract provisions remained substantially unchanged until the early 1990s.

The long-term water supply contracts outline how the contractors will repay all SWP capital and operating costs in return for the state's financing, constructing, operating, and maintaining the SWP and providing water service. The contracts are complex legal documents with multiple provisions, primarily covering water delivery and repayments.

The water delivery provisions cover a range of issues, including: the Department's obligation to take all reasonable efforts to complete the facilities necessary to deliver the water amounts contracted for in Table A of Article 6 (Article 6(c)); the allocation of supplies made available in excess of Table A supplies (Article 21); the allocation of Table A supplies in times of temporary shortage (Article 18(a)); the potential for reductions in Table A amounts in the event of a permanent shortage (Article 18(b)); and the potential for subsequent increases in Table A amounts if the permanent shortage situation was cured or lessened (Article 18(d)).

These provisions and several other important contract water delivery provisions are described briefly below--- a few of which were further amended by the Monterey Amendment. A long-term water supply contract for one of the contractors, as it was prior to being amended by the Monterey Amendment is contained in Appendix C.



NOTE: THE BOUNDARIES ON THIS MAP ARE ONLY A RENDERING, NOT AN EXACT DELINEATION OF THE STATE WATER PROJECT CONTRACTORS' SERVICE AREAS
 Source: Department of Water Resources, "Management of the CA State Water Project", Bulletin 132-04.



FIGURE 2-3
State Water Project and Water Supply Contractors' Service Areas

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Monterey Amendment and Settlement Agreement DEIR

2.5.1 Article 6

Charges to SWP contractors include the costs of facilities for the conservation and development of a water supply and the conveyance of such supply to SWP service areas. "Conservation facilities" are those SWP facilities used to develop (or "conserve") water supply, and primarily consist of Oroville and San Luis Reservoirs. Costs for the planning, design, right of way, construction, and operation of the SWP conservation facilities are allocated among the contractors based on their proportionate share of total contractor "Table A amounts." Pursuant to Article 6(a), Table A lists quantities of water which are used as the basis for calculating costs for the storage and development of such supply (referred to as "Table A amounts" pursuant to the Monterey Settlement Agreement).

Table A amounts are also used in allocating among contractors the total SWP water supply that is determined to be available for delivery each year. Under the original contracts, the sum of the maximum Table A amounts of all contractors was not to exceed 4.0 million AF, and was equal to the planned minimum SWP yield of the SWP conservation facilities. This contractual maximum was subsequently increased to 4.23 million AF in 1964. As a result of the Monterey Amendment, in 1996 this contractual maximum was reduced to 4.185 million AF. This number of the contractual limit of total maximum Table A amounts was also referred to in the definition of "minimum SWP yield," which is the dependable annual supply of the SWP that was to be made available to SWP contractors. This yield was also sometimes called "firm yield," which for modeling purposes was based on the maximum amount of water that could be delivered on demand during the 1928-34 drought period taking into consideration certain shortage allocations. However, this planned minimum SWP yield was determined during the formulation of the SWP during the 1950's and 1960's and was based on the assumed amount of water the SWP could deliver upon completion of all anticipated SWP facilities. But all of the originally contemplated facilities have not been built and the existing SWP facilities and operations today are not what was envisioned over 50 years ago (see Chapter 3 for more history of the SWP). In recent years, for operations and planning purposes, the concept of firm yield has been replaced with water delivery reliability curves which show the likelihood of water deliveries by the SWP in any year given the range of historical hydrologic events.

The contractors and their Table A amounts in 1995, prior to execution of the Monterey Amendment, are listed in Table 2-4. The contractors with the largest Table A amounts are Metropolitan Water District of Southern California (MWDSC), a M&I contractor, and Kern County Water Agency (KCWA), primarily an agricultural contractor. Together these two water agencies represent about three-quarters of the total Table A amounts.

Table A amounts in each contractor's SWP long-term water supply contracts ramped up over time until they reached a maximum Table A amount. The contracts were structured to reflect increasing population and water demand, estimated by the Department, and sequential completion of SWP facilities. For most contractors, Table A amounts reached their maximum levels in the early to mid-1990s as shown in Table 2-5. In 1995, the sum of all contractor's Table A amounts was 4,163,066 AF. Currently, the sum of all contractor's maximum Table A amounts is 4,172,786 AF. The difference between this amount and the contractual maximum of 4.185 million AF discussed above is due to a 12,214 AF reduction in Santa Barbara County Flood Control and Water Conservation District's maximum Table A amount in the late 1980's.

