

6. EFFECTS OF PROPOSED PROJECT ON SWP AND SWP CONTRACTOR OPERATIONS

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6.1 INTRODUCTION

The Monterey Amendment and the Settlement Agreement include provisions, many of which result in changes in the allocation of SWP water supplies among contractors and in deliveries to the contractors. This chapter describes the changes in SWP operations that stem from the proposed project and lead to the altered water allocations and deliveries. The changes in operations are part of the proposed project rather than a consequence of it. Operations of the SWP before and after implementation of the proposed project are described in this chapter with emphasis on operation of Lake Oroville, the Banks and North Bay Pumping Plants, and San Luis Reservoir.

6.2 SWP OPERATIONS PRIOR TO IMPLEMENTATION OF THE PROPOSED PROJECT

The SWP is operated to provide water for agricultural, municipal, industrial, recreational and environmental purposes. The California Department of Water Resources (Department) manages the SWP to meet agricultural and municipal contractors' requests for water to the maximum extent possible while meeting all regulatory requirements. The regulatory requirements are described in Chapter 7, Section 7-1. Water is stored in Lake Oroville and released to meet regulatory requirements and to serve four contractors north of the Delta and 24 contractors south of the Delta. The Department also releases water from Lake Oroville to satisfy water rights that predate the Department's water rights. In each of the last five years, about 1,000,000 acre-feet of water has been released from Lake Oroville to satisfy prior water rights. The Department serves one contractor, Plumas County FCWCD, from Lake Davis, upstream of Lake Oroville in the Feather River watershed. Water released from Lake Oroville is pumped from the Delta at the Banks Pumping Plant to serve the south-of-the Delta contractors and at the North Bay Pumping Plant to serve the Napa County and Solano County contractors. In addition, these pumping plants can capture water from unregulated flows entering the Delta for conveyance to contractors.

The amount of water available to the SWP varies widely from year to year depending on hydrologic conditions. Contractors can request water from the SWP in accordance with their contracts, but their requests vary from year to year based on the demand for water in their service areas and the availability of water from other sources. Water demand in all contractors' service areas is met from a number of different water sources. Some contractors have local sources of surface and groundwater and other sources of imported water. A contractor's need for SWP water in a particular year depends on the cost and availability of water from other sources. For example, in years when large amounts of water are available from the Owens and Colorado rivers, MWDSC's demand for SWP water may be reduced. The Department's ability to meet contractors' requests for water is limited not only by hydrology, but also by the capacity of the SWP's storage and conveyance facilities, agreements with other agencies, water rights and, State and federal environmental laws and regulations.

6.2.1 Operation of SWP Storage and Conveyance Facilities

Most of the SWP's water supply is obtained from Lake Oroville, north of the Delta, and from unregulated Delta inflow whereas about 97 percent of the demand for SWP water is located south of the Delta. The Department's ability to convey water from Lake Oroville, to contractors south of the Delta is constrained by the physical characteristics of the Delta, environmental regulations and the capacity and operational constraints of SWP storage and conveyance facilities.

Within these constraints, the SWP is operated to optimize the capture of water in the Delta, maximize the usable supply released to the Delta from Oroville storage, and maximize the intake allotment of Clifton Court Forebay at the maximum permitted rate as much of the time as possible. The diversion of water into Clifton Court Forebay for pumping at the Banks Pumping Plant is controlled by SWRCB D-1641 and permits issued by the U.S. Army Corps of Engineers under Section 10 of the Rivers and Harbors Act. This diversion rate is normally restricted to 6,680 cfs as a three-day average inflow to Clifton Court Forebay, although at times of high San Joaquin River flows, one-third of the flow in that river at Vernalis may be pumped in addition. Additional information on the environmental regulations that apply to the SWP's Delta operations is contained in Section 7.1.

The Clifton Court Forebay radial gates are operated at certain times to protect water levels in the south Delta area for the benefit of local agricultural interests. At these times, the radial gates controlling inflow to the forebay may be open during any period of the tidal cycle with the exception of the two hours before and after the low-low tide and the hours leading up to the high-high tide each day.

The Banks Pumping Plant is operated to minimize the impact to power loads on the California electrical grid to the extent practical, using Clifton Court Forebay as a holding reservoir to allow that flexibility. Generally, more pump units are operated during off-peak energy demand periods and fewer during peak periods. Because the installed capacity of the pumping plant is 10,300 cfs, the plant can be operated to reduce power grid impacts, by running all available pumps at night and a reduced number during the higher energy demand hours, even when Clifton Court Forebay is admitting the maximum permitted inflow.

Typically, the Department pumps all the water it can at the Banks Pumping Plant, as limited by supply availability and regulatory and system capacity constraints. At times, however, when San Luis Reservoir is full, pumping at Banks is reduced to only that amount needed to meet contractors' total current demand, even though additional supply is available in the Delta. Under these conditions, Banks Pumping Plant operations are "demand limited".

San Luis Reservoir is the Department's primary storage facility south of the Delta. San Luis Reservoir is a joint SWP and CVP facility in which storage is shared about equally. The SWP's share is used to store water pumped from the Delta at the Banks Pumping Plant, generally in the winter and spring, that exceeds contractors' current demands. Water is released from San Luis Reservoir to the California Aqueduct, generally in the late spring, summer and fall, when pumping at Banks is insufficient to meet contractors' peak demands.

The Department attempts to fill its share of San Luis Reservoir as early in the water year (which begins October 1 and ends September 30) as it can. The reservoir is generally filled in the winter and spring, possibly as early as January, or even earlier in some years, but more often in February, March, or April. Once the SWP's share of San Luis Reservoir is full, and other SWP

storage facilities south of the Delta are full or at their storage targets, the Department generally announces the availability of additional water, on a temporary and interruptible basis, under Article 21 of the long term water supply contracts. Contractors may request delivery of Article 21 water if they can put it to direct beneficial use or store it for future use in their service areas.

During the summer, the Department releases water from Lake Oroville to supplement Delta inflow and allow the Banks Pumping Plant to export the stored Oroville water to help meet demand. These releases are scheduled to maximize export capability and gain maximum benefit from the stored water while meeting in-stream fish flow requirements, temperature requirements, Delta water quality, and all other applicable standards in the Feather River and the Delta.

As San Luis Reservoir is drawn down to meet demands, it usually reaches its low point in late August or early September. From September through mid-October, demand for deliveries usually drops falling below Banks Pumping Plant diversions from the Delta; diversions above that demand are then used to begin refilling San Luis Reservoir, reversing its spring and summer drawdown. From mid-October until the first major storms in late fall or winter unregulated flow continues to decline and releases from Lake Oroville are restricted due to flow stability agreements with CDFG. This results in export rates at Banks that are somewhat less than demand, typically causing a second seasonal decrease in the SWP's share of the storage in San Luis Reservoir. Once the fall and winter storms increase runoff into the Delta, Banks can increase its pumping rate and eventually fill the SWP's share of San Luis Reservoir.

Once the south-of-Delta SWP storage reservoirs are full, the contractors are taking all the water they can accept (both Table A and Article 21 water), and Banks Pumping Plant is not being used to convey non-Project water, then the amount of water taken into Clifton Court Forebay may be cut back to just balance south of Delta SWP deliveries. At this time, Delta outflow increases by the amount of the intake decrease at Clifton Court Forebay.

The Department must balance storage between Lake Oroville and San Luis Reservoirs carefully to meet flood control requirements, Delta water quality and flow requirements, and optimize the supplies to its contractors consistent with all environmental constraints. Lake Oroville may be operated to move water through the Delta to San Luis Reservoir via the Banks Pumping Plant under different schedules depending on Delta conditions, reservoir storage volumes, and storage targets. Predicting those operational differences for an EIR is not practical, as the decisions reflect operator judgment based on many real-time factors as to when to move water from Lake Oroville to San Luis Reservoir and other south-of-Delta SWP reservoirs. Even if it were possible to predict the differences, it would likely make little or no difference in the total amount of water moved through Banks Pumping Plant in a year, and would likely make no difference to allocations of the water to the contractors.

6.2.2 Coordinated Operation of the SWP and CVP

The SWP and CVP both divert large volumes of water from the Delta and must comply with applicable environmental regulations including Delta water quality standards. Coordinated operations help the two water projects meet consumptive and environmental water needs more efficiently. Coordinated operations in the 1970s and early 1980s were accomplished by annual agreements between the Department and Reclamation. In 1986, the two agencies executed the Coordinated Operating Agreement (COA), which specifies how the two parties would operate their facilities to meet their customers' water demands and Delta water quality standards and other environmental regulations without adversely affecting each other. The COA specifies two

conditions for operational purposes: balanced conditions and excess conditions. Balanced conditions occur when releases from upstream reservoirs and unregulated flow equal the water supply needed to meet Sacramento Valley in-basin uses and exports from the Delta. Excess conditions occur when releases from upstream reservoirs and unregulated flow exceed the water supply needed to meet Sacramento Valley in-basin uses and exports from the Delta. During balanced conditions, the SWP and CVP coordinate their operations in a prescribed manner. During excess conditions, the SWP and CVP still coordinate their operations for flood control and other purposes, but their operations are not prescribed by the COA.

The CVP and SWP have historically shared their Delta export pumping facilities when it is advantageous to do so. Sharing of the pumping facilities can help both projects deliver water to their contractors when demand is high or some facilities are out of service in emergencies or during maintenance. The sharing of facilities is referred to as the Joint Point of Diversion (JPOD). In 1978, the Department agreed to, and the SWRCB permitted, the CVP to use the SWP's Banks Pumping Plant capacity to divert and export up to 195,000 AF annually from the Delta to replace pumping capacity lost at the CVP's Tracy Pumping Plant (now known as the Jones Pumping Plant). Pumping capacity was lost as a result of restrictions contained in the SWRCB's Decision 1485. In 1986, Reclamation and the Department formally agreed that "either party may make use of its facilities available to the other party for pumping and conveyance of water by written agreement".

6.2.3 Allocation and Delivery of SWP Supplies

The following narrative describes the practices of the Department in determining the overall amount of Table A water that can be allocated and the allocation process itself. There are many variables that control how much water the SWP can capture and provide to its contractors for beneficial use. An understanding of the allocation process and the way it is implemented is helpful to understanding the analysis in this document.

The allocations are developed from analysis of a broad range of variables that include:

- Volume of water stored in Lake Oroville,
- Flood operation restrictions at Lake Oroville,
- End-of-water-year (September 30) target for water stored in Lake Oroville,
- Volume of water stored in San Luis Reservoir,
- Minimum target (low-point) for water stored in San Luis Reservoir,
- Snow survey results,
- Forecasted runoff,
- Feather River flow and temperature requirements for fish habitat,
- Feather River service area delivery obligations,
- Feather River flow levels to support direct diverters,
- Expected depletions in the Sacramento River basin,
- Expected Delta conditions,
- Precipitation and streamflow conditions since the last snow surveys and forecasts,
- Contractor delivery requests for water, and

- Other SWP uses (i.e. recreation, fish and wildlife purposes, operational purposes, and operational losses).

From these and other variables, the Department estimates the total Table A water supply available to allocate to contractors and meet the SWP's needs. The Department then enters the water supply, contractor requests, and Table A amounts into a spreadsheet and computes the allocation percentage that would be provided by the available water supply for the calendar year. The allocation percentage was computed based on requests for Table A water through 1993 and based on Table A amounts thereafter. (See Chapter 2 for a more complete discussion of the Department's past practices with respect to allocations and the controversies surrounding them.)

Department management then makes the final decision on the initial percentage of Table A amounts to allocate to the contractors. The decision is made, and announced in a press release followed by a Notice to Contractors. (A past practice was to issue a letter to all contractors, followed by a Water Service Contractors' Council memorandum.) This process is repeated several times each year as necessary to update allocations to match current hydrologic conditions.

By October 1, (the beginning of the water year), the contractors submit initial water delivery schedules (i.e., requests) for monthly Table A water deliveries for the following calendar year. The initial allocation announcement is made by December 1 of each year. The allocation of water is made with a conservative assumption of future precipitation, and generally in graduated steps, carefully avoiding over-allocating water before the hydrologic conditions are well defined for the year. The Department might allocate as little as 10 percent of requested supply as was the case in December 1993. As storms move in off the Pacific and new snow surveys and runoff assessments occur, the allocations are increased accordingly. Generally the last allocation is made by mid-April or mid-May, although in 1991, allocations were increased from 20 percent to 30 percent on October 4.

Beginning in late December, the contractors may submit updated weekly and monthly delivery schedules to the Department. The Department uses these updated requests and, after accumulating any new information on hydrologic conditions, may revise its estimates of probable deliveries, update allocations, schedule actual weekly water deliveries and adjust SWP operations. If the Department has more water available than is needed to satisfy all of the contractors' requests for Table A water, the SWP's needs and regulatory requirements, additional water is made available to the contractors. Prior to the Monterey Amendment, the Department made two types of additional water available under Article 21 of the long-term water supply contracts. Article 21 water that was called "scheduled surplus water" was made available to the contractors when the amount of water predicted to be available in SWP storage reservoirs and from unregulated Delta flow exceeded Table A requests for the year. In that case, the Department offered scheduled surplus water to contractors and approved deliveries through the year that did not interfere with Table A deliveries. Article 21 water that was called "unscheduled water" was in excess of the SWP's immediate needs and was typically offered to contractors on a short-term (daily or weekly) basis. Delivery of unscheduled water could be discontinued on short notice. For both types of Article 21 water, use for agricultural purposes and for groundwater recharge had priority over M&I use. Article 21(g) stated that scheduled surplus water would not be delivered if it encouraged development of an economy dependent on surplus water.

For example, in October 1985, the contractors requested 2.36 million acre-feet (AF) of Table A water for delivery in 1986. In December 1985, as a wet winter was beginning, the Department approved an allocation of 100 percent for M&I contractors and about 95 percent for agricultural contractors. In February 1986, the allocation for agricultural contractors was increased to 100 percent and the availability of surplus water was announced. Ultimately, the Department delivered about 2 million AF of Table A water and 37,000 AF of surplus water to contractors in 1986.

In drier years, the Department may not have sufficient water to satisfy the requests of the contractors and meet the SWP's other obligations and needs. The shortage provision of Article 18(a) of the long-term water supply contracts specifies how water should be allocated to contractors during shortages. Prior to the Monterey Amendment, Article 18(a) required that deliveries to the agricultural contractors be reduced before the M&I contractors were subject to any reduction in deliveries.

Table 6-1 shows Table A amounts, contractors' initial requests for Table A water and delivered Table A water, scheduled surplus water and unscheduled surplus water for each year from 1980 to 1995. It also shows the percentage of the requests for urban and agricultural water that the Department was able to meet each year. From 1980 through 1989, the Department was able to meet 100 percent of the contractors' requests for Table A water.

Several dry years occurred in the early 1990s and the Department was unable to meet all contractors' requests for Table A water. In 1990, the Department allocated 100 percent of the water requested by M&I contractors but cut allocations to agricultural contractors to 50 percent of their requests. In 1991, a critically dry year, the Department allocated 30 percent of the water requested by M&I contractors but allocated no water to the agricultural contractors. In the following years, 1992, 1993 and 1994, the Department allocated 45 percent, 100 percent and 50 percent of their requests to both M&I and agricultural contractors, respectively. M&I and agricultural contractors were subject to the same proportional cutbacks in 1992 and 1994 because the cutbacks in deliveries to agricultural contractors allowable under Article 18(a) (100 percent in a seven-year period) had been exhausted in 1990 and 1991.

Although not a policy, the general practice of the Department has been to allocate Table A water in five percent increments as it announces its decisions. An exception to this practice occurred in late 1989, when the Department initially approved a 72 percent allocation for agricultural users for 1990. Another exception occurred in 2001, when a 33 percent allocation was announced on May 4, increased to 35 percent on May 17, and then finally set at 39 percent on August 16, 2001. Other minor exceptions to the practice occurred in 1986, 1987 and 1994.

The practice of allocating water in five percent increments is reflective of the relative imprecision inherent in projecting water conditions and customer demands months in advance. Weather conditions and contractor demand both involve substantial uncertainty. For example, weather conditions may cause some contractors, notably MWDSC, to eventually schedule delivery of less water than originally requested. A cooler summer and wetter spring are primary reasons that MWDSC may require a lesser supply in some years than the amount it forecasts when it submits its delivery request to the Department in the prior October. Similarly, southern Central Valley agricultural contractor demands may be reduced by a wet spring.