Article 6(c) requires the Department to take all reasonable steps to complete the water supply facilities needed to deliver the water amounts contracted for in Table A. This promise of future action was provided because all parties recognized that the initial facilities then being

TABLE 2-4

TABLE A AMOUNTS (1995)

SWP Contractors	Table A Amount (AF)	Type
Butte County	1,200	M&I ¹
Plumas County FC&WCD	1,250	M&I
Yuba City	9,600	M&I
Napa County FC&WCD	9,780	M&I
Solano County WA	34,250	M&I
Alameda Co. FC&WCD, Zone 7	42,000	M&I ²
Alameda County WD	42,000	M&I ²
Santa Clara Valley WD	100,000	M&I
Oak Flat WD	5,700	Agricultural
Kings County	4,000	Agricultural
Dudley Ridge WD	57,700	Agricultural
Empire West Side ID	3,000	Agricultural
KCWA	1,153,400	Agricultural ³
Tulare Lake Basin WSD	118,500	Agricultural
San Luis Obispo Co. FC&WCD	25,000	M&I
Santa Barbara Co. FC&WCD	45,486	M&I
Antelope Valley-East Kern WA	138,400	M&I ⁴
Castaic Lake WA	54,200	M&I ⁵
Coachella Valley WD	23,100	M&I
Crestline-Lake Arrowhead WA	5,800	M&I
Desert WA	38,100	M&I
Little Rock Creek ID	2,300	M&I ¹
Mojave WA	50,800	M&I
Metropolitan WDSC	2,011,500	M&I
Palmdale WD	17,300	M&I
San Bernardino Valley MWD	102,600	M&I
San Gabriel Valley MWD	28,800	M&I
San Geronio Pass WA	17,300	M&I
Ventura County FCD	20,000	M&I
Total	4,163,066	

Notes:

1. Municipal and Industrial
2. These contractors provide small amounts of water to agriculture.
3. Approximately 15 percent of KCWA's Table A amount is classified as municipal and industrial.
4. Approximately 25 percent of Antelope Valley-East Kern Water Agencies SWP water is used by agriculture.
5. 12,700 acre-feet of Castaic Lake WA's Table A amount was acquired from Devils Den Water District in 1992 and is classified as agricultural, but can be delivered for M&I usage.

Year	Upper Feather River	North Bay	South Bay	San Joaquin Valley	Central Coast	Southern California	Total
1970	700	0	114,200	202,000	0	5,700	322,600
1972	970	0	118,300	413,066	0	209,423	741,759
1974	1,230	0	122,400	460,650	0	597,920	1,182,200
1976	1,990	0	126,500	543,417	0	836,480	1,508,387
1978	1,850	0	130,700	635,900	0	1,049,584	1,818,034
1980	1,810	500	134,800	758,100	1,946	1,317,614	2,214,770
1982	1,970	800	139,200	876,500	5,626	1,550,449	2,574,545
1984	3,630	1,100	143,600	979,211	12,698	1,744,098	2,884,337
1986	4,190	1,400	148,100	1,091,946	28,210	1,983,890	3,257,736
1988	5,060	15,471	152,500	1,246,100	43,722	2,225,482	3,688,335
1990	6,040	28,190	160,900	1,313,450	70,846	2,500,600	4,079,666
1991	11,880	29,590	166,400	1,338,011	70,846	2,510,200	4,126,567
1992	11,920	32,010	171,900	1,342,300	70,846	2,510,200	4,138,816
1993	11,960	34,620	177,400	1,342,300	70,846	2,510,200	4,146,966
1994	12,000	37,215	182,000	1,342,300	70,846	2,510,200	4,154,201
1995	12,050	44,030	184,000	1,342,300	70,846	2,510,200	4,163,066

Source: California Department of Water Resources Bulletin 132-01.

constructed would not be sufficient, by themselves, to meet the contractors' maximum Table A amounts, and that even the supply provided by those initial facilities would decline as upstream, local water needs increased. The Monterey Amendment did not change this provision.