San Luis Reservoir often contains much more water at the low point in August or September than the earlier forecasts, but occasionally is drawn down to or even below the targeted 42,000 AF low point, which represents the SWP share of "dead pool" storage. Under some conditions,

TABLE 6-1

ALLOCATIONS AND DELIVERIES OF TABLE A AND ARTICLE 21 WATER (1980—1995)

Year	Total Table A Amounts AF	Initial Table A Requests AF	Final Table A Allocations AF	Table A Deliveries AF	Article 21 Water Delivered AF			Final Allocation %	
					Unscheduled	Surplus	Total	M & I	Ag
1980	2,214,770	1,880,386	1,880,386	1,529,749	72,457	332,100	404,557	100	100
1981	2,392,468	1,876,707	1,876,707	1,909,562	275,045	633,383	908,428	100	100
1982	2,574,545	2,342,576	2,342,576	1,750,024	168,151	46,983	215,873	100	100
1983	2,701,164	2,365,818	2,365,818	1,184,869	0	13,019	13,019	100	100
1984	2,884,337	1,563,620	1,563,620	1,588,619	0	262,917	262,917	100	100
1985	3,055,846	1,862,709	1,862,709	1,995,453	0	307,672	307,672	100	100
1986	3,257,736	2,364,193	2,364,193	1,995,636	22,034	14,586	36,620	100	100
1987	3,484,115	2,717,215	2,337,715	2,130,086	114,907	0	114,907	100	100
1988	3,688,335	2,625,328	2,595,120	2,385,122	0	0	0	100	100
1989	3,958,190	2,999,451	2,999,451	2,853,747	0	0	0	100	100
1990	4,079,666	3,218,790	2,469,405	2,582,151	90	0	90	100	50
1991	4,126,567	3,484,687	671,711	549,113	3,521	0	3,521	30	0
1992	4,138,816	3,630,618	1,634,000	1,471,454	1,156	0	1,156	45	45
1993	4,146,966	3,846,195	3,846,195	2,315,235	0	0	0	100	100
1994	4,154,201	3,841,096	1,918,622	1,749,351	112,625	0	112,625	50	50
1995	4,163,066	3,163,780	3,163,780	1,967,093	64,330	0	64,330	100	100

Source: California Department of Water Resources Bulletin 132-05 and California Department of Water Resources files.

such as occurred in 1981, 1982, and 1990, the state share of San Luis Reservoir may be drawn below the target. Actual state share storage in San Luis Reservoir was 5,555 AF at December 31, 1990. (Total water storage, including CVP supplies in San Luis Reservoir, was higher than the total dead pool level of 80,000 AF.) In contrast, the Department set a target for low point storage in San Luis Reservoir at 100,000 AF in 1993. The actual summer low point in 1993 was 723,206 AF.

Thus in 1993, a wet year, low point storage exceeded the target by over 600,000 AF. In 1990, a drought year, the low point storage was short of the target by nearly 100,000 AF. This, and the previous example, illustrates the imprecision of forecasting at the beginning of the year, before the hydrologic conditions are known, and before real contractor demands are known, even though the Department adjusts allocations as information on hydrologic conditions and water demand improves as the year progresses. Because the Department makes its supply projections cautiously, not wishing to overestimate likely water availability, and the contractors make their delivery requests cautiously, not wishing to underestimate demand, the potential for variations between projections and actual events, especially under wet hydrologic conditions, is considerable.

6.2.4 Operations and Activities During Droughts

During a drought the Department makes the most beneficial use of available water to the SWP by utilizing drought-related activities and modifying operations. It considers the variables listed previously with an emphasis on the following:

- Managing available supplies;
- Determining acceptable amounts of water to be retained in storage to be carried over (targeted) for use in following years;
- Ensuring water supplies to meet following-year Delta requirements;
- Ensuring water quality to contractors;
- Supplementing water supplies through transfers, exchanges, and purchases; and
- Encouraging carryover programs to allow contractors' more flexibility in the management of available supplies.

6.2.4.1 Water Quality

Water quality in the Delta depends primarily on a balance between downstream freshwater flows and saltwater tidal incursions. The Department monitors water quality through an automated network of continually operating recorders, laboratory analyses of field samples collected at weekly, quarterly, monthly, or annual intervals and long-range modeling activities. Additionally, the Department conducts special studies to investigate water quality at potential problem sites or as a result of unique events.

During periods of low river flows from the Sacramento and San Joaquin rivers, water is released from both SWP and CVP reservoirs to meet Delta standards. In addition, both the CVP and SWP can reduce exports from the Delta, increase releases, and open or close the Delta Cross Channel (to help regulate direction of water passing into the Delta), to improve water quality in the Delta. For example, in 1991 when exceptionally high tides and strong westerly winds, high consumptive use in the Delta, and physical failures at the Suisun Marsh salinity control gates

combined to cause chloride levels to rise unacceptably at the Contra Costa Water District intake in the western Delta, both the SWP and CVP curtailed exports to try to improve water quality.

In addition to Delta operations, SWP reservoirs can be operated to improve stream flows and water quality during droughts. During an extended drought when reservoir levels are low, a top priority at Lake Oroville is meeting water temperature requirements for fish downstream of the dam while balancing power generation through the Hyatt Powerplant.

In order to improve water quality to South Bay contractors, the Department in 1988 made releases from Lake Del Valle during the summer in order to blend Del Valle water with Delta water to reduce chloride levels in the South Bay Aqueduct water. Typically, Lake Del Valle reservoir levels are maintained at a constant elevation for recreation from Memorial Day through Labor Day.

6.2.4.2 Transfers

In 1982, because of increasing environmental concerns and costs of developing large-scale water projects, California adopted a statewide policy of encouraging voluntary transfers between agencies throughout the state (CWC §109). Enabling legislation provided a means for the Department to acquire supplemental water supplies, especially during a drought, and directed the Department to establish an ongoing program to facilitate voluntary exchange or transfer of water (CWC § 480).

During the 1987 through 1992 drought, the Department established a drought information center and drought water banks. The purpose of the drought water bank was to provide supplies to entities with a critical need for water during droughts. Water for the banks was obtained from surplus water in non-SWP surface reservoirs, groundwater and water saved as a result of fallowing agricultural lands. During the drought, the Department purchased considerable amounts of water from Yuba County Water Agency and other agencies in northern California on behalf of individual SWP contractors, or for augmentation of overall SWP supplies. The Department also approved transfers of Table A water from both M&I and agricultural contractors to agricultural contractors whose only source of water was SWP water, or whose permanent crops (trees and vines) were in water-deficient areas.

6.2.4.3 Carryover Storage in San Luis Reservoir

Prior to 1990, the long-term water supply contracts contained no provision for contractors to carry over allocated Table A water in SWP reservoirs from one year to the next (although Articles 12(d) and Article 14(b) "make-up" water offered credits of water). During the spring and fall of 1988, insufficient rainfall induced fears of a continued drought and deficiencies on agricultural requests. The Department informed the contractors of its willingness to consider requests to carry over 1988 Table A water for two purposes: (1) for agricultural contractors to use for pre-irrigation during January, February, and March 1989; and (2) for all contractors to replace water that could not be delivered during the fall of 1988 because of outages within the contractors' distribution systems. The contractors were informed that carryover water could not affect the delivery of Table A water to other SWP contractors. By summer 1991, most contractors had signed contract amendments to provide for Article 12(e) carryover. Often no water was carried over in San Luis Reservoir pursuant to Article 12(e) and when it was, the amounts were usually small. Prior to 1994, the maximum total amount of water carried over pursuant to Article 12(e) was 25,000 AF.

6.2.5 Storage of SWP Water by Contractors

Contractors may store SWP water within their service areas for later use. For example, in a wet year, a contractor might take more SWP water than it needs in that year to meet current demand, placing the balance in storage for future use. The ability to store SWP water enables contractors to increase the overall reliability of their water supplies. Some contractors are able to store SWP water in groundwater basins within their service areas, for example KCWA and Mojave WA. Other contractors have built surface storage facilities within their service areas to increase their ability to take SWP water when it is available. Diamond Valley Reservoir in MWDSC's service area, approved prior to the Monterey Amendment but completed afterwards, and Anderson Reservoir in Santa Clara Valley WD's service area are examples of reservoirs used to store SWP water.

Prior to the Monterey Amendment, the SWP contracts did not prohibit storage of SWP water outside contractors' service areas but it was not common. Starting in the mid- to late-1980s, some contractors became interested in storing SWP water outside their service areas. This may have been due to increasing water demand, fewer opportunities to store SWP water within contractors' service areas and concerns about delivery reliability in dry years. Delivery reliability in dry years would be improved by additional SWP storage but there was growing recognition that none was likely to be constructed any time soon.

In the early 1990s, Semitropic WSD developed a groundwater bank with a capacity of one million AF. MWDSC acquired about one-third of the capacity of the water bank. In 1993, the Department and MWDSC negotiated an agreement for temporary storage of a portion of MWDSC's SWP water in the Semitropic WSD's water bank. In 1994, the two agencies signed an agreement permitting long-term storage of a portion of MWDSC's SWP water in the water bank. Other similar storage programs were being discussed prior to the Monterey Amendment as described in Chapter 2.

6.2.6 Table A Transfers

Prior to the Monterey Amendment, SWP water was occasionally transferred from one contractor to another. SWP contractors transferred water from one contractor to another to increase their water management flexibility and help meet the needs of their customers. Transfers were arranged by the contractors but were subject to approval by the Department. The transfers were temporary in nature and were approved and implemented by the Department on a case-by-case basis.

Prior to the Monterey Amendment, Department approval had been sought for only one permanent transfer of Table A amount. In 1991, the Department approved the transfer of Devil's Den Water District's entire Table A amount of 12,700 AF to Castaic Lake WA. Several other agricultural contractors were interested in selling Table A amounts and several M&I contractors were interested in acquiring Table A amounts, but no transfers other than the transfers between Devil's Den WD and Castaic Lake WA had been executed prior to the Monterey Amendment.

6.2.7 Conveyance of Non-project Water

In accordance with the California Water Code, the Department is required to convey non-SWP water in SWP facilities when capacity to do so is available and conveyance of non-SWP water does not interfere with SWP operations. This obligation was in effect prior to the Monterey

Year	From	To	Delivery (AF)
2005	Westlands WD	KCWA	11,284
2005	USBR (CVP Art. 215)	DRWD	576
2004-2005	CVP Contractors	KCWA	21,508
2004	Brown's Valley ID	Santa Clara Valley WD	3,100
2003	Brown's Valley ID	Santa Clara Valley WD	3,100
2003	Byron Bethany ID	Zone 7	1,000
2002	Lower Tule River ID (CVP)	Tulare Lake Basin WSD	10,956
2002	Kern-Tulare/Rag Gulch (CVP)	KCWA	39,975
2002	Byron Bethany ID	Zone 7	2,000
2001	Byron Bethany ID	Zone 7	3,997
2000	Natomas Central Mutual Water Co.	MWDSC	900
2000	Byron Bethany ID	Zone 7	1,000
1999	Byron Bethany ID	Zone 7	2,000
1998	Tulare Lake Basin WSD (Kern River Water)	MWDSC	1,000
1998	Byron Bethany ID	Zone 7	2,000
1997	Natomas Central Mutual Water Co.	Mojave WA	1,600
1997	Byron Bethany ID	Zone 7	667
1996	Byron Bethany ID	Zone 7	667
1995	Byron Bethany ID	Zone 7	667
1994	Byron Bethany ID	Zone 7	2,000
1993	Alhambra Pacific Joint Venture	Solano	600
1992	Glenn-Colusa ID	Solano	38
1992	Glenn-Colusa ID	Napa	116
1991	Yuba County	Napa	7,390
1991	Yuba County	SCVWD	25,589
1991	Placer County	SCVWD	13,714
1990	Yuba County	Empire	2,031
1990	Yuba County	Tulare Lake Basin	31,211
1989	Yuba County	SCVWD	17,085
1989	Yuba County	Tulare Lake Basin	53,501
1989	Yuba County	Empire	812
1989	Yuba County	Napa	3,958
1988	USBR	Napa	1,646
1987	USBR	Napa	7,693

Note: Table does not include water purchased by California Department of Water Resources.

Amendment and was not affected by it. Table 6-2 shows conveyance of non-SWP water by the Department from 1987 through 2005. From 1996 through 2005, the Department conveyed an average of about 6,000 AF per year of non-SWP water.

6.3 CHANGES IN SWP OPERATIONS SINCE 1995 UNRELATED TO THE PROPOSED PROJECT

Several aspects of the SWP operations have changed since 1995. Some of these are a direct result of the Monterey Amendment, and are addressed in subsequent sections. Others are a result of factors unrelated to the Monterey Amendment. They include increased water demand since 1995, application of the federal Endangered Species Act to certain fish species in the

Delta, the implementation of the CALFED Bay-Delta Program, and the implementation of the Environmental Water Account (EWA) in 2000, as part of the CALFED Program.

6.3.1 Increased SWP Demand

Since 1995, water demands have increased in many contractors' service areas. This demand increase affects the operation of the SWP. The increased demand is independent of the changes that are a part of the proposed project.

As noted above, there are times (primarily in wetter periods) when Banks Pumping Plant operations are demand-limited, and the Department is able to pump enough water from the Delta to fill San Luis Reservoir and meet all contractor demands without maximizing its pumping capability at Banks. But demand-limited conditions have been much less likely to occur in recent years because the contractors request all, or nearly all, of their Table A amounts every year. Since about 1999, Banks operations have been more often supply-limited. Under supply-limited conditions, Banks Pumping Plant is operated at its maximum permitted capacity in order to maximize the volume of water captured, subject to the limitations of water quality, Delta standards, and a host of other variables, until all needs are satisfied and all SWP storage facilities south of the Delta are full or at their storage targets. As a consequence of the increase in requests for Table A water, and relatively dry hydrologic condition since 2000, there were fewer times when Delta pumping was reduced than formerly.

6.3.2 CALFED Bay-Delta Program and the Environmental Water Account

In 1994, the CALFED Bay-Delta Program was formed to address long-standing and unresolved conflicts over water use in the Sacramento-San Joaquin Delta. It is a collaborative program of 23 federal and state agencies. Its goal is to restore the ecological health of the Delta while ensuring an adequate supply for Delta water users including the SWP and CVP.

Several fish species in the Delta are listed as threatened or endangered pursuant to the FESA. The federal agencies responsible for administering the act, USFWS and NMFS, have determined that, at certain times of the year, diversion of water from the Delta by the SWP and CVP could harm listed fish species. The USFWS and the NMFS have the authority to require a cessation or curtailment of pumping at times when they believe continued pumping would jeopardize endangered fish species. Curtailments of pumping occurred at times in May and June of 1996, 1997, 1999, and 2000.

During Phase I of the CALFED Program, a range of alternatives for achieving long-term solutions to the problems of the Delta was developed. In Phase II, a programmatic EIS/EIR was prepared on the CALFED Program. The preferred alternative, identified in the CALFED Record of Decision, which was published in 2000, is being implemented in Phase III of the CALFED Program. One of the CALFED program actions being implemented to address water supply reliability in the context of endangered species issues is the EWA.

The purpose of the EWA is to enable diversion of water by the SWP and CVP from the Delta to be reduced at times when at-risk fish species may be harmed or killed while preventing the uncompensated loss of water to SWP and CVP contractors. The EWA facilitates a reduction in Delta diversions at times when the species of concern are most at risk. These pumping curtailments are called "fish actions."

The EWA replaces any water lost to the SWP and CVP due to curtailment of pumping by purchase of supplies from willing sellers and by taking advantage of regulatory flexibility and certain SWP operational assets. The EWA acquires water from willing sellers by transfers of water from non-SWP reservoirs, by purchase of previously banked groundwater and by transfers of surface water made available by groundwater substitution. The EWA can also purchase water made available by the idling of crop land or by the substitution of high water use crops with lower water use crops, but this has not yet been done.

The EWA can gain operational assets by relaxing the export/Delta inflow (E/I) ratio at times to increase Banks pumping; by pumping of certain environmental water released to the Delta after it has served its other purposes; and by temporary use of available storage in SWP and CVP reservoirs. The EWA can also use 500 cfs of the capacity at the Banks Pumping Plant above the 6,680 cfs intake rate from July 1 through September 30 each year to move purchased EWA transfer water through the Delta or gain unappropriated water if the Delta is in excess conditions. The replacement water is then delivered to the CVP and SWP at the O'Neill Forebay of San Luis Reservoir.

Five agencies administer the EWA. They are the Department and Reclamation (the agencies that operate the SWP and the CVP) the USFWS, the NMFS and the CDFG, (the agencies responsible for protecting and managing the Delta's natural resources). The Department and Reclamation are called the Project Agencies; the others are called the Management Agencies. The EWA began operation in late 2000.

The operation of the EWA does not change any deliveries to SWP or CVP contractors, but it does change certain aspects of SWP operations. As part of the EWA adaptive management process described above, the SWP is permitted to pump an additional 500 cfs from July 1 to September 30, making the summer limit effectively 7,180 cfs rather than 6,680 cfs. Thus, due to fish actions, less water may be moved through the Delta in December through June and more water may be pumped in July through September.

Because the EWA Program supports pumping curtailments (fish actions) between December and June, and repays the water primarily in the summer months, the water levels in San Luis Reservoir are generally lower with EWA operations than without during parts of the year. The amount of pumping curtailments at Banks that are not yet repaid is termed EWA debt. The amount of water stored in San Luis Reservoir is tracked in two ways: actual and base case. The base case is the storage level in the reservoir that would have occurred if there were no EWA debt to the SWP. The actual level is lower than the base case by the amount of EWA debt.