2.5.2 Article 15(a)/Article 41

Pursuant to Article 15(a) of the long-term water supply contracts, the Department has approved the sale or transfer of SWP water by a SWP contractor outside its service area. Additionally, Article 41 provides the Department with the authority to approve the assignment or transfers of any part of the contracts. Prior to the Monterey Amendment, the Department implemented various water management practices through SWP contract amendments, separate agreements, or case-by-case agreements. Those water management programs are discussed below.

Transfers

The Department has approved annual transfers of allocated Table A water to help SWP contractors increase their water management flexibility, especially during dry years. One such program involves a transfer from one SWP contractor to another, for the benefit of a landowner who farms in both contractors' service areas. For example, in 1990, Dudley Ridge WD received 161 AF from KCWA and 200 AF from Tulare Lake Basin Water Storage District (WSD) on behalf of two landowners who farm in both districts. This water management option provided Dudley Ridge WD, which relies solely on SWP supplies due to limited access to groundwater, the ability to supplement its low allocation of SWP water during the drought.

In 1992, the Department approved the permanent transfer of Devil's Den WD's entire 12,700 AF of Table A amount to Castaic Lake WA pursuant to Article 41. Castaic Lake WA purchased approximately 90 percent of the farmland comprising the Devil's Den WD service area. The Department's approval conditioned the Table A amount transferred to remain classified as agricultural Table A amount and to remain subject to Article 18(a) shortage provision dealing

with agricultural-use cutbacks. However, Castaic Lake WA's SWP contract amendment allowed it to use the water in its service area for municipal water supply.

Exchanges

In order to achieve flexibility and reliability of both existing and future water supplies to SWP contractors, the Department had approved water exchanges prior to the Monterey Amendment. Exchanges can occur to help contractors re-regulate water supplies, and entail the Department's approval of the SWP operation needed to effect the action; for example, changing the location and timing of water delivery. For example, in 1989 the Department approved a transfer of up to 45,000 AF of KCWA's 1989 allocated Table A water to Westlands Water District, a CVP contractor, to help Westlands WD during a water-short year. Westlands WD was to return a like amount of its CVP water to KCWA during the following 10-year period.

An exchange has been on-going since 1998 between Mojave WA and Solano County WA. In years when Solano County WA has extra water supplies, it transfers a portion of its allocated Table A supply to Mojave WA for direct or in-lieu recharge of the adjudicated groundwater basin within Mojave WA's service area. For every two units of water that is delivered to Mojave WA, the Solano County WA will receive one unit back during a dry year from Mojave WA's supply of Table A water.

Storage Programs Outside Contractor's Service Area

In the late 1980s, the Department began considering requests for storage of a contractor's SWP supplies in groundwater banks outside its service area. In 1988, MWDSC began working on a program with CVP contractor Arvin-Edison WSD to store, through in-lieu and direct recharge means, a portion of MWDSC's SWP water supplies in the groundwater basin underlying Arvin-Edison WSD within Kern County. The benefits of the program were to provide some surface water supplies for about 40 percent of the land formerly irrigated by groundwater, ensuring that the remaining 60 percent of the land could be irrigated from a stabilized groundwater source, reducing groundwater pumping lifts, and providing a water management option for an M&I contractor. Public workshops were held in July 1989 on the program and discussions with the Department and KCWA continued in the early 1990s to resolve local concerns. Deliveries to the program began in 1997.

In 1990, as part of its program to determine the feasibility of operating several local elements of the Kern Water Bank, the Department delivered 150,000 AF from storage in San Luis Reservoir into storage in the Kern County groundwater basin. Under these demonstration programs, the water was delivered according to the terms of five separate agreements between the Department and KCWA and five of KCWA's member units: Semitropic WSD, Buena Vista WSD, Kern Delta WD, Rosedale-Rio Bravo WSD, and Berrenda Mesa WD. The water was recharged mainly through in-lieu (meaning the district used delivered SWP water in place of pumping groundwater, thereby crediting the groundwater that was not pumped as banked surface water), with some water directly recharged to the groundwater basins utilizing existing systems of canals and wells. MWDSC also participated in a groundwater program with KCWA and Semitropic prior to the Monterey Amendment. In 1993, MWDSC began delivering a portion of its SWP supply to Semitropic.