San Luis Reservoir operations with the EWA in operation occur as follows. The Department attempts to fill San Luis Reservoir as early in the year as it can. Once it is full in the base case (full except for EWA debt), other SWP storage facilities south of the Delta are full or conveyance capacity to fill these reservoirs is maximized, and conditions are such that exports are projected to exceed demand, the Department typically announces the availability of additional water under Article 21 of the water supply contracts. Contractors may request delivery of the additional water if they can put it to direct beneficial use or place it in storage. If the contractors' Table A and Article 21 water deliveries are being satisfied, and the permitted maximum intake capacity at Clifton Court Forebay exceeds those demands, the EWA may use that added pumping capacity to repay any debt it might have to the SWP in San Luis Reservoir. Otherwise EWA repays the debt later in the year with purchased water or operational assets, or may carry some debt to the SWP into a future year.

Once the EWA debt is repaid, the south-of-Delta SWP storage reservoirs are full or at their storage targets, the contractors are taking all the water they can accept (both Table A and Article 21), and Banks is not being used to convey non-SWP water, then the amount of water taken into Clifton Court Forebay may be cut back to just balance south-of-Delta SWP deliveries. At this time, Delta outflow increases by the amount of the intake decrease at Clifton Court Forebay and pumping at the Banks Pumping Plant is decreased by a like amount. Under current demand conditions, this change generally occurs only during wet winters, and usually ends by the start of VAMP, which generally begins April 15, but occasionally begins later (May 1 in 2005 and 2006).

The result of this aspect of EWA operations is to reduce the amount of time when all SWP reservoirs south of the Delta are full or at their storage targets, all SWP demands are being met, and Banks pumping can be reduced. Banks pumping would generally not be reduced until the EWA debt has been repaid and SWP storage in San Luis Reservoir is physically full.

6.3.3 Vernalis Adaptive Management Program

During April, the Vernalis Adaptive Management Program (VAMP) takes effect. The VAMP is an experimental/management program designed to protect juvenile Chinook salmon migrating down the San Joaquin River and through the Delta. The program involves the release of water from reservoirs on the San Joaquin River and the curtailment of pumping by the SWP and CVP. Around the time the SWP and CVP reduce their export pumping for the VAMP, water demands from both agricultural and M&I contractors are increasing, and if still available, delivery of Article 21 water is usually discontinued. Water is released from San Luis Reservoir to the California Aqueduct as needed to meet contractors' demands for Table A water that exceed allowable Delta pumping.

By late May, after VAMP and its "shoulders" (the ramping down of pumping before VAMP and ramping back up of pumping after VAMP), Delta pumping at the Banks Pumping Plant can be increased depending on Delta inflow and Delta standards. By late May, demands usually exceed the restored pumping rate at Banks, and continued releases from San Luis Reservoir are needed to meet contractor demands for Table A water.

6.3.4 Water Rights Decision 1641 and Joint Point of Diversion

The SWRCB's issued Water Rights Decision 1641 in 1999 and revised it in two water rights orders in 2000 and 2001. Revised D-1641 requires Reclamation and the Department to continue to meet certain water quality and flow objectives in the Delta. The SWRCB's actions are described in detail in Chapter 7, Section 7.1.

D-1641 also authorizes the Department to divert up to 4,600 cfs at the CVP's Jones Pumping Plant subject to approval by Reclamation if certain conditions are met. Reclamation may divert water at the Banks Pumping Plant in accordance with similar provisions. Per D-1641, use of JPOD is allowed only when fish and wildlife and other legal users of water are protected from harm.

6.4 SWP OPERATIONS UNDER THE PROPOSED PROJECT

The Monterey Amendment made numerous changes to the long-term water supply contracts between the Department and the SWP contractors. Some of the changes affected the operations of the SWP whereas others were administrative changes that had no effect on SWP operations. Table 6-3 lists the articles in the SWP contracts that were amended, deleted or added as part of the Monterey Amendment and indicates whether they have the potential to change SWP operations. If an article could cause changes in the way SWP water is stored or conveyed then it was assumed that it could have the potential to produce a change in SWP or contractor operations, which might in turn have environmental effects.

The contractual changes with the greatest potential for effects on SWP operations are those that altered water allocation procedures in times of shortage and surplus, enabled transfers and retirements of Table A amounts, and provided for the use of various water supply management practices.

6.4.1 Analytical Methods

Two analytical methods were used to examine the effects of the Monterey Amendment on SWP and SWP contractor operations: analysis of historical data and CALSIM II model simulation and post-processing of CALSIM II output. Several studies were conducted using analysis of historical data (Study Nos. 1, 2 and 3) and CALSIM II (Study Nos. 4 and 5). The studies are listed in Table 5-2 and are contained in Appendices F, H, I and K.

To characterize the effects of the proposed project between 1996 and 2003, three historical analyses were performed. One historical analysis (Study No. 1) examined the effects of the Table A transfers and retirements and the altered water allocation procedures on Table A allocations. A second analysis examined the changes in historical SWP operations between 1996 and 2003 attributable to the combined effects of the water supply management practices and the Table A retirements (Study No. 2). Study No. 2 took account of the effects of Article 52, the transfer of the Kern Fan Element property from state to local ownership, and the subsequent development of the Kern Water Bank. The Kern Water Bank represents new south of delta storage that would not be available under the baseline scenario and thus could potentially increase deliveries and Delta diversions. In fact, a survey of users of the Kern Water Bank indicated that between 1996 and 2004 and in the absence of the Kern Water Bank, the users of the bank would have placed the available SWP water in other storage available to them. Consequently, Article 52 of the Monterey Amendment did not have any effect on deliveries or Delta diversions between 1996 and 2004.

A third historical analysis was used to examine possible future effects of the water supply management practices on SWP operations (Study No. 3). Study No. 3 is similar to Study No. 2 in that it uses historical data from 1996 to 2004, but it uses different assumptions with respect to the availability of in-service area storage and out-of-service area storage.

Although the historical analyses provide useful information, its value is limited by the fact that the period from 1996 through 2005 (inclusive) is representative of only a small portion of the hydrologic record. The CALSIM II model simulates SWP operations over a longer period of hydrologic record. For this EIR, it was used to estimate the total annual SWP water supplies that would be available under a wider range of hydrologic conditions under conditions prevailing or projected to prevail in 1995, 2003, and 2020. CALSIM II estimates of total annual deliveries were post-processed to estimate deliveries to individual contractors with the results shown as

Amended, Deleted, or Added Article	Summary	Potential Change in SWP or Contractor Operations	Notes
1(d)	Definition change for "Contractor"	No	
1(k)	Reduces SWP's minimum project yield from 4.23 to 4.185 MAF/yr	No	a
1(hh)	Definition change for "Water System Facilities"	No	
1(jj)	Definition added for "Interruptible water"	No	
1(kk)	Definition added for "Non-SWP water"	No	
1(ll)	Definition added for "Monterey Amendment"	No	
4	Revises options for continued service	No	
7(a)	Revises procedures for requesting changes in Table A amounts	No	
12	Title change for Article 12	No	
12(a)(2)	Makes Department review and modification of contractor delivery schedules consistent with Article 18	No	
12(d)	Deleted	No	
12(f)	Added to clarify priorities for delivery of water	Yes	
14(a)	Expands conditions under which the Department can curtail deliveries to include outages or reductions in capability of facilities outside of State's control	No	
14(b)	Clarifies conditions for subsequent delivery of water not delivered due to curtailments covered in 14(a)	No	
16(a)	Reduces sum of maximum Table A amounts to 4.185 MAF to be consistent with 1(k)	Yes	
18(a)	Revises allocation procedures in shortages	Yes	
18(b)	Deletes provision for reducing Table A amounts when there is a threatened permanent water shortage as defined in provision	Yes	b
18(d)(e)	Eliminates references to Article 18(b)	No	
21(a) through (j)	Eliminates provisions for scheduled "surplus" water, renames "unscheduled water" as "interruptible water and sets terms for delivery of "interruptible water". Eliminates some restrictions on use of "surplus" water.	Yes	
22(j)	Clarifies financial obligations with regards to "the conservation portion of the water system revenue bond financing costs" as they relate to new Article 51	No	
24(b)	Refines definition of financial obligation with regards to aqueduct capital costs	No	
24(g)	Clarifies financial obligations with regards to the "capital cost component of the Transportation Charge" as they relate to new Article 51	No	
25(d)(3)	Clarifies method used to allocate power costs	No	
50(j)	Added to clarify the obligations related to bond financing under Article 50 and unaffected by new Article 51	No	
51	Added to specify numerous financial adjustments	No	
52	Added to transfer state-owned land in the Kern Fan Element to KCWA	Yes	c
53	Added to allow for accelerated administrative approval of voluntary permanent transfer up to 130,000 AF from Agricultural Contractors. Also provides for retirement of 45,000 AF of Table A between KCWA and DRWD	Yes	
54	Added to allow flexible storage at Castaic Lake and Lake Perris	Yes	
55	Added to clarify process and charges associated with the transportation of non-SWP water for contractors	No	
56	Added to encourage cooperation among the contractors to develop groundwater storage programs and to govern storage of Project Water outside contractor service areas. Also established a process for contractors to sell their SWP water via a turnback pool	Yes	

Notes:
a. Affects SWP as it relates to total Table A amounts in article 16(a).
b. Will analyze potential effects of invoking Article 18(b) in No Project Alternatives 1 and 2.
c. Virtually eliminates the possibility that a state-owned groundwater bank on the Kern Fan Element property would be developed as part of the SWP.

averages of deliveries in wet, above normal, below normal, dry and critically dry years (Study No. 4). The CALSIM estimates do not include the effects of the water supply management practices.

The CALSIM II model uses historical hydrological data from a 73-year period of record and other data to simulate river flow in the Sacramento and San Joaquin valleys, flow in the Delta and the operations of the SWP and CVP. It is an analytical tool that is best used to evaluate alternative projects or decisions. It does not forecast actual operations of the SWP or CVP. Actual day-to-day operations of the SWP and CVP depend on continuous collection of, and response to, real-time data. Actual operations are more complex than can be simulated by CALSIM II or any other mathematical simulation model.

As noted earlier, the Department usually allocates water in five-percent increments. A five percent allocation increase provides about 200,000 AF of water for the SWP contractors. A one percent allocation provides about 40,000 AF of Table A. The CALSIM II model allocates a computed number of acre feet of water based on its internal formulas in amounts that are not even whole percentages of the total contract Table A. Thus, it is important to note that the degree of precision of the total annual allocations in the CALSIM II model output exceeds the real-world practices of the Department in determining overall allocations.

It is also important to note that the CALSIM II post-processing spreadsheets distribute the precise CALSIM-determined SWP allocations to the individual contractors for each year. In real world practice, the differences between the CALSIM II estimates and the five percent (or one percent) Department allocations would be carried over as a difference between the target year-end reservoir storage and actual year-end storage, and could increase or decrease allocations in the subsequent year.

None of the individual analytical studies described above, and in Chapter 5, fully characterize the effects of the proposed project on SWP operations and the environment. But used together, as described in the following sections of this chapter, they provide a comprehensive evaluation of the effects of the proposed project.

6.4.2 Changes in Allocations and Deliveries to Contractors Induced by Permanent Transfers and Retirements of Table A Amounts and Altered Allocation Procedures

Each year, the Department determines the total amount of water available for delivery to the contractors. Several provisions of the Monterey Amendment affect how this total supply is allocated among the individual contractors. The allocations identify how much water each contractor has available to it for delivery that year. The altered allocation procedures of Articles 18 and 21 change how water is allocated between agricultural and M&I contractors. In addition, Article 53 of the Monterey Amendment provides for permanent transfers and retirements of Table A amounts. Agricultural contractors would permanently retire 45,000 AF of Table A amount and permanently transfer up to 130,000 AF of Table A amount to M&I contractors.

Between 1996 and 2003, 45,000 AF of Table A amount was permanently retired and 114,000 AF of Table A amount was transferred from agricultural to M&I contractors pursuant to the Monterey Amendment. Included in the 114,000 AF is a 41,000 AF transfer from Wheeler Ridge-Maricopa Water Service District, a KCWA member agency, to Castaic Lake WA. This transfer is currently the subject of litigation.¹ It is included in this analysis because the Department is currently operating under the amendments that authorized the transfer; that is, water associated with the transferred Table A amount is allocated to Castaic Lake WA and the

costs associated with that Table A amount are billed to and paid by Castaic Lake WA. The agencies that retired or transferred Table A amounts pursuant to the Monterey Amendment between 1996 and 2003 and those that received the transfers are listed in Table 6-4.

Additional Monterey Amendment-related Table A transfers have occurred or are expected between 2003 and 2020. They are shown in Table 6-5. Of the 130,000 AF of Table A transfer provided for by Article 53 of the Monterey Amendment, 114,000 AF was transferred between 1996 and 2003. The remaining 16,000 AF is expected to be transferred from KCWA to Coachella Valley WD and Desert WA. Coachella Valley WD and Desert WA would receive 12,000 AF and 4,000 AF of Table A amount, respectively. These transfers would make up the balance of the 130,000 AF of Table A transfer provided for by the Monterey Amendment.²

From 1996 through 2003, several other permanent transfers of Table A amount totaling 22,273 AF occurred under Article 41, a provision of the long-term water supply contracts that was in place prior to the Monterey Amendment. The source of all the transfers was Tulare Lake Basin WSD. The transfers are listed in Table 6-4 and were not a consequence of the Monterey Amendment. In the analysis that follows, the transfers were assumed to occur under all scenarios examined in this EIR (baseline, proposed project and alternatives to the proposed project) because they would likely have occurred whether or not the Monterey Amendment had been executed.

Two other transfers occurred in 2005. MWDSC transferred 88,100 AF of Table A amount to Coachella WA and 11,900 AF of Table A amount to Desert WA. These transfers were a result of the Quantification Settlement Agreement, an agreement on how water from the Colorado River will be shared. These transfers are also unrelated to the Monterey Amendment and were assumed to occur under all scenarios examined in this EIR (baseline, proposed project and alternatives to the proposed project).

Table 6-6 shows Table A amounts in 1995 before implementation of the Monterey Amendment and Table A amounts in 2003 and 2020. Under the baseline scenario the total Table A amount would have increased from its 1995 value of 4,163,066 AF to 4,171,926 AF in 2003 and 4,217,686 AF in 2020 in accordance with the pre-Monterey Amendment SWP contracts. The transfers of Table A amount from Tulare Lake Basin WSD to other contractors shown in Table 6-4 are assumed to occur between 1995 and 2003 and the Quantification Settlement Agreement transfers from MWDSC to Coachella WA and Desert WA are assumed to occur between 2003 and 2020.

Table A amounts for the proposed project in 2003 and 2020 are also shown in Table 6-6. The total Table A amounts for the proposed project in 2003 and 2020 are lower than those under the baseline scenario by 45,000 AF, the amount of Table A retired in accordance with the Monterey Amendment. They also reflect the effect of the Table A transfers shown in Tables 6-4 and 6-5.

In addition to providing for transfers and retirements of Table A amounts, the Monterey Amendment altered the procedures for allocating SWP water in times of shortage and surplus. The Monterey Amendment amends the temporary shortage provisions of Article 18(a) of the long-term water supply contracts which specifies how water should be allocated to the contractors during annual water shortages. Prior to the Monterey Amendment, Article 18(a) required that deliveries to agricultural contractors be curtailed in years of shortage before M&I contractors suffered any cutbacks and Article 21 gave delivery priority to agricultural contractors when surplus water was available. Amended Articles 18(a) and 21 require shortages and surpluses to be shared among all contractors in proportion to their Table A amounts.

TABLE 6-4				
TABLE A TRANSFERS AND RETIREMENTS 1996-2003				
Transferring/Retiring Contractor	Transaction Type	Purchasing Contractor	Quantity (AF)	Notes
Kern County Water Agency	Retirement	NA	40,670	a
Dudley Ridge Water District	Retirement	NA	4,330	a
Kern County Water Agency	Transfer	Palmdale Water District	4,000	a
Kern County Water Agency	Transfer	Napa County Flood Control and Water Conservation District	4,025	a
Kern County Water Agency	Transfer	Solano County Water Agency	5,756	a
Kern County Water Agency	Transfer	Alameda County Flood Control and Water Conservation District – Zone 7	10,000	a
Kern County Water Agency	Transfer	Mojave Water Agency	25,000	a
Kern County Water Agency	Transfer	Alameda County Flood Control and Water Conservation District – Zone 7	7,000	a
Kern County Water Agency	Transfer	Alameda County Flood Control and Water Conservation District – Zone 7	15,000	a
Kern County Water Agency	Transfer	Alameda County Flood Control and Water Conservation District – Zone 7	2,219	a
Kern County Water Agency	Transfer	Castaic Lake Water District	41,000	a, b
Tulare Lake Basin Water Service District	Transfer	Antelope Valley – East Kern Water Agency	3,000	c
Tulare Lake Basin Water Service District	Transfer	Dudley Ridge Water District	3,973	c
Tulare Lake Basin Water Service District	Transfer	Alameda County Flood Control and Water Conservation District, Zone 7	400	c
Tulare Lake Basin Water Service District	Transfer	County of Kings	5,000	c
Tulare Lake Basin Water Service District	Transfer	Coachella Valley Water District	9,900	c

Notes:
a. Retirements and transfers included in the 45,000 acre-foot retirement and 130,000 AF transfer provided for in the Monterey Amendment.
b. Pending resolution of a legal challenge.
c. Transfers unrelated to the Monterey Amendment and included in the baseline scenario.
Source: California Department of Water Resources.

TABLE 6-5			
EXPECTED TABLE A TRANSFERS AND RETIREMENTS 2003-2020			
Transferring/Retiring Contractor	Purchasing Contractor	Quantity (AF)	Notes
Kern County Water Agency	Coachella Valley Water District	12,000	a
Kern County Water Agency	Desert Water Agency	4,000	a
Metropolitan Water District of Southern California	Coachella Valley Water District	88,100	b
Metropolitan Water District of Southern California	Desert Water Agency	11,900	b

Notes:
a. Transfers included in the 130,000 AF transfer provided for in the Monterey Amendment.
b. Transfers unrelated to the Monterey Amendment and included in the baseline scenario.
Source: California Department of Water Resources.

TABLE 6-6

TABLE A AMOUNTS IN 2003 AND 2020 UNDER BASELINE SCENARIO AND WITH PROPOSED PROJECT (AF)

SWP Contractors	1995	2003		2020	
		Baseline	Proposed Project	Baseline	Proposed Project
County of Butte	1,200	3,500	3,500	27,500	27,500
Plumas County FC&WCD	1,250	1,690	1,690	2,700	2,700
City of Yuba City	9,600	9,600	9,600	9,600	9,600
Napa County FC&WCD	9,780	17,450	21,475	24,900	28,925
Solano County WA	34,250	41,000	46,756	42,000	47,756
Alameda Co. FC&WCD, Zone 7	42,000	46,400	80,619	46,400	80,619
Alameda County WD	42,000	42,000	42,000	42,000	42,000
Santa Clara Valley WD	100,000	100,000	100,000	100,000	100,000
Oak Flat WD	5,700	5,700	5,700	5,700	5,700
County of Kings	4,000	9,000	9,000	9,000	9,000
Dudley Ridge WD	57,700	61,673	57,343	61,673	57,343
Empire West Side ID	3,000	3,000	3,000	3,000	3,000
KCWA (Ag)	1,018,800	1,018,800	864,130	1,018,800	848,130
KCWA (Muni)	134,600	134,600	134,600	134,600	134,600
Tulare Lake Basin WSD	118,500	96,227	96,227	96,227	96,227
San Luis Obispo Co. FC&WCD	25,000	25,000	25,000	25,000	25,000
Santa Barbara Co. FC&WCD	45,486	45,486	45,486	45,486	45,486
Antelope Valley-East Kern WA	138,400	141,400	141,400	141,400	141,400
Castaic Lake WA (Ag)	12,700	12,700	12,700	12,700	12,700
Castaic Lake WA (Muni)	41,500	41,500	82,500	41,500	82,500
Coachella Valley WD	23,100	33,000	33,000	121,100	133,100
Crestline-Lake Arrowhead WA	5,800	5,800	5,800	5,800	5,800
Desert WA	38,100	38,100	38,100	50,000	54,000
Little Rock Creek ID	2,300	2,300	2,300	2,300	2,300
Mojave WA	50,800	50,800	75,800	50,800	75,800
Metropolitan WDSC	2,011,500	2,011,500	2,011,500	1,911,500	1,911,500
Palmdale WD	17,300	17,300	21,300	17,300	21,300
San Bernardino Valley MWD	102,600	102,600	102,600	102,600	102,600
San Gabriel Valley MWD	28,800	28,800	28,800	28,800	28,800
San Geronio Pass WA	17,300	5,000	5,000	17,300	17,300
Ventura County FCD	20,000	20,000	20,000	20,000	20,000
Total	4,163,066	4,171,926	4,126,926	4,217,686	4,172,686

6.4.2.1 Analysis Using Historical Data

Allocations from 1996 through 2005

The effects of the Table A transfers and retirements and the altered water allocation procedures on allocations of SWP water were analyzed using historical data for the period 1996 through 2005. Because the Monterey Amendment was implemented in 1996, post-Monterey Amendment SWP allocations to individual contractors in the period 1996 through 2005 are a matter of historical record. The Department conducted a study (Study No. 1) that compared the actual Table A allocations to individual contractors that occurred between 1996 and 2005 to the Table A allocations that the Department calculates it would have made in that period under the baseline scenario. Under the baseline scenario, water demand would increase but none of the provisions of the Monterey Amendment would be implemented. For a description of the analytical method and complete results of Study No. 1, see Chapter 5 and Appendix I.

Table 6-1 shows historical SWP allocations and deliveries from 1980 to 1995, prior to implementation of the proposed project. During the ten-year period preceding implementation of the proposed project, allocations of Table A water averaged 2,400 TAF, ranging from 672 TAF in 1991 (a critically dry year that was the fifth year in an extended drought) to 3,846 TAF in 1993 (an above normal year). During the same period, deliveries of SWP water averaged 2,033 TAF (2,000 TAF of Table A and 33 TAF of Article 21 water) with the maximum delivery of 2,854 TAF occurring in 1989. As discussed previously, individual contractors may not take delivery of all the water allocated to them for a number of reasons such as lower than projected demand in their service area or greater than projected availability of water from local sources.

Table 6-7 shows historical allocations and deliveries following implementation of the proposed project. From 1996 through 2005, after implementation of most elements of the proposed project, allocations of Table A water averaged 3,010 TAF, ranging from 1,608 TAF in 2001 (a dry year) to 3,714 TAF in 2003 (a normal year). During the same period, deliveries averaged 2,658 TAF (2,495 of Table A and 163 TAF of Article 21 water). The maximum delivery during the period 1996 through 2005 was 3,559 TAF in 2005.

Year	Total Table A Amounts AF	Initial Table A Requests AF	Final Table A Approvals AF	Table A Deliveries AF	Article 21 Water Delivered AF	Final Allocation %	
						M&I	Ag
1996	4,111,341	2,676,467	2,701,707	2,514,825	28,647	100	100
1997	4,084,866	2,976,606	2,977,246	2,325,775	21,432	100	100
1998	4,086,021	3,335,367	3,191,045	1,725,519	20,288	100	100
1999	4,119,646	3,147,569	3,214,259	2,738,891	158,070	100	100
2000	4,121,631	3,617,267	3,406,083	3,200,677	308,785	90	90
2001	4,124,136	4,124,136	1,607,570	1,546,742	43,435	39	39
2002	4,125,031	3,913,698	2,887,014	2,573,030	37,165	70	70
2003	4,126,926	4,126,926	3,714,233	2,901,041	59,828	90	90
2004	4,127,061	4,128,811	2,683,727	2,599,536	218,496	65	65
2005	4,125,686	4,127,986	3,713,117	2,828,406	731,083	90	90

Source: California Department of Water Resources.

Comparison of the ten-year periods preceding and following implementation of the proposed project shows a rising trend in both allocations of Table A water and total deliveries. The rising trend is attributable to more favorable hydrology between 1996 and 2005 than between 1986 and 1995, increased water demand in the M&I contractors' service areas and facilities improvements that gave some contractors better access to SWP water.

Several provisions of the Monterey Amendment affected allocations to individual contractors after 1995 but the provisions with the greatest effect were those that altered the water allocation method (Article 18(a)) and called for transfers of Table A amount from M&I to agricultural contractors (Article 53). For example, in 2000, all contractors were allocated 90 percent of their Table A amounts. If the Monterey Amendment had not been in place the agricultural and M&I contractors would have been allocated 79 percent and 100 percent of their Table A amounts, respectively. Similarly, in 2001, all contractors were allocated 39 percent of their Table A amounts. If the Monterey Amendment had not been in place the agricultural and M&I contractors would have been allocated 3 percent and 53 percent of their Table A amounts, respectively.

Tables 6-8 and 6-9 show the effects of the Table A transfers and altered water allocation procedures on the M&I and agricultural contractors as groups between 1996 and 2005. The Table A allocations for the proposed project are the actual allocations that occurred between 1996 and 2005 because the proposed project was being implemented in those years. The Table A allocations for the baseline scenario represent the Table A allocations that would have occurred if the Monterey Amendment had not been implemented. They were estimated by applying pre-Monterey Amendment allocation procedures to the contractors' Table A amounts and requests. As noted above, Table A allocations are not the same as Table A deliveries. The Department makes Table A allocations based on hydrologic conditions and the amount of water in storage in SWP reservoirs. Contractors may not take delivery of all the water allocated to them.

Year	Water Year Type^a	Baseline Scenario (AF)	Proposed Project (AF)	Difference (AF)	Percent Change
1996	W	2,931,611	2,931,611	0	0%
1997	W	2,909,466	2,909,466	0	0%
1998	W	2,910,621	2,910,621	0	0%
1999	W	2,063,859	2,063,859	0	0%
2000	AN	2,394,920	2,394,920	0	0%
2001	D	1,562,830	1,150,007	-412,853	-26%
2002	D	2,241,720	2,064,742	-176,978	-8%
2003	AN	2,623,456	2,652,015	28,559	1%
2004	BN	1,890,183	1,919,717	29,534	2%
2005	AN	2,625,755	2,655,257	29,503	1%
Total		24,154,420	23,652,215	-502,205	-2%
Notes: AN= Above Normal D = Dry BN = Below Normal W = Wet					
a. The Department classifies water year types as wet (W), above normal (AN), below normal (BN), dry (D), and critically dry (CD), based on flow in the Sacramento and San Joaquin rivers. Source: California Department of Water Resources.					

Year	Water Year Type^a	Baseline Scenario (AF)	Proposed Project (AF)	Difference (AF)	Percent Change
1996	W	1,224,730	1,179,730	-45,000	-4%
1997	W	1,220,400	1,175,400	-45,000	-4%
1998	W	1,220,400	1,175,400	-45,000	-4%
1999	W	1,147,176	1,175,400	28,224	2%
2000	AN	1,023,932	1,057,860	44,928	4%
2001	D	36,679	459,271	422,593	1152%
2002	D	648,200	824,333	176,133	27%
2003	AN	1,090,810	1,062,251	-28,559	-3%
2004	BN	781,056	764,010	-17,046	-2%
2005	AN	1,086,156	1,057,860	-28,296	-3%
Total		9,468,539	9,931,516	462,977	5%

Note:
AN= Above Normal D = Dry BN = Below Normal W = Wet

a. The Department classifies water year types as wet (W), above normal (AN), below normal (BN), dry (D), and critically dry (CD), based on flow in the Sacramento and San Joaquin rivers.
Source: California Department of Water Resources.

As shown in Table 6-8, in most years, the M&I contractors' total Table A allocation was similar with the proposed project and under the baseline scenario. However, in dry years (2001 and 2002) the M&I contractors' total Table A allocation with the proposed project was considerably less than it would have been under the baseline scenario. For the ten-year period, the M&I contractors' total Table A allocation was about 500,000 AF (or about two percent) less than it would have been under the baseline scenario.

As shown in Table 6-9, in most years, the agricultural contractors' total Table A allocations with the proposed project and under the baseline scenario were within 10 percent of each other. However, in two dry years (2001 and 2002), the agricultural contractors' total Table A allocation with the proposed project was considerably more than it would have been under the baseline scenario. For the 10-year period, the agricultural contractors' Table A allocation was about 450,000 AF (or five percent) more than it would have been under the baseline scenario.

The effects of the Table A transfers and retirements and altered water allocation procedures on individual M&I and agricultural contractors between 1996 and 2005 varied. The effects differ for the following four groups of contractors:

- M&I contractors that did not participate in a Monterey Amendment-related transfer or retirement of Table A amount;
- M&I contractors that did participate in a Monterey Amendment-related transfer or retirement of Table A amount;
- Agricultural contractors that did not participate in a Monterey Amendment-related transfer or retirement of Table A amount; and
- Agricultural contractors that did participate in a Monterey Amendment-related transfer or retirement of Table A amount.

Table 6-10 shows the effects of the Table A transfers and retirements and altered water allocation procedures on Santa Clara Valley WD, Santa Barbara County FC&WCD and MWDSC. These three contractors are examples of M&I contractors that did not participate in a Monterey Amendment related transfer or retirement of Table A amount. In most years, the Table A allocations for M&I contractors in this group were similar with the proposed project and under the baseline scenario. However, in dry years (2001 and 2002) the Table A allocations for M&I contractors in this group with the proposed project were less than they would have been under the baseline scenario. For M&I contractors in this group, Table A allocations were reduced by about two or three percent over the ten-year period from 1996 through 2005 with the proposed project compared to the baseline scenario. The reason for the reduction in Table A allocations for M&I contractors in this group is that the altered water allocation procedure that is a part of the proposed project subjected these contractors to greater cuts in dry years than would have occurred under the baseline scenario.

Table 6-11 shows the effects of the Table A transfers and retirements and altered water allocation procedures on Solano County WA, Alameda County, Zone 7, and Mojave WA. These three contractors are examples of M&I contractors that participated in a Monterey Amendment-related transfer of Table A amount. M&I contractors in this group received greater Table A allocations in most or all years with the proposed project than under the baseline scenario. Some M&I contractors in this group (Solano County WA, for example) received greater Table A allocations with the proposed project than under the baseline scenario in all but dry years because the Table A transfers that are a part of the proposed project increased their individual Table A amounts. This is because the allocation-decreasing effects of the altered allocation procedures were insufficient to offset the allocation-increasing effects of the Table A transfers in all years. However, in dry years the allocation-increasing effects of the Table A transfers were more than offset by the allocation-decreasing effects of the altered water allocation procedure.

The other two contractors in this group received greater Table A allocations with the proposed project than they would have under the baseline scenario every year from 1996 through 2005.

Table 6-12 shows the effects of the Table A transfers and retirements and altered water allocation procedures on County of Kings and Oak Flat WD. These two contractors did not participate in a Monterey Amendment-related transfer or retirement of Table A amount. Agricultural contractors in this group experienced an increase in their Table A allocations in many years between 1996 and 2005 compared to the baseline scenario. The increases in Table A allocations in many years were small and attributable to the retirement of 45,000 AF of Table A amount that is part of the Monterey Amendment. The retirement of 45,000 AF of Table A amount increased each contractor's share of the total Table A amount by about one percent with a consequent effect on its Table A allocations. For example, prior to the Monterey Amendment, Oak Flat WD's Table A amount of 5,700 AF represented 0.1372 percent of the total Table A amount. After the Monterey Amendment, it represented 0.1387 percent of the total Table A amount. In 2001 and 2002, two dry years, agricultural contractors in this group received a substantial increase in their allocations because of the altered allocation procedures that eliminated agriculture-first allocation cuts. In 2001, for example, agricultural contractors in this group received Table A allocations about twelve times greater than they would have under the baseline scenario.

Contractor	Year	Baseline Table A Allocation (AF)	Proposed Project Table A Allocation (AF)	Change in Table A Allocation	
				AF	Percent
Santa Clara Valley WD	1996	100,000	100,000	0	0%
	1997	100,000	100,000	0	0%
	1998	100,000	100,000	0	0%
	1999	100,000	100,000	0	0%
	2000	100,000	100,000	0	0%
	2001	53,000	39,000	-14,000	-26%
	2002	76,000	70,000	-6,000	-8%
	2003	88,885	89,852	968	1%
	2004	64,000	65,000	1,000	2%
	2005	89,000	90,000	1,000	1%
	Total	871,596	843,960	-17,032	-2%
Santa Barbara FC&WCD	1996	45,486	45,486	0	0%
	1997	38,986	38,986	0	0%
	1998	38,986	38,986	0	0%
	1999	45,486	45,486	0	0%
	2000	45,486	45,486	0	-0%
	2001	24,108	17,740	-6,368	-26%
	2002	34,569	31,840	-2,729	-8%
	2003	40,430	40,870	440	1%
	2004	29,111	29,566	455	2%
	2005	40,483	40,937	455	1%
Total	383,454	370,884	-7,747	-2%	
MWDSC	1996	2,011,500	2,011,500	0	0%
	1997	2,011,500	2,011,500	0	0%
	1998	2,011,500	2,011,500	0	0%
	1999	1,180,000	1,180,000	0	0%
	2000	1,507,136	1,507,136	0	0%
	2001	1,066,095	784,485	-281,610	-26%
	2002	1,528,740	1,408,050	-120,690	-8%
	2003	1,787,916	1,807,380	19,463	1%
	2004	1,287,360	1,307,475	20,115	1%
	2005	1,701,235	1,720,350	9,115	1%
Total	16,092,982	15,749,375	-343,607	-2%	

Source: California Department of Water Resources.

Contractor	Year	Baseline Table A Allocation (AF)	Proposed Project Table A Allocation (AF)	Change in Table A Allocation	
				AF	Percent
Solano County WA	1996	37,800	37,800	0	0%
	1997	38,250	38,250	0	0%
	1998	38,710	38,710	0	0%
	1999	39,170	39,170	0	0%
	2000	39,620	39,620	0	0%
	2001	21,242	17,876	-3,366	-16%
	2002	30,810	32,407	1,597	5%
	2003	36,443	42,011	5,569	15%
	2004	26,528	30,684	4,156	16%
	2005	36,935	42,530	5,595	15%
	Total	345,509	359,059	13,550	4%
Alameda FC&WCD, Zone 7	1996	44,000	44,000	0	0%
	1997	46,000	46,000	0	0%
	1998	46,000	46,000	0	0%
	1999	46,000	46,000	0	0%
	2000	46,000	65,800	19,800	43%
	2001	24,380	31,286	6,905	28%
	2002	35,172	56,153	20,981	60%
	2003	40,887	72,079	31,192	76%
	2004	29,696	52,402	22,706	76%
	2005	41,296	72,557	31,261	76%
	Total	399,431	532,277	132,846	33%
Mojave	1996	50,800	50,800	0	0%
	1997	50,800	50,800	0	0%
	1998	50,800	75,800	25,000	49%
	1999	20,000	45,000	25,000	125%
	2000	20,000	42,500	22,500	113%
	2001	26,924	29,562	2,538	10%
	2002	38,608	53,060	14,452	37%
	2003	45,153	68,108	22,955	51%
	2004	32,512	49,270	16,758	52%
	2005	45,212	68,220	23,008	51%
	Total	380,809	533,120	152,311	40%

Source: California Department of Water Resources.