In 1991 the Department implemented two water storage programs in which SWP contractors could store local water supplies in SWP facilities, or could store allocated Table A water in facilities belonging to other SWP contractors. The Spring 1991 Storage Program provided a

means for SWP contractors to store in SWP facilities water captured as runoff, pumped from groundwater supplies, or purchased from suppliers in contractors' local areas. Agencies participating in the program included two SWP contractors: Antelope Valley-Eastern Kern WA and San Bernardino Valley MWD. The Department provided to San Bernardino Valley MWD the storage of 3,600 AF of water diverted from the Santa Ana River and Mill Creek into the California Aqueduct, for use later in the year. San Bernardino Valley MWD also stored local water during 1992 and 1993. Antelope Valley-Eastern Kern WA utilized the program by purchasing additional water supplies from Tejon Ranch in the northern part of its service area, which was then introduced into the California Aqueduct for delivery to the southern part of its service area. The Fall 1991 Storage Program entailed the delivery of 200,000 AF of water from San Luis Reservoir to M&I contractors for storage in local reservoirs or groundwater basins. The water was made available from October through December 1991 due to high storage in SWP reservoirs.

Water Purchases

As a means of conserving and making the most beneficial use of available water supplies, the Department has arranged for purchases of water for SWP operations and deliveries to SWP contractors since 1977. In 1991, California began its first statewide water transfer program, the Drought Water Bank. Established through Executive Order by Governor Wilson in February 1991, the bank was administered by the Department. Of the 862,040 AF of water transferred to the 1991 water bank, 167,012 AF was used for environmental protection of the Delta and other environmental activities. Of the remainder, some was purchased on behalf of and delivered to individual contractors, some was for non-SWP water users, and some was retained as part of SWP water supply. Water was purchased from three sources: 1) surplus water in non-SWP surface reservoirs; 2) additional pumping of groundwater; and 3) fallowed agricultural lands. In 1992, the Department purchased almost 200,000 AF of water and approximately 222,000 AF of water in 1994, on behalf of individual SWP contractors and non-SWP water users.

From 1987-1992, the Department also purchased water from Yuba County WA in northern California on behalf of individual SWP contractors, or for augmentation of overall SWP supplies. For example during 1989, the Department purchased 200,000 AF of water from Yuba County WA's New Bullards Bar Reservoir (non-SWP water) on behalf of two SWP contractors, Santa Clara Valley WD and Tualre Lake Basin WSD. The total acquired by each contractor for delivery in 1989 and 1990 was 90,000 AF and 110,000 AF respectively. Of the 200,000 AF purchased, approximately 20 percent was applied to meet Delta water quality standards.

Conveyance of Non-SWP Water

The California Water Code requires the Department to transport water for others in SWP facilities when capacity is available to do so. The Department has conveyed non-SWP water for the SWP contractors in SWP facilities prior to the Monterey Amendment when sufficient capacity in the facilities was available. For example in 1990, a critically dry year, non-SWP water purchased from Yuba County WA was transported to three contractors: Tulare Lake Basin WSD, Santa Clara Valley WD, and Empire West Side Irrigation District (ID). The amounts conveyed using SWP facilities were 31,211 AF, 28,962 AF, and 2,031 AF respectively.

2.5.3 Article 18

The long-term water supply contracts contained provisions specifying how the Department should curtail water to contractors during a temporary shortage of water supply. A temporary

water supply shortage was defined in Article 18 as one due to drought or other temporary cause, with the result that such supply was less than the total of all contractors' requests for Table A water for that year.

In the long-term water supply contract, Article 18(a) specified that reductions for agricultural use could not exceed 50 percent in any one year and up to an aggregate limit of 100 percent in any series of seven consecutive years before reducing water deliveries for other purposes. If additional reductions were necessary, Article 18(a) stated that further reductions were to be allocated proportionately among all contractors.

During the 1980's and early 1990's the Department did not always allocate water among the contractors based solely on Table A amounts. For example, some contractors did not yet have conveyance connection to the SWP, and many contractors did not request their full Table A amounts. Further, during this time, there was controversy among the Department, agricultural contractors, and M&I contractors regarding whether water should be allocated among contractors based on contractor requests or their Table A amounts. In the shortage years during this period, the Department reduced deliveries of water pursuant to Article 18(a) deficiency percentages, but did so in several years based on contractor requests and in 1994 (the year the Monterey Agreement was negotiated) based on Table A amounts. Since implementation of the Monterey Amendment, water supply is allocated among all contractors in proportion to each contractor's Table A amount for that year, up to each contractor's request for water, regardless of whether the water is for agricultural or M&I purposes. Therefore, any water supply shortage is now shared proportionately among all contractors.