TABLE 6-12					
EFFECTS OF PROPOSED PROJECT ON TABLE A ALLOCATIONS FOR SELECTED AGRICULTURAL CONTRACTORS THAT DID NOT PARTICIPATE IN A MONTEREY AMENDMENT-RELATED TABLE A TRANSFER					
Contractor	Year	Baseline Table A Allocation (AF)	Proposed Project Table A Allocation (AF)	Change in Table A Allocation	
				AF	Percent
County of Kings	1996	4,000	4,000	0	0%
	1997	4,000	4,000	0	0%
	1998	3,320	3,600	280	0%
	1999	120	1,560	1,440	8%
	2000	2,120	2,800	680	14%
	2001	8,000	8,087	87	1,120%
	2002	5,760	5,850	90	33%
	2003	8,010	8,100	90	1%
	2004	5,700	5,700	0	1%
	2005	5,700	5,700	0	1%
	Total	46,730	49,397	2,667	9%
Oak Flat WD	1996	5,700	5,700	0	0%
	1997	5,700	5,700	0	0%
	1998	5,700	5,700	0	0%
	1999	5,338	5,700	342	6%
	2000	4,731	5,130	399	8%
	2001	171	2,223	2,052	1,200%
	2002	3,021	3,990	969	32%
	2003	5,066	5,122	55	1%
	2004	3,648	3,705	57	2%
	2005	5,073	5,130	57	1%
	Total	44,168	48,100	3,931	9%
Tulare Lake Basin WSD	1996	118,500	118,500	0	0%
	1997	118,500	118,500	0	0%
	1998	118,500	118,500	0	0%
	1999	111,390	118,500	7,110	6%
	2000	98,355	106,650	8,295	8%
	2001	3,555	46,215	42,660	1,200%
	2002	59,109	78,069	18,960	32%
	2003	98,775	99,850	1,075	1%
	2004	61,585	62,548	962	2%
	2005	85,642	86,604	962	1%
Total	873,912	953,936	80,024	9%	

Source: California Department of Water Resources.

Table 6-13 shows the effects of the Table A transfers and retirements and altered water allocation procedures on the only agricultural contractor that participated in a Monterey Amendment-related transfer of Table A amount, KCWA. KCWA experienced a reduction in its Table A allocation compared to the baseline scenario in every year between 1996 and 2005 except 2001 and 2002. The reduction resulted from KCWA's Monterey Amendment-related transfer of 114,000 AF of Table A amount to M&I contractors and its retirement of 40,670 AF of the total 45,000 AF of Table A amount that was retired, both of which reduced KCWA's share of the total Table A amount. In the dry years 2001 and 2002, the reduction in Table A amount attributable to the Table A transfers and retirements was more than offset by the effects of the altered water allocation procedures. Prior to the Monterey Amendment, KCWA would have been allocated very little or no water in 2001. With the Monterey Amendment in place, its allocation in that year was increased substantially compared to the baseline scenario.

Contractor	Year	Baseline Table A Allocation (AF)	Proposed Project Table A Allocation (AF)	Change in Table A Allocation	
				AF	Percent
KCWA	1996	1,157,730	1,117,060	-40,670	-4%
	1997	1,153,400	1,112,730	-40,670	-4%
	1998	1,153,400	1,087,730	-65,670	-6%
	1999	1,092,272	1,087,730	-4,542	0%
	2000	980,204	932,117	-48,087	-5%
	2001	101,969	390,370	288,402	283%
	2002	643,436	700,664	57,228	9%
	2003	1,027,169	899,376	-127,793	-12%
	2004	738,176	649,175	-89,002	-12%
	2005	1,026,526	898,857	-127,669	-12%
	Total	9,074,281	8,875,809	-198,473	-2%

Source: California Department of Water Resources.

Future Allocations

Future SWP allocations cannot be predicted using historical analysis. However, because most of the provisions of the Monterey Amendment were implemented between 1996 and 2003, trends in allocations determined from historical analysis provide insight into future allocations barring catastrophic events.

6.4.2.2 Analysis Using CALSIM II

The CALSIM II model is a planning tool that uses historical data from a 73-year period of record and other data to simulate operations of the SWP and CVP. In Study No. 4, the CALSIM II model was used to estimate total annual deliveries of SWP water available in different year types under 2003 and 2020 conditions. CALSIM II model output of total deliveries was then post-processed to allocate these supplies to individual contractors in accordance with the allocation rules that apply to the baseline and proposed project scenarios. For a description of the analytical method and complete results of Study No. 4, see Chapter 5 and Appendix F.

The CALSIM II model is demand-driven; that is, a certain demand for SWP water is input to the model and the model then tries to meet as high a proportion as possible of the demand each year taking account of hydrologic conditions, environmental regulations, and the physical characteristics of the California water system. Demand for water in California increased from 1995 to 2003 and increases are expected to continue in the future even with the levels of aggressive water conservation assumed in the latest update to the California Water Plan. Individual contractors' demands for SWP water in 2003 and 2020 were estimated and used as input to the model. The assumptions made to estimate contractors' demands are described in Appendix F.

Separate CALSIM II model runs were made for the baseline and proposed project scenarios to reflect the differences in water demand for individual contractors related to the Table A retirements and transfers. For example, the demands of the two agricultural contractors that retired Table A amounts, and so for the SWP as a whole, are lower by 45,000 AF under the

proposed project scenario as compared to the baseline. Similarly, the demands of agricultural contractors that transferred Table A amounts are lower by the amount transferred under the proposed project scenario. However, under 2003 conditions, it was assumed that those M&I contractors that received Table A transfers do not yet have a demand for the water in every year. Consequently, the difference in total SWP demand under the proposed project scenario compared to the baseline is something greater than the 45,000 AF of retired Table A amount. But this transfer-related reduction in demand is a temporary phenomenon. It was assumed that by 2020 the demands for these M&I contractors would increase to their full Table A amounts.

Deliveries to individual contractors with the proposed project and under the baseline scenario were estimated over the 73-year period of hydrologic record with averages calculated for wet, above normal, below normal, dry, and critically dry years. The following paragraphs describe the effects of the proposed project relative to the baseline scenario in average wet and critically dry years because the effects of the proposed project are most apparent in these hydrologic year types. Estimated deliveries in all hydrologic year types are contained in Appendix F. Annual average deliveries over the 73-year period of record were also calculated.

In the following section, Table A deliveries and total deliveries, including both Table A and Article 21 water deliveries, are discussed separately for two reasons; Table A water is the contractors' primary SWP supply, and the estimates of Table A deliveries are more accurate than those for Article 21 deliveries. Many contractors include only Table A deliveries in their future water supply planning because they are uncertain that they will be able to take advantage of Article 21 water. The availability, and if available, the timing of availability, of Article 21 water is uncertain. To take advantage of Article 21, a contractor must be able to use it or store it at the time it is available. Thus, for many contractors, Monterey Amendment-induced changes in Table A deliveries are of more importance than Monterey Amendment-induced changes in total deliveries.

As noted earlier, CALSIM II is demand driven. For the CALSIM studies for this EIR, contractor demands for Table A water were refined based on recent deliveries and discussions with some contractors. Consequently, contractors are very likely to be able to use the Table A deliveries estimated by the model, and thus the delivery estimates should have good accuracy. No similar refinement of demands for Article 21 water occurred and as a result, the estimates of deliveries of Article 21 water to individual contractors are much less accurate than the estimates of deliveries of Table A water.

The water supply management practices that are part of the Monterey Amendment may alter how much of a contractor's allocated SWP supply it is able to accept. But a contractor's use of the various water supply management practices is often dependent on local conditions unrelated to the SWP. For this reason, the CALSIM II model does not simulate the water supply management practices and consequently their effects are not reflected in the estimates of deliveries to individual contractors discussed below and contained in Tables 6-14 through 6-25. The effects of the water supply management practices are described in Section 6.4.3.

Table A Deliveries under 2003 Conditions

Table 6-14 shows estimated average Table A deliveries to individual contractors under 2003 conditions in *wet years* with the proposed project and under the baseline scenario. In wet years, the average of total Table A deliveries would decrease by 3 percent compared to the baseline scenario due to the Table A retirement and the Table A transfers to M&I contractors that do not yet have full demand for Table A water. Collectively, average Table A deliveries to

TABLE 6-14

ESTIMATED AVERAGE WET YEAR TABLE A DELIVERIES UNDER 2003 CONDITIONS FOR BASELINE SCENARIO AND THE PROPOSED PROJECT

SWP Contractors	Baseline Scenario			Proposed Project			Table A Difference	
	Table A	Article 21	Total	Table A	Article 21	Total	TAF/yr	%
Napa County FC&WCD	6.8	2.1	8.9	6.8	3.1	9.9	0	0
Solano County WA	37.7	2.3	40	37.7	4.2	41.9	0	0
Alameda Co. FC&WCD, Zone 7	46.4	2.4	48.8	66.5	4.3	70.8	20.1	43
Alameda County WD	35.2	2.9	38.1	35.2	4.1	39.3	0	0
Santa Clara Valley WD	84.7	10.6	95.3	84.7	13.4	98.1	0	0
Oak Flat WD	5.3	0	5.3	5.3	0	5.3	0	0
County of Kings	8.6	0	8.6	8.4	0	8.4	-0.2	-2
Dudley Ridge WD	57.0	4.3	61.3	53.4	4.3	57.7	-3.6	-6
Empire West Side ID	2.8	3.3	6.1	2.8	1.9	4.7	0	0
KCWA (Ag)	938.5	200.3	1138.8	805.0	152.0	957	-133.5	-14
KCWA (Muni)	134.6	0	134.6	134.6	0	134.6	0	0
Tulare Lake Basin WSD	87.3	53.9	141.2	89.6	31.9	121.5	2.3	3
San Luis Obispo Co. FC&WCD	4.4	0	4.4	4.4	0	4.4	0	0
Santa Barbara Co. FC&WCD	26.3	0	26.3	26.3	0	26.3	0	0
Antelope Valley-East Kern WA	64.9	3.5	68.4	64.9	4.5	69.4	0	0
Castaic Lake WA (Ag)	11.7	0	11.7	11.8	0	11.8	0.1	1
Castaic Lake WA (Muni)	41.5	2.3	43.8	68.6	4.4	73	27.1	65
Coachella Valley WD	19.3	6.3	25.6	19.3	4.6	23.9	0	0
Crestline-Lake Arrowhead WA	1.9	0	1.9	1.9	0	1.9	0	0
Desert WA	31.2	14.3	45.5	31.2	11.1	42.3	0	0
Little Rock Creek ID	0	0	0	0	0	0	0	0
Mojave WA	13.2	0	13.2	13.2	0	13.2	0	0
Metropolitan WDSC	1272.5	215.1	1487.6	1272.5	304.8	1577.3	0	0
Palmdale WD	14.9	0	14.9	14.9	0	14.9	0	0
San Bernardino Valley MWD	69.8	0	69.8	69.8	0	69.8	0	0
San Gabriel Valley MWD	18.1	0	18.1	18.1	0	18.1	0	0
San Geronio Pass WA	0.1	0	0.1	0.1	0	0.1	0	0
Ventura County FCD	5.0	0	5.0	5.0	0	5.0	0	0
Total All Contractors	3,039.7	523.5	3563.2	2,952.0	548.5	3,500.5	-87.7	-3
Total Agricultural Contractors	1,111.2	261.8	1373.0	976.3	190.0	1,166.3	-134.9	-12
Total Municipal Contractors	1,928.4	261.7	2190.1	1975.7	358.5	2,334.2	47.3	2

TABLE 6-15

ESTIMATED AVERAGE CRITICALLY DRY YEAR TABLE A DELIVERIES UNDER 2003 CONDITIONS FOR BASELINE SCENARIO AND THE PROPOSED PROJECT

SWP Contractors	Baseline Scenario			Proposed Project			Table A Difference	
	Table A	Article 21	Total	Table A	Article 21	Total	TAF/yr	%
Napa County FC&WCD	4.7	0.2	4.9	4.4	0.4	4.8	-0.3	-6
Solano County WA	17.8	0.3	18.1	19.3	0.5	19.8	1.5	8
Alameda Co. FC&WCD, Zone 7	19.9	0.3	20.2	30.5	0.5	31	10.6	53
Alameda County WD	16.8	0.3	17.1	16.0	0.5	16.5	-0.8	-5
Santa Clara Valley WD	40.1	1.2	41.3	38.3	1.8	40.1	-1.8	-4
Oak Flat WD	1.6	0	1.6	2.1	0	2.1	0.5	31
County of Kings	2.5	0	2.5	3.3	0	3.3	0.8	32
Dudley Ridge WD	17.5	0.5	18.0	21.3	0.5	21.8	3.8	22
Empire West Side ID	0.9	0.4	1.3	1.1	0.3	1.4	0.2	22
KCWA (Ag)	289.9	21.8	311.7	321.0	22.2	343.2	31.1	11
KCWA (Muni)	57.8	0	57.8	55.3	0	55.3	-2.5	-4
Tulare Lake Basin WSD	27.4	5.8	33.2	35.7	5.3	41	8.3	30
San Luis Obispo Co. FC&WCD	3.5	0	3.5	3.3	0	3.3	-0.2	-6
Santa Barbara Co. FC&WCD	19.5	0	19.5	18.4	0	18.4	-1.1	-6
Antelope Valley-East Kern WA	46.0	0.4	46.4	44.2	0.5	44.7	-1.8	-4
Castaic Lake WA (Ag)	3.6	0	3.6	4.7	0	4.7	1.1	31
Castaic Lake WA (Muni)	17.8	0.3	18.1	31.4	0.5	31.9	13.6	76
Coachella Valley WD	9.2	0.7	9.9	11.1	0.9	12	1.9	21
Crestline-Lake Arrowhead WA	1.7	0	1.7	1.6	0	1.6	-0.1	-6
Desert WA	15.1	1.5	16.6	14.4	1.9	16.3	-0.7	-5
Littlerock Creek ID	0	0	0	0	0	0	0	0
Mojave WA	12.2	0	12.2	12.3	0	12.3	0.1	1
Metropolitan WDSC	771.5	34.9	806.4	733.9	44.4	778.3	-37.6	-5
Palmdale WD	7.0	0	7.0	7.6	0	7.6	0.6	9
San Bernardino Valley MWD	38.1	0	38.1	36.2	0	36.2	-1.8	-5
San Gabriel Valley MWD	10.4	0	10.4	9.9	0	9.9	-0.5	-5
San Geronio Pass WA	0.1	0	0.1	0.1	0	0.1	0	0
Ventura County FCD	4.6	0	4.6	4.6	0	4.6	0	0
Total All Contractors	1,457.3	68.6	1,525.9	1,481.9	80.1	1,562	24.6	2
Total Agricultural Contractors	343.5	28.5	372	389.3	28.2	417.5	45.8	13
Total Municipal Contractors	1,113.9	40.1	1,154.0	1,092.6	51.9	1,144.5	-21.3	-2

TABLE 6-16

**ESTIMATED AVERAGE ANNUAL TABLE A DELIVERIES UNDER 2003 CONDITIONS FOR BASELINE SCENARIO
AND THE PROPOSED PROJECT**

SWP Contractors	Baseline Scenario			Proposed Project			Table A Difference	
	Table A	Article 21	Total	Table A	Article 21	Total	TAF/yr	%
Napa County FC&WCD	6.5	1.0	7.5	6.4	1.7	8.1	-0.1	-2
Solano County WA	34.2	1.0	35.2	34.3	2.1	36.4	0.1	0
Alameda Co. FC&WCD, Zone 7	41.1	1.1	42.2	59.3	2.2	61.5	18.2	44
Alameda County WD	31.9	1.4	33.3	31.3	2.1	33.4	-0.6	-2
Santa Clara Valley WD	76.6	5.1	81.6	75.3	7.1	82.4	-1.3	-2
Oak Flat WD	4.4	0	4.4	4.7	0.0	4.7	0.3	7
County of Kings	7.0	0	7.0	7.3	0.0	7.3	0.3	4
Dudley Ridge WD	47.2	2.2	49.4	46.8	2.2	49	0.4	-8
Empire West Side ID	2.3	1.6	3.9	2.4	1.0	3.4	0.1	4
KCWA (Ag)	778.3	101.2	879.5	705.7	81.8	787.5	-72.6	-9
KCWA (Muni)	119.4	0	119.4	117.8	0	117.8	-1.6	-1
Tulare Lake Basin WSD	73.0	26.7	99.7	78.6	16.7	95.3	5.6	8
San Luis Obispo Co. FC&WCD	4.3	0	4.3	4.2	0	4.2	-0.1	-2
Santa Barbara Co. FC&WCD	25.2	0	25.2	24.9	0	24.9	-0.3	-1
Antelope Valley-East Kern WA	61.8	1.7	63.5	61.3	2.3	63.6	-0.5	-1
Castaic Lake WA (Ag)	9.7	0	9.7	10.4	0	10.4	0.7	7
Castaic Lake WA (Muni)	36.8	1.0	37.8	61.1	2.2	63.3	24.5	67
Coachella Valley WD	17.5	3.0	20.5	17.8	2.7	20.5	0.3	2
Crestline-Lake Arrowhead WA	1.9	0	1.9	1.8	0	1.8	-0.1	-5
Desert WA	28.3	6.9	35.2	27.8	5.9	33.7	-0.5	-2
Littlerock Creek ID	0	0	0	0	0	0	0	0
Mojave WA	13.0	0	13.0	13.0	0	13.0	0	0
Metropolitan WDSC	1310.1	119.8	1429.9	1284.6	164.0	1448.6	-25.5	-2
Palmdale WD	13.5	0	13.5	13.5	0	13.5	0	0
San Bernardino Valley MWD	64.4	0	64.4	63.5	0	63.5	-0.9	-1
San Gabriel Valley MWD	16.8	0	16.8	16.6	0	16.6	-0.2	-1
San Geronio Pass WA	0.1	0	0.1	0.1	0	0.1	0	0
Ventura County FCD	4.9	0	4.9	4.9	0	4.9	0	0
Total All Contractors	2,830.1	273.8	3,103.9	2,775.7	294.0	3,069.7	-54.4	-2
Total Agricultural Contractors	921.8	131.7	1,053.5	855.9	101.6	957.5	-65.9	-7
Total Municipal Contractors	1,908.3	142.0	2050.3	1,919.7	192.3	2112	11.4	1

TABLE 6-17

**ESTIMATED AVERAGE WET YEAR TOTAL DELIVERIES UNDER 2003 CONDITIONS FOR BASELINE SCENARIO
AND THE PROPOSED PROJECT**

SWP Contractors	Baseline Scenario			Proposed Project			Total Difference	
	Table A	Article 21	Total	Table A	Article 21	Total	TAF/yr	%
Napa County FC&WCD	6.8	2.1	8.9	6.8	3.1	9.9	2	11
Solano County WA	37.7	2.3	40	37.7	4.2	41.9	1.9	5
Alameda Co. FC&WCD, Zone 7	46.4	2.4	48.8	66.5	4.3	70.8	22	45
Alameda County WD	35.2	2.9	38.1	35.2	4.1	39.3	1.2	3
Santa Clara Valley WD	84.7	10.6	95.3	84.7	13.4	98.1	2.8	3
Oak Flat WD	5.3	0	5.3	5.3	0	5.3	0	0
County of Kings	8.6	0	8.6	8.4	0	8.4	-.2	-2
Dudley Ridge WD	57.0	4.3	61.3	53.4	4.3	57.7	-3.6	-6
Empire West Side ID	2.8	3.3	6.1	2.8	1.9	4.7	-1.4	-23
KCWA (Ag)	938.5	200.3	1138.8	805.0	152.0	957	-181.8	-16
KCWA (Muni)	134.6	0	134.6	134.6	0	134.6	0	0
Tulare Lake Basin WSD	87.3	53.9	141.2	89.6	31.9	121.5	-19.7	-14
San Luis Obispo Co. FC&WCD	4.4	0	4.4	4.4	0	4.4	0	0
Santa Barbara Co. FC&WCD	26.3	0	26.3	26.3	0	26.3	0	0
Antelope Valley-East Kern WA	64.9	3.5	68.4	64.9	4.5	69.4	1	1
Castaic Lake WA (Ag)	11.7	0	11.7	11.8	0	11.8	0.1	1
Castaic Lake WA (Muni)	41.5	2.3	43.8	68.6	4.4	73	29.2	67
Coachella Valley WD	19.3	6.3	25.6	19.3	4.6	23.9	-1.7	-7
Crestline-Lake Arrowhead WA	1.9	0	1.9	1.9	0	1.9	0	0
Desert WA	31.2	14.3	45.5	31.2	11.1	42.3	-3.2	-7
Littlerock Creek ID	0	0	0	0	0	0	0	0
Mojave WA	13.2	0	13.2	13.2	0	13.2	0	0
Metropolitan WDSC	1272.5	215.1	1487.6	1272.5	304.8	1577.3	89.7	6
Palmdale WD	14.9	0	14.9	14.9	0	14.9	0	0
San Bernardino Valley MWD	69.8	0	69.8	69.8	0	69.8	0	0
San Gabriel Valley MWD	18.1	0	18.1	18.1	0	18.1	0	0
San Geronio Pass WA	0.1	0	0.1	0.1	0	0.1	0	0
Ventura County FCD	5.0	0	5.0	5.0	0	5.0	0	0
Total All Contractors	3,039.7	523.5	3563.2	2,952.0	548.5	3,500.5	-62.7	-2
Total Agricultural Contractors	1,111.2	261.8	1373.0	976.3	190.0	1,166.3	-206.7	-15
Total Municipal Contractors	1,928.4	261.7	2190.1	1975.7	358.5	2,334.2	144.1	7

TABLE 6-18**ESTIMATED AVERAGE CRITICALLY DRY YEAR TOTAL DELIVERIES UNDER 2003 CONDITIONS FOR BASELINE SCENARIO AND THE PROPOSED PROJECT**

SWP Contractors	Baseline Scenario			Proposed Project			Total Difference	
	Table A	Article 21	Total	Table A	Article 21	Total	TAF/yr	%
Napa County FC&WCD	4.7	0.2	4.9	4.4	0.4	4.8	-0.1	-2
Solano County WA	17.8	0.3	18.1	19.3	0.5	19.8	1.7	9
Alameda Co. FC&WCD, Zone 7	19.9	0.3	20.2	30.5	0.5	31	10.8	53
Alameda County WD	16.8	0.3	17.1	16.0	0.5	16.5	-0.6	-4
Santa Clara Valley WD	40.1	1.2	41.3	38.3	1.8	40.1	-1.2	-3
Oak Flat WD	1.6	0	1.6	2.1	0	2.1	0.5	31
County of Kings	2.5	0	2.5	3.3	0	3.3	0.8	32
Dudley Ridge WD	17.5	0.5	18.0	21.3	0.5	21.8	3.8	21
Empire West Side ID	0.9	0.4	1.3	1.1	0.3	1.4	0.1	8
KCWA (Ag)	289.9	21.8	311.7	321.0	22.2	343.2	31.5	10
KCWA (Muni)	57.8	0	57.8	55.3	0	55.3	-2.5	-4
Tulare Lake Basin WSD	27.4	5.8	33.2	35.7	5.3	41	7.8	23
San Luis Obispo Co. FC&WCD	3.5	0	3.5	3.3	0	3.3	-0.2	-6
Santa Barbara Co. FC&WCD	19.5	0	19.5	18.4	0	18.4	-1.1	-6
Antelope Valley-East Kern WA	46.0	0.4	46.4	44.2	0.5	44.7	-1.7	-4
Castaic Lake WA (Ag)	3.6	0	3.6	4.7	0	4.7	1.1	31
Castaic Lake WA (Muni)	17.8	0.3	18.1	31.4	0.5	31.9	13.8	76
Coachella Valley WD	9.2	0.7	9.9	11.1	0.9	12	2.1	21
Crestline-Lake Arrowhead WA	1.7	0	1.7	1.6	0	1.6	-0.1	-6
Desert WA	15.1	1.5	16.6	14.4	1.9	16.3	-0.3	-2
Littlerock Creek ID	0	0	0	0	0	0	0	0
Mojave WA	12.2	0	12.2	12.3	0	12.3	0.1	1
Metropolitan WDSC	771.5	34.9	806.4	733.9	44.4	778.3	-28.1	-3
Palmdale WD	7.0	0	7.0	7.6	0	7.6	0.4	6
San Bernardino Valley MWD	38.1	0	38.1	36.2	0	36.2	-1.9	-5
San Gabriel Valley MWD	10.4	0	10.4	9.9	0	9.9	-0.5	-5
San Geronio Pass WA	0.1	0	0.1	0.1	0	0.1	0	0
Ventura County FCD	4.6	0	4.6	4.6	0	4.6	0	0
Total All Contractors	1,457.3	68.6	1,525.9	1,481.9	80.1	1,562	36.1	2
Total Agricultural Contractors	343.5	28.5	372	389.3	28.2	417.5	45.5	12
Total Municipal Contractors	1,113.9	40.1	1,154.0	1,092.6	51.9	1,144.5	-9.5	-1

TABLE 6-19

ESTIMATED AVERAGE ANNUAL TOTAL DELIVERIES UNDER 2003 CONDITIONS FOR BASELINE SCENARIO AND THE PROPOSED PROJECT

SWP Contractors	Baseline Scenario			Proposed Project			Total Difference	
	Table A	Article 21	Total	Table A	Article 21	Total	TAF/yr	%
Napa County FC&WCD	6.5	1.0	7.5	6.4	1.7	8.1	0.6	8
Solano County WA	34.2	1.0	35.2	34.3	2.1	36.4	1.2	3
Alameda Co. FC&WCD, Zone 7	41.1	1.1	42.2	59.3	2.2	61.5	19.3	46
Alameda County WD	31.9	1.4	33.3	31.3	2.1	33.4	0.1	0
Santa Clara Valley WD	76.6	5.1	81.6	75.3	7.1	82.4	0.8	1
Oak Flat WD	4.4	0	4.4	4.7	0.0	4.7	0.3	7
County of Kings	7.0	0	7.0	7.3	0.0	7.3	0.3	4
Dudley Ridge WD	47.2	2.2	49.4	46.8	2.2	49	-0.4	-1
Empire West Side ID	2.3	1.6	3.9	2.4	1.0	3.4	-0.5	-13
KCWA (Ag)	778.3	101.2	879.5	705.7	81.8	787.5	-92	-10
KCWA (Muni)	119.4	0	119.4	117.8	0	117.8	-1.6	-1
Tulare Lake Basin WSD	73.0	26.7	99.7	78.6	16.7	95.3	-4.4	-4
San Luis Obispo Co. FC&WCD	4.3	0	4.3	4.2	0	4.2	-0.1	-2
Santa Barbara Co. FC&WCD	25.2	0	25.2	24.9	0	24.9	-0.3	-1
Antelope Valley-East Kern WA	61.8	1.7	63.5	61.3	2.3	63.6	0.1	0
Castaic Lake WA (Ag)	9.7	0	9.7	10.4	0	10.4	0.7	7
Castaic Lake WA (Muni)	36.8	1.0	37.8	61.1	2.2	63.3	25.5	67
Coachella Valley WD	17.5	3.0	20.5	17.8	2.7	20.5	0	0
Crestline-Lake Arrowhead WA	1.9	0	1.9	1.8	0	1.8	-0.1	-5
Desert WA	28.3	6.9	35.2	27.8	5.9	33.7	-1.5	-4
Littlerock Creek ID	0	0	0	0	0	0	0	0
Mojave WA	13.0	0	13.0	13.0	0	13.0	0	0
Metropolitan WDSC	1310.1	119.8	1429.9	1284.6	164.0	1448.6	18.7	0
Palmdale WD	13.5	0	13.5	13.5	0	13.5	0	0
San Bernardino Valley MWD	64.4	0	64.4	63.5	0	63.5	-0.9	-1
San Gabriel Valley MWD	16.8	0	16.8	16.6	0	16.6	-0.2	-1
San Geronio Pass WA	0.1	0	0.1	0.1	0	0.1	0	0
Ventura County FCD	4.9	0	4.9	4.9	0	4.9	0	0
Total All Contractors	2,830.1	273.8	3,103.9	2,775.7	294.0	3,069.7	-34.2	-1
Total Agricultural Contractors	921.8	131.7	1,053.5	855.9	101.6	957.5	-96.0	-11
Total Municipal Contractors	1,908.3	142.0	2050.3	1,919.7	192.3	2112	61.7	3

TABLE 6-20

**ESTIMATED AVERAGE WET YEAR TABLE A DELIVERIES UNDER 2020 CONDITIONS FOR BASELINE SCENARIO
AND THE PROPOSED PROJECT**

SWP Contractors	Baseline Scenario			Proposed Project			Table A Difference	
	Table A	Article 21	Total	Table A	Article 21	Total	TAF/yr	%
Napa County FC&WCD	24.4	0.1	24.5	28.1	1.5	29.6	3.7	15
Solano County WA	41.2	0.1	41.3	46.4	1.6	48.0	5.2	13
Alameda Co. FC&WCD, Zone 7	45.5	0.3	45.8	78.2	1.7	79.9	32.7	72
Alameda County WD	41.2	0.7	41.9	40.8	1.6	42.4	-0.4	-1
Santa Clara Valley WD	98.2	2.1	100.3	97.1	5.6	102.7	-1.1	-1
Oak Flat WD	5.1	0	5.1	5.3	0	5.3	0.2	4
County of Kings	8.3	0	8.3	8.3	0	8.3	0	0
Dudley Ridge WD	55.8	1.8	57.6	53.0	1.7	54.7	-2.8	-5
Empire West Side ID	2.7	1.2	3.9	2.8	0.3	3.1	0.1	4
KCWA (Ag)	919.7	79.4	999.1	784.5	59.9	844.4	-135.2	15
KCWA (Muni)	132.1	0	132.1	130.6	0	130.6	-1.5	-1
Tulare Lake Basin WSD	85.9	19.6	105.5	89	6.4	95.4	3.1	4
San Luis Obispo Co. FC&WCD	24.5	0	24.5	24.3	0	24.3	-0.2	-1
Santa Barbara Co. FC&WCD	44.6	0	44.6	44.1	0	44.1	-0.6	-1
Antelope Valley-East Kern WA	138.7	1.0	139.7	137.2	1.8	139.0	-1.5	-1
Castaic Lake WA (Ag)	11.5	0	11.5	11.7	0	11.7	0.2	2
Castaic Lake WA (Muni)	40.7	0.1	40.8	80.1	1.7	81.8	39.4	97
Coachella Valley WD	118.5	1.9	120.4	129.2	3.4	132.6	10.7	9
Crestline-Lake Arrowhead WA	5.7	0	5.7	5.6	0	5.6	-0.1	-2
Desert WA	49.1	3.6	52.7	52.4	3.6	56.0	3.3	7
Littlerock Creek ID	2.3	0	2.3	2.2	0	2.2	-0.1	-4
Mojave WA	49.9	0	49.9	73.6	0	73.6	23.7	47
Metropolitan WDSC	1,876.3	80.4	1,956.7	1,855.2	100.3	1,955.5	-21.1	-1
Palmdale WD	17.0	0	17.0	20.7	0	20.7	3.7	22
San Bernardino Valley MWD	100.7	0	100.7	99.6	0	99.6	-1.1	-1
San Gabriel Valley MWD	28.3	0	28.3	28.0	0	28.0	-0.3	-1
San Geronio Pass WA	17.0	0	17.0	16.8	0	16.8	-0.2	-1
Ventura County FCD	19.6	0	19.6	19.4	0	19.4	-0.2	-1
Total All Contractors	4,004.6	192.3	4,196.9	3,964.1	190.9	4,155.0	-40.5	-1
Total Agricultural Contractors	1,089.1	102.0	1,191.9	954.6	68.2	1,022.8	-134.5	-12
Total Municipal Contractors	2,915.5	90.4	3,005.9	3,009.5	122.7	3,132.2	94	3

TABLE 6-21

ESTIMATED AVERAGE CRITICALLY DRY YEAR TABLE A DELIVERIES UNDER 2020 CONDITIONS FOR BASELINE SCENARIO AND THE PROPOSED PROJECT