Article 18(b) specified how the Department could reduce contractors' Table A amounts in the event of a permanent shortage of water supply due to a reduction in the minimum SWP yield, regardless of preventive or remedial actions taken by the Department, including lack of construction of sufficient additional conservation facilities. In the event the Department declared a permanent shortage under Article 18(b), the Department would proportionally reduce Table A amounts so that the sum of the Table A amounts equaled the reduced SWP minimum yield. The effect of an implementation of Article 18(b) would have been to reduce the number of years when agricultural contractors would have to take shortages in advance of urban contractors. It would also have reduced the amount of that shortage in years when Article 18(a) was applied to SWP deliveries. It would not, however, have altered the amount of water that the Department delivered to the contractors in the many years when more than the minimum SWP yield was available in the SWP system. Instead, such water would have been delivered to the contractors under Article 21.

Prior to the Monterey Amendment, Article 18(d) provided a means for the Department, with contractor consent, to revise Table A amounts upward after implementation of Article 18(b), if the Department judged that circumstances justified such a revision.

2.5.4 Article 21

The long-term water supply contracts have provided a means for the Department to offer to SWP contractors an additional water supply pursuant to Article 21. Prior to about 1987, when SWP demands were generally below 2 million acre-feet, a "surplus water" supply was offered first to SWP contractors who could use such a supply for agricultural use or groundwater replenishment, then to other SWP contractors for M&I uses. The contractors could schedule this water (often called "scheduled surplus water") for delivery throughout a year when the total

SWP water supply could fulfill the total of that year's annual Table A and when reservoir storage targets had been met.

The Department has additionally delivered "extra surplus water" (further renamed "unscheduled water") when all of the following conditions have existed: the SWP's share of San Luis Reservoir is full, or projected to be full in the near term; other SWP reservoirs are full or at their storage targets, or the conveyance capacity to fill these reservoirs is maximized; the Delta is in "excess" conditions (see Chapter 7); Table A deliveries are being fully met; and the Banks Pumping Plant has spare capacity. "Unscheduled water" has been relatively unpredictable and has been as brief as a day or as long as several months, and had priorities similar to "surplus" water.

Shortly after initial execution of the long-term water supply contracts, Article 21 was amended to clarify that "surplus" water was to be offered to SWP contractors for agricultural use or groundwater replenishment, with the provision that "the State shall refuse to deliver such surplus water to any contractor to the extent that the State determines that such delivery would tend to encourage the development of an economy within the area served by such contractor which would be dependent upon the sustained delivery of water in excess of the contractor's maximum annual entitlement." It was foreseen that once annual Table A amounts (i.e. "entitlement") reached their maximum amounts, the Department could not offer a supply of scheduled surplus water on a reliable basis. In 1974, this provision was placed in section (g) of Article 21, entitled "Restrictions on Deliveries." Additional constraints were added, such as the scheduling of a contractor's approved annual deliveries.

2.5.5 Carryover Water

SWP contractors have had the opportunity to carry over, or retain, a portion of their allocated Table A water in SWP conservation reservoirs from one year into the following year(s), subject to conservation reservoir operations including reservoir levels, filling cycles, and flood operations. Carrying over water allows the contractors to make the most beneficial use of allocated water by not losing such supply at the end of the year, and for contingency planning in case the next year is dry.

Article 12(e) Carryover

From 1977 through 1990, the Department approved annual requests by SWP contractors to carry over a portion of their allocated Table A water in SWP conservation reservoirs on a discretionary basis. This water management practice became the subject of a contract amendment in 1991. Article 12(e) was added to all but one of the long-term water supply contracts and provided contractors the opportunity to carry over Table A water for delivery in the first three months of the following year. Article 12(e) carryover water is limited to Table A water that a contractor scheduled for delivery in October through December which was not delivered due to a scheduled or unscheduled outage in the contractor's service area, or due to a delay in planned pre-irrigation or groundwater storage activities.