SWP Contractors	Baseline Scenario			Proposed Project			Table A Difference	
	Table A	Article 21	Total	Table A	Article 21	Total	TAF/yr	%
Napa County FC&WCD	8.9	0.4	10.2	9.4	0.5	9.9	0.5	6
Solano County WA	15.0	0.4	15.4	15.5	0.5	16.0	0.5	3
Alameda Co. FC&WCD, Zone 7	16.5	0.5	17.0	26.2	0.5	26.7	9.7	59
Alameda County WD	15.0	0.5	15.5	13.6	0.5	14.1	-1.4	-9
Santa Clara Valley WD	35.7	1.8	37.5	32.4	1.8	33.2	-3.3	-9
Oak Flat WD	1.3	0	1.3	1.8	0	1.8	0.5	38
County of Kings	2.0	0	2.0	2.9	0	2.9	0.9	45
Dudley Ridge WD	13.8	0.5	14.3	18.6	0.5	19.1	4.8	35
Empire West Side ID	0.7	0.5	1.2	1.0	0.4	1.4	0.3	43
KCWA (Ag)	228.6	22.7	251.3	275.2	22.7	297.9	46.6	20
KCWA (Muni)	48.1	0	48.1	43.7	0	43.7	-4.4	-9
Tulare Lake Basin WSD	21.6	6.8	28.4	31.9	6.5	38.4	10.3	48
San Luis Obispo Co. FC&WCD	8.9	0	8.9	8.1	0	8.1	-0.8	-9
Santa Barbara Co. FC&WCD	16.2	0	16.2	14.8	0	14.8	-1.4	-9
Antelope Valley-East Kern WA	50.1	0.5	50.6	45.9	0.5	46.4	-4.2	-8
Castaic Lake WA (Ag)	2.8	0	2.8	4.1	0	4.1	1.3	46
Castaic Lake WA (Muni)	14.8	0.4	15.2	26.8	0.5	27.3	12	81
Coachella Valley WD	41.9	0.9	42.8	43.2	0.9	44.1	1.3	3
Crestline-Lake Arrowhead WA	2.1	0	2.1	1.9	0	1.9	-0.2	-10
Desert WA	17.9	2.1	20.0	17.5	2.3	19.8	-0.4	-2
Littlerock Creek ID	0.8	0	0.8	0.7	0	0.7	-0.1	-13
Mojave WA	18.1	0	18.1	24.6	0	24.6	6.5	36
Metropolitan WDSC	682.8	45.4	728.2	620.2	45.5	665.7	-62.6	-9
Palmdale WD	6.2	0	6.2	6.9	0	6.9	0.7	11
San Bernardino Valley MWD	36.6	0	36.6	33.3	0	33.3	-3.3	-9
San Gabriel Valley MWD	10.3	0	10.3	9.3	0	9.3	-1	-10
San Geronio Pass WA	6.2	0	6.2	5.6	0	5.6	-0.6	-10
Ventura County FCD	7.1	0	7.1	6.5	0	6.5	-0.6	-8
Total All Contractors	1,330.2	83.2	1,413.4	1,341.0	83.2	1,424.2	10.8	1
Total Agricultural Contractors	270.8	30.5	301.3	334.9	30.0	364.9	64.1	24
Total Municipal Contractors	1,059.4	52.8	1,112.2	1,006.1	53.2	1,059.3	-53.3	-5

TABLE 6-22

**ESTIMATED AVERAGE ANNUAL TABLE A DELIVERIES UNDER 2020 CONDITIONS FOR BASELINE SCENARIO
AND THE PROPOSED PROJECT**

SWP Contractors	Baseline Scenario			Proposed Project			Table A Difference	
	Table A	Article 21	Total	Table A	Article 21	Total	TAF/yr	%
Napa County FC&WCD	20.1	0.1	20.2	22.5	0.9	23.4	2.4	12
Solano County WA	33.9	0.2	34.1	37.1	1.0	38.1	3.2	9
Alameda Co. FC&WCD, Zone 7	37.5	0.3	37.8	62.6	1.0	63.6	25.1	67
Alameda County WD	33.9	0.5	34.4	32.6	0.9	33.5	-1.3	-4
Santa Clara Valley WD	80.8	1.5	82.3	77.7	3.3	81.0	-3.1	-4
Oak Flat WD	3.8	0.0	3.8	4.3	0.0	4.3	0.5	13
County of Kings	6.1	0.0	6.1	6.8	0.0	6.8	0.7	11
Dudley Ridge WD	41.2	1.1	42.3	43.4	1.0	44.4	2.2	5
Empire West Side ID	2.0	0.7	2.7	2.3	0.2	2.5	0.2	7
KCWA (Ag)	679.0	48.1	727.1	642.2	36.1	678.3	-36.8	-5
KCWA (Muni)	108.8	0.0	108.8	104.5	0.0	104.5	-4.3	-4
Tulare Lake Basin WSD	63.7	11.8	75.5	72.9	4.9	77.8	9.2	14
San Luis Obispo Co. FC&WCD	20.2	0.0	20.2	19.4	0.0	19.4	-0.8	-4
Santa Barbara Co. FC&WCD	36.8	0.0	36.8	35.3	0.0	35.3	-1.5	-4
Antelope Valley-East Kern WA	113.9	0.7	114.6	109.8	1.0	110.8	-4.1	-4
Castaic Lake WA (Ag)	8.5	0.0	8.5	9.6	0.0	9.6	1.1	13
Castaic Lake WA (Muni)	33.5	0.2	33.7	64.1	1.0	65.1	30.6	91
Coachella Valley WD	96.7	1.3	98.0	103.4	2.0	105.4	6.7	7
Crestline-Lake Arrowhead WA	4.7	0.0	4.7	4.5	0.0	4.5	-0.2	-4
Desert WA	40.4	5.7	46.1	41.9	2.4	44.3	1.5	4
Littlerock Creek ID	1.9	0.0	1.9	1.8	0.0	1.8	-0.1	-5
Mojave WA	41.1	0.0	41.1	58.9	0.0	58.9	17.8	43
Metropolitan WDSC	1545.0	52.1	1597.1	1483.3	62.9	1546.2	-61.7	-4
Palmdale WD	14.0	0.0	14.0	16.5	0.0	16.5	2.5	18
San Bernardino Valley MWD	82.9	0.0	82.9	79.7	0.0	79.7	-3.2	-4
San Gabriel Valley MWD	23.3	0.0	23.3	22.4	0.0	22.4	-0.9	-4
San Geronio Pass WA	14.0	0.0	14.0	13.4	0.0	13.4	-0.6	-4
Ventura County FCD	16.2	0.0	16.2	15.5	0.0	15.7	-0.7	-4
Total All Contractors	3,203.8	120.8	3324.6	3,189.3	118.7	3,308.0	-14.5	0
Total Agricultural Contractors	804.3	61.6	865.9	781.5	42.2	823.7	-22.8	-3
Total Municipal Contractors	2,399.5	59.2	2,458.7	2,407.8	76.5	2,484.3	8.3	0

TABLE 6-23

**ESTIMATED AVERAGE WET YEAR TOTAL DELIVERIES UNDER 2020 CONDITIONS FOR BASELINE SCENARIO
AND THE PROPOSED PROJECT**

SWP Contractors	Baseline Scenario			Proposed Project			Total Difference	
	Table A	Article 21	Total	Table A	Article 21	Total	TAF/yr	%
Napa County FC&WCD	24.4	0.1	24.5	28.1	1.5	29.6	5.1	21
Solano County WA	41.2	0.1	41.3	46.4	1.6	48.0	6.7	16
Alameda Co. FC&WCD, Zone 7	45.5	0.3	45.8	78.2	1.7	79.9	34.1	74
Alameda County WD	41.2	0.7	41.9	40.8	1.6	42.4	0.5	1
Santa Clara Valley WD	98.2	2.1	100.3	97.1	5.6	102.7	2.4	2
Oak Flat WD	5.1	0	5.1	5.3	0	5.3	0.2	4
County of Kings	8.3	0	8.3	8.3	0	8.3	0	0
Dudley Ridge WD	55.8	1.8	57.6	53.0	1.7	54.7	-2.9	5
Empire West Side ID	2.7	1.2	3.9	2.8	0.2	3.0	-0.9	-23
KCWA (Ag)	919.7	79.4	999.1	784.5	59.9	844.4	-154.7	-15
KCWA (Muni)	132.1	0	132.1	130.6	0	130.6	-1.5	-1
Tulare Lake Basin WSD	85.9	19.6	105.5	89	6.4	95.4	-10.1	-10
San Luis Obispo Co. FC&WCD	24.5	0	24.5	24.3	0	24.3	-0.2	-1
Santa Barbara Co. FC&WCD	44.6	0	44.6	44.1	0	44.1	-0.5	-1
Antelope Valley-East Kern WA	138.7	1.0	139.7	137.2	1.8	139.0	-0.7	-1
Castaic Lake WA (Ag)	11.5	0	11.5	11.7	0	11.7	0.2	2
Castaic Lake WA (Muni)	40.7	0.1	40.8	80.1	1.7	81.8	41.0	100
Coachella Valley WD	118.5	1.9	120.4	129.2	3.4	132.6	12.2	10
Crestline-Lake Arrowhead WA	5.7	0	5.7	5.6	0	5.6	-0.1	-2
Desert WA	49.1	3.6	52.7	52.4	3.6	56.0	3.3	6
Littlerock Creek ID	2.3	0	2.3	2.2	0	2.2	-0.1	-4
Mojave WA	49.9	0	49.9	73.6	0	73.6	23.7	47
Metropolitan WDSC	1,876.3	80.4	1,956.7	1,855.2	100.3	1,955.5	-1.2	0
Palmdale WD	17.0	0	17.0	20.7	0	20.7	3.7	22
San Bernardino Valley MWD	100.7	0	100.7	99.6	0	99.6	-1.1	-1
San Gabriel Valley MWD	28.3	0	28.3	28.0	0	28.0	-0.7	-2
San Geronio Pass WA	17.0	0	17.0	16.8	0	16.8	-0.2	-1
Ventura County FCD	19.6	0	19.6	19.4	0	19.4	-0.2	-1
Total All Contractors	4,004.6	192.3	4,196.9	3,964.1	190.9	4155.0	-41.9	-1
Total Agricultural Contractors	1,089.1	102.0	1,191.1	954.6	68.2	1,022.8	-168.3	-14
Total Municipal Contractors	2,915.5	90.4	3005.9	3,009.5	122.7	3,132.2	126.3	4

TABLE 6-24

ESTIMATED AVERAGE CRITICALLY DRY YEAR TOTAL DELIVERIES UNDER 2020 CONDITIONS FOR BASELINE SCENARIO AND THE PROPOSED PROJECT

SWP Contractors	Baseline Scenario			Proposed Project			Total Difference	
	Table A	Article 21	Total	Table A	Article 21	Total	TAF/yr	%
Napa County FC&WCD	8.9	0.4	10.2	9.4	0.5	9.9	0.5	5
Solano County WA	15.0	0.4	15.4	15.5	0.5	16.0	0.5	3
Alameda Co. FC&WCD, Zone 7	16.5	0.5	17.0	26.2	0.5	26.7	9.7	57
Alameda County WD	15.0	0.5	15.5	13.6	0.5	14.1	-1.4	-9
Santa Clara Valley WD	35.7	1.8	37.5	32.4	1.8	33.2	-4.3	-11
Oak Flat WD	1.3	0	1.3	1.8	0	1.8	0.5	38
County of Kings	2.0	0	2.0	2.9	0	2.9	0.9	45
Dudley Ridge WD	13.8	0.5	14.3	18.6	0.5	19.1	4.8	34
Empire West Side ID	0.7	0.5	1.2	1.0	0.4	1.4	0.2	17
KCWA (Ag)	228.6	22.7	251.3	275.2	22.7	297.9	46.6	19
KCWA (Muni)	48.1	0	48.1	43.7	0	43.7	-4.4	-9
Tulare Lake Basin WSD	21.6	6.8	28.4	31.9	6.5	38.4	10	35
San Luis Obispo Co. FC&WCD	8.9	0	8.9	8.1	0	8.1	0.8	-9
Santa Barbara Co. FC&WCD	16.2	0	16.2	14.8	0	14.8	-1.4	-9
Antelope Valley-East Kern WA	50.1	0.5	50.6	45.9	0.5	46.4	-4.2	-8
Castaic Lake WA (Ag)	2.8	0	2.8	4.1	0	4.1	1.3	46
Castaic Lake WA (Muni)	14.8	0.4	15.2	26.8	0.5	27.3	12.1	80
Coachella Valley WD	41.9	0.9	42.8	43.2	0.9	44.1	1.3	3
Crestline-Lake Arrowhead WA	2.1	0	2.1	1.9	0	1.9	-0.2	-10
Desert WA	17.9	2.1	20.0	17.5	2.3	19.8	-0.2	-1
Littlerock Creek ID	0.8	0	0.8	0.7	0	0.7	-0.1	-13
Mojave WA	18.1	0	18.1	24.6	0	24.6	6.5	36
Metropolitan WDSC	682.8	45.4	728.2	620.2	45.5	665.7	-62.5	-9
Palmdale WD	6.2	0	6.2	6.9	0	6.9	0.7	11
San Bernardino Valley MWD	36.6	0	36.6	33.3	0	33.3	-3.3	-9
San Gabriel Valley MWD	10.3	0	10.3	9.3	0	9.3	-01.0	-10
San Geronio Pass WA	6.2	0	6.2	5.6	0	5.6	-0.6	-10
Ventura County FCD	7.1	0	7.1	6.5	0	6.5	-0.6	-8
Total All Contractors	1,330.2	83.2	1,413.4	1,341.0	83.2	1,424.2	10.8	1
Total Agricultural Contractors	270.8	30.5	301.3	334.9	30.0	364.9	63.6	21
Total Municipal Contractors	1,059.4	52.8	1,112.2	1,006.1	53.2	1,059.3	-52.9	-5

TABLE 6-25

**ESTIMATED AVERAGE ANNUAL TOTAL DELIVERIES UNDER 2020 CONDITIONS FOR BASELINE SCENARIO
AND THE PROPOSED PROJECT**

SWP Contractors	Baseline Scenario			Proposed Project			Total Difference	
	Table A	Article 21	Total	Table A	Article 21	Total	TAF/yr	%
Napa County FC&WCD	20.1	0.1	20.2	22.5	0.9	23.4	3.2	16
Solano County WA	33.9	0.2	34.1	37.1	1.0	38.1	4.0	12
Alameda Co. FC&WCD, Zone 7	37.5	0.3	37.8	62.6	1.0	63.6	25.8	68
Alameda County WD	33.9	0.5	34.4	32.6	0.9	33.5	-0.9	-2
Santa Clara Valley WD	80.8	1.5	82.3	77.7	3.3	81.0	-1.3	3
Oak Flat WD	3.8	0.0	3.8	4.3	0.0	4.3	0.5	13
County of Kings	6.1	0.0	6.1	6.8	0.0	6.8	0.7	11
Dudley Ridge WD	41.2	1.1	42.3	43.4	1.0	44.4	2.1	5
Empire West Side ID	2.0	0.7	2.7	2.3	0.2	2.5	-0.2	-4
KCWA (Ag)	679.0	48.1	727.1	642.2	36.1	678.3	-48.8	-7
KCWA (Muni)	108.8	0.0	108.8	104.5	0.0	104.5	-4.3	-4
Tulare Lake Basin WSD	63.7	11.8	75.5	72.9	4.9	77.8	2.3	3
San Luis Obispo Co. FC&WCD	20.2	0.0	20.2	19.4	0.0	19.4	-0.8	-4
Santa Barbara Co. FC&WCD	36.8	0.0	36.8	35.3	0.0	35.3	-1.5	-4
Antelope Valley-East Kern WA	113.9	0.7	114.6	109.8	1.0	110.8	-3.8	-3
Castaic Lake WA (Ag)	8.5	0.0	8.5	9.6	0.0	9.6	1.1	13
Castaic Lake WA (Muni)	33.5	0.2	33.7	64.1	1.0	65.1	31.4	93
Coachella Valley WD	96.7	1.3	98.0	103.4	2.0	105.4	7.4	8
Crestline-Lake Arrowhead WA	4.7	0.0	4.7	4.5	0.0	4.5	-0.2	-4
Desert WA	40.4	5.7	46.1	41.9	2.4	44.3	-1.8	-4
Littlerock Creek ID	1.9	0.0	1.9	1.8	0.0	1.8	-0.1	-5
Mojave WA	41.1	0.0	41.1	58.9	0.0	58.9	17.8	43
Metropolitan WDSC	1545.0	52.1	1597.1	1483.3	62.9	1546.2	-50.9	-3
Palmdale WD	14.0	0.0	14.0	16.5	0.0	16.5	2.5	18
San Bernardino Valley MWD	82.9	0.0	82.9	79.7	0.0	79.7	-3.2	-4
San Gabriel Valley MWD	23.3	0.0	23.3	22.4	0.0	22.4	-0.9	-4
San Geronio Pass WA	14.0	0.0	14.0	13.4	0.0	13.4	-0.6	-4
Ventura County FCD	16.2	0.0	16.2	15.5	0.0	15.7	-0.5	-3
Total All Contractors	3,203.8	120.8	3,324.6	3,189.3	118.7	3,308.0	-16.6	0
Total Agricultural Contractors	804.3	61.6	865.9	781.5	42.2	823.7	-42.2	-5
Total Municipal Contractors	2,399.5	59.2	2,458.7	2,407.8	76.5	2,484.3	25.6	1