Wet Weather Carryover

Pursuant to long-term water supply contract Article 7 (for South Bay contractors) and Article 45 (for San Joaquin Valley contractors: County of Kings, Empire West Side ID, Oak Flat WD, Tulare Lake Basin WSD), seven SWP contractors could acquire credits of deferred Table A water for future delivery if above-normal supplies of local water reduced their needs for SWP

water, termed “wet weather water” by the Department. Subject to the provisions of the contract, the seven contractors could request increased deliveries in later years with wet weather water if there was available SWP water supply and if its delivery did not interfere with the delivery of allocated Table A water to other contractors. Additionally, the sum of a contractor’s wet weather water and its annual Table A amount could not exceed its maximum Table A amount. Signers of the Monterey Amendment lost their balances of wet weather water and this contract provision. Although Empire West Side ID did not sign the Monterey Amendment, their maximum Table A amount was reached in the second year of deliveries, and subject to Article 45 provisions could not acquire wet weather credits.

2.5.6 Article 14(b)

Article 14(b) of the long-term water supply contract provides for allocated Table A water not delivered at any time during a year due to a Department discontinuance or reduction of deliveries for the purposes of repair, maintenance, and replacement of any of the SWP facilities, to be delivered at other times during the year or succeeding years. The delayed delivery is conditioned upon the ability of the Department to deliver that water, considering the Table A delivery schedules of all contractors. Under the Monterey Amendment, Article 14(b) was amended to provide for delivery in only one succeeding year, rather than in succeeding years.

2.5.7 Article 12(d)

Article 12(d) of the long-term water supply contracts provided a means for a contractor to take delivery of Table A water in succeeding years, which the Department was unable to deliver as a result of causes beyond its control. In 1977 as a result of the drought, contractors acquired up to 457,000 AF of Table A future delivery credits, which were taken in 1978 and 1979. In the Monterey Amendment, the Department and the contractors agreed to eliminate this provision and any outstanding Article 12(d) future delivery credits.

2.6 SWP FINANCING AND REPAYMENT

2.6.1 Financing

The major source of financing for construction of the SWP has been from two types of bonds: State general obligation bonds and revenue bonds. General obligation bonds are backed by the “full faith and credit” of the State and are normally paid back from general fund revenues. The State has sold approximately \$1.58 billion of the \$1.75 billion in general obligation bonds authorized by the Burns-Porter Act for the SWP. The Department is repaying the general fund for the principal and interest on those general obligations bonds from revenues it receives from billings to the SWP contractors and other sources.

To supplement general obligation bonds, the Department has sold revenue bonds under the authority of the 1933 Central Valley Project Act. These revenue bonds help finance projects such as power plants that and water facility additions and improvements. The principal and interest on the revenue bonds are paid by the Department from revenues received from SWP contractors and other sources. In addition to bonds, other capital funding sources have included tideland oil revenues (from the leasing of state lands for oil production, primarily off the Long Beach and Santa Barbara coastlines), investment earnings, legislative appropriations for recreation, federal flood control payments, and funds advanced by the SWP contractors.

2.6.2 Repayment

The 29 SWP contractors repay, with interest, about 94 percent of the cost for constructing and operating the SWP conservation facilities. All SWP contractors pay the same unit rate for constructing and operating the SWP conservation facilities, which are used to develop the SWP's water supply and include Lake Oroville, San Luis Reservoir, and a portion of the California Aqueduct from the Sacramento-San Joaquin Delta to San Luis Reservoir. The costs for the development of the conservation facilities are to be repaid by the contractors through the term of the repayment period (2035). Each contractor's annual charge for repayment of these costs is based on that year's unit rate multiplied by that contractor's Table A amount. Each contractor also pays its own "transportation charge," which repays the cost for constructing and operating the aqueduct facilities needed to deliver water to a SWP contractor's service area. Under the transportation charge, the more distant contractors pay a higher charge than those located near the water source in the Sacramento-San Joaquin Delta. In addition to repayment by SWP water contractors, the federal government has paid for a portion of the facilities built by the SWP for flood control.

Since plans to construct the SWP included recreational facilities, those facilities are financed in accordance with several legislative provisions including the Davis-Dolwig Act. The Davis-Dolwig Act declared that providing for the enhancement of fish and wildlife and for recreation in connection with the SWP benefits all the people of California, and that the costs attributable to such enhancement should be paid by them. Likewise, the floodwater storage space in SWP reservoirs is paid by the federal government.