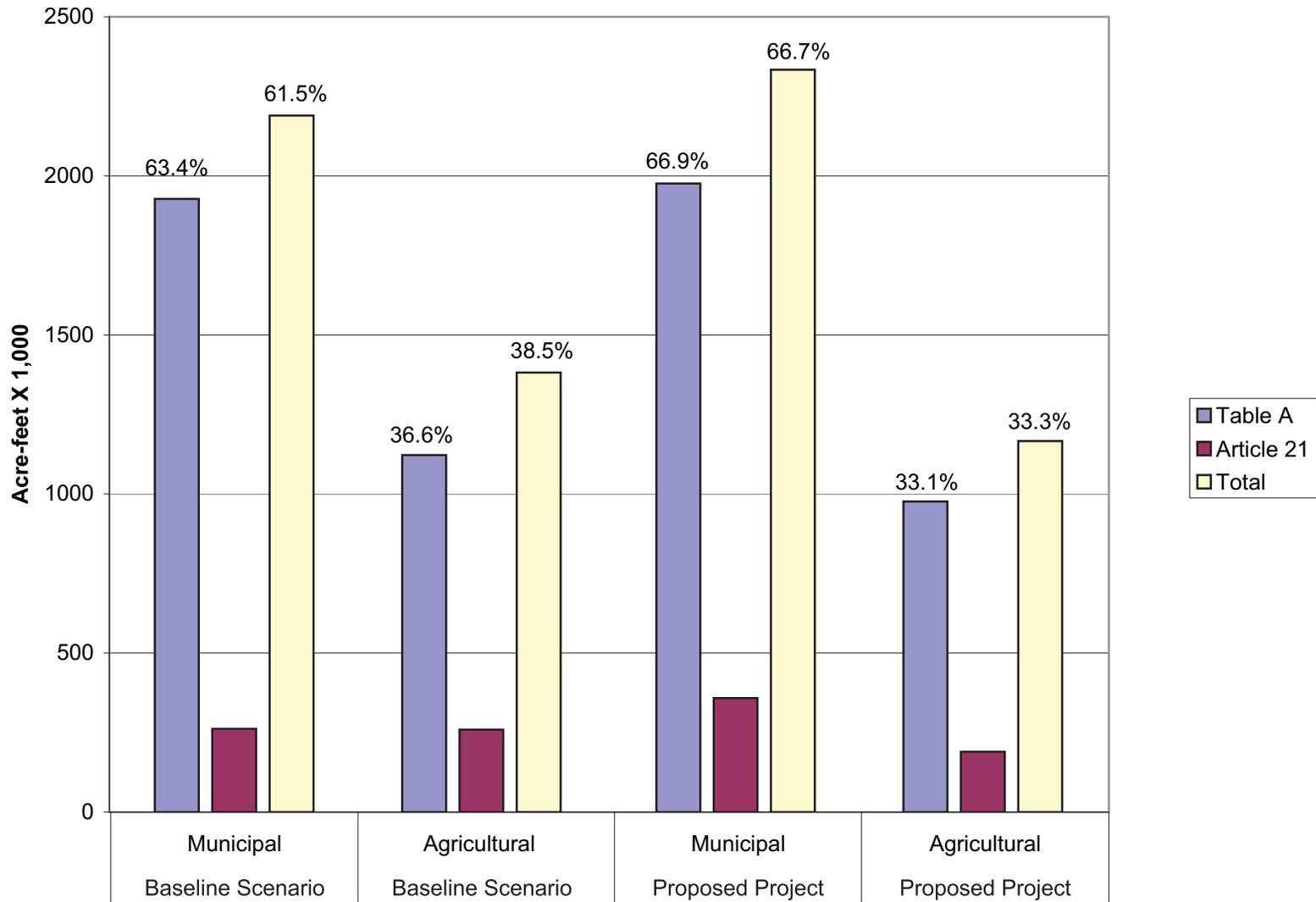
agricultural contractors in wet years would decrease by 12 percent and deliveries to M&I contractors would increase by two percent relative to the baseline scenario. As shown in Figure 6-1, the agricultural contractors' share of total Table A deliveries in wet years would decrease from 36.6 percent under the baseline scenario to 33.1 percent with the proposed project. The M&I contractors' share would increase from 63.4 percent to 66.9 percent. Deliveries to M&I contractors in wet years would increase because their share of the total Table A amount would increase as a result of Table A transfers. Agricultural contractors' deliveries in wet years would decrease because their share of the total Table A amount would decrease.

Table A deliveries to most individual contractors in wet years would change by less than 5 percent relative to the baseline scenario. Agricultural contractors subject to large decreases in wet year deliveries include KCWA (-14 percent) and Dudley Ridge WD (-6 percent) resulting from Table A retirements and, for KCWA, also from Table A transfers to M&I contractors. M&I contractors subject to large increases in deliveries include Alameda County, Zone 7 (43 percent) and Castaic Lake WA (51 percent), resulting primarily from Table A transfers from KCWA.

Table 6-15 shows estimated average Table A deliveries to individual contractors under 2003 conditions in *critically dry years* with the proposed project and under the baseline scenario. In critically dry years, the average of total Table A deliveries would increase by 2 percent compared to the baseline scenario. This is because reductions in Table A deliveries with the proposed project in wet and average years would cause water to accumulate in SWP reservoirs enabling increased deliveries in critically dry years. Collectively, average Table A deliveries to agricultural contractors in critically dry years would increase by 13 percent and deliveries to M&I contractors would decrease by two percent relative to the baseline scenario. As shown in Figure 6-2, the agricultural contractors' share of total Table A deliveries in critically dry years would increase from 23.6 percent under the baseline scenario to 26.3 percent with the proposed project. The M&I contractors' share would decrease from 76.4 percent to 73.7 percent. Deliveries to agricultural contractors would increase because they would no longer be subject to the agriculture-first cuts in very dry periods. Their increase in critically dry year deliveries as a result of the altered allocation procedures under Article 18 would more than offset the effects of the decrease in their share of the total Table A amount as a result of Table A transfers and retirements.

Agricultural contractors would be subject to increases in critically dry year Table A deliveries of between 11 and 32 percent. M&I contractors subject to large increases in deliveries include Alameda County, Zone 7 (+53 percent), Castaic Lake WA (+68 percent) and Coachella Valley WD (+21 percent). Several M&I contractors that did not receive transfers of Table A amount would be subject to decreases in Table A deliveries of about 5 percent including San Luis Obispo County FC&WCD, Santa Barbara County FC&WCD, Antelope Valley-East Kern WA, Crestline-Lake Arrowhead WA, San Bernardino Valley MWD, San Gabriel Valley MWD and MWDCS.

Table 6-16 shows estimated *average annual* Table A deliveries to individual contractors under 2003 conditions with the proposed project and under the baseline scenario. The average annual deliveries are the average deliveries over the 73-year period of record between 1922 and 1994. The average annual of total Table A deliveries would decrease by 2 percent compared to the baseline scenario due to the Table A retirement and the Table A transfers to M&I contractors that do not yet have a full demand for Table A water. Collectively, average annual Table A deliveries to agricultural contractors would decrease by seven percent and

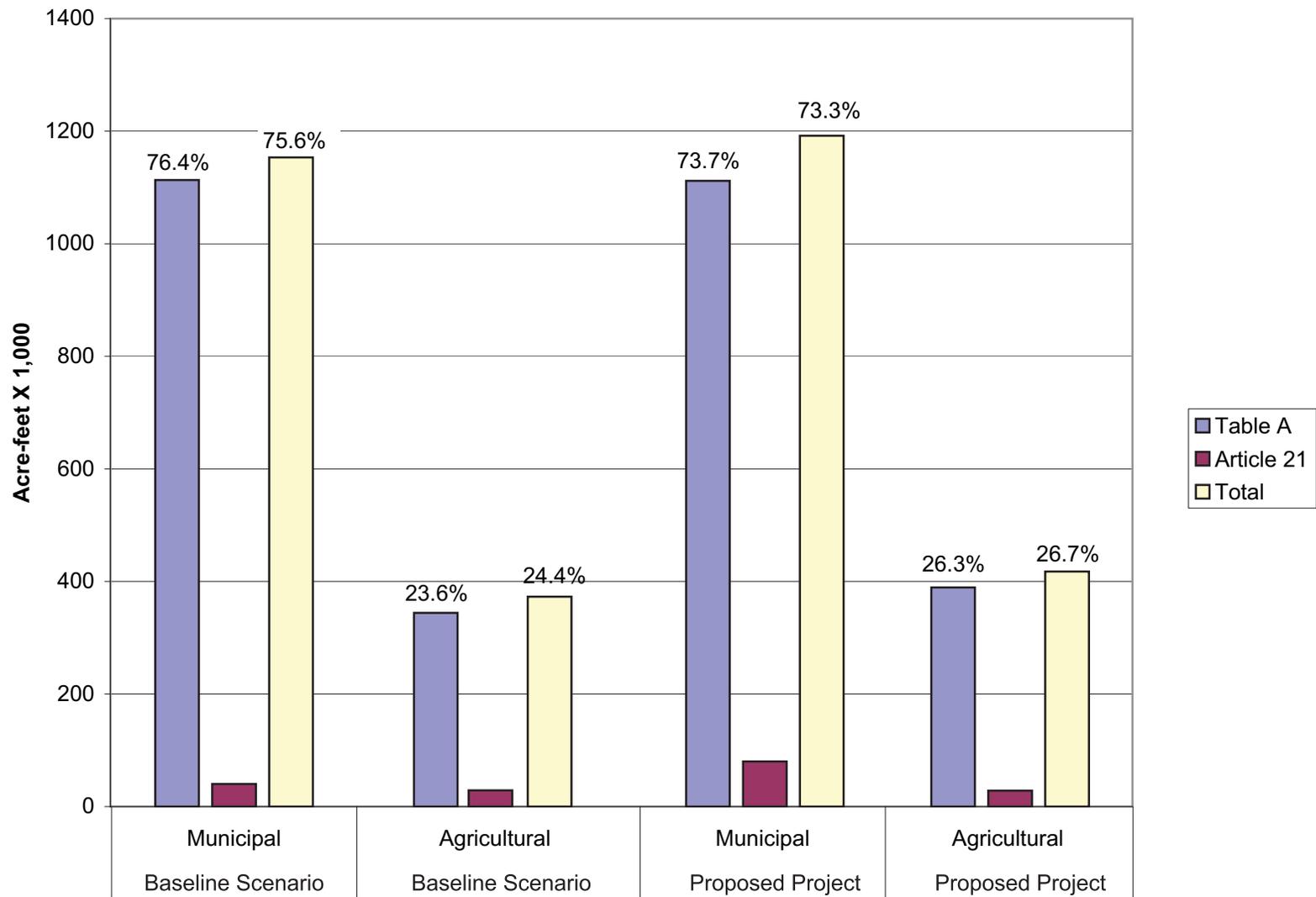


Source: PBSJ, 2007.



FIGURE 6-1
Average Wet Year Deliveries 2003 Conditions

D50680.00



Source: PBS&J, 2007.



FIGURE 6-2
Average Critical Year Deliveries 2003 Conditions

D50680.00

deliveries to M&I contractors would increase by one percent relative to the baseline scenario. As shown in Figure 6-3, the agricultural contractors' share of total Table A deliveries would decrease from an average of 32.6 percent under the baseline scenario to 30.8 percent with the proposed project. The M&I contractors' share would increase from an average of 67.4 percent to 69.2 percent.

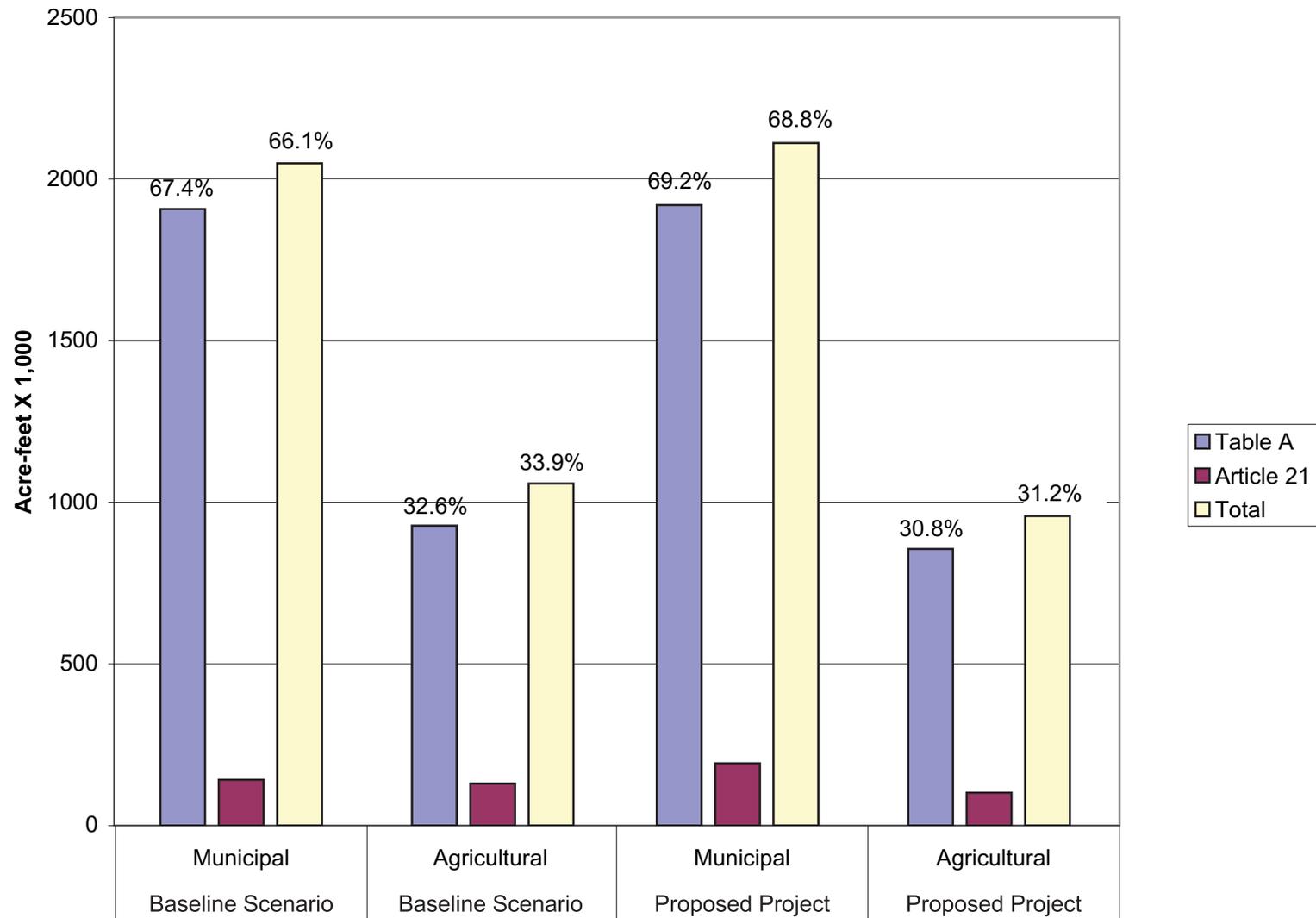
Average annual Table A deliveries to most individual contractors would change by less than 5 percent relative to the baseline scenario. Agricultural contractors subject to large decreases in annual average deliveries include KCWA (-9 percent) and Dudley Ridge WD (-8 percent). M&I contractors subject to large increases in deliveries include Alameda County, Zone 7 (+44 percent) and Castaic Lake WA (+54 percent).

Total Deliveries under 2003 Conditions

Table 6-17 shows estimated average Table A and Article 21 deliveries to individual contractors under 2003 conditions in *wet years* with the proposed project and under the baseline scenario. In wet years, the average of total Table A and Article 21 deliveries would decrease by 2 percent compared to the baseline scenario. Collectively, average deliveries to agricultural contractors in wet years would decrease by 15 percent and deliveries to M&I contractors would increase by 7 percent relative to the baseline scenario. As shown in Figure 6-1, the agricultural contractors' share of total deliveries in wet years would decrease from 38.5 percent under the baseline scenario to 33.3 percent with the proposed project. The M&I contractors' share would increase from 61.5 percent to 66.7 percent. Deliveries to M&I contractors in wet years would increase because their share of the total Table A amount would increase as a result of Table A transfers and because they would receive more Article 21 water in wet years under the altered allocation procedures. Agricultural contractors deliveries in wet years would decrease because their share of the total Table A amount would decrease and they would no longer have preferential access to Article 21 water.

Deliveries to most individual contractors in wet years would change by less than 5 percent relative to the baseline scenario. Agricultural contractors subject to large decreases in wet year deliveries include Empire West Side ID (-23 percent), KCWA (-16 percent) and Tulare Lake Basin WSD (-14 percent). M&I contractors subject to large increases in deliveries include Napa County FC&WCD (11 percent), Alameda County, Zone 7 (45 percent) and Castaic Lake WA (53 percent).

Table 6-18 shows estimated average Table A and Article 21 deliveries to individual contractors under 2003 conditions in *critically dry years* with the proposed project and under the baseline scenario. In critically dry years, the average of total Table A and Article 21 deliveries would increase by 2 percent compared to the baseline scenario. Collectively, average deliveries to agricultural contractors in critically dry years would increase by 12 percent and deliveries to M&I contractors would decrease by 1 percent relative to the baseline scenario. As shown in Figure 6-2, the agricultural contractors' share of total deliveries in critically dry years would increase from 24.4 percent under the baseline scenario to 26.7 percent with the proposed project. The M&I contractors' share would decrease from 75.6 percent to 73.3 percent. Deliveries to agricultural contractors would increase because they would no longer be subject to the agriculture-first cuts in very dry periods. Their increase in critically dry year deliveries as a result of the altered allocation procedures under Article 18 would more than offset the effects of the decrease in their share of the total Table A amount as a result of Table A transfers and retirements.



Source: PBS&J, 2007.



FIGURE 6-3
Average Annual Deliveries 2003 Conditions

D50680.00

Agricultural contractors would be subject to increases in critically dry year deliveries of between 8 and 31 percent. M&I contractors subject to large increases in deliveries include Alameda County, Zone 7 (+53 percent), Castaic Lake WA (+69 percent) and Coachella Valley WD (+21 percent). M&I contractors that did not receive transfers of Table A amounts would be subject to decreases in deliveries of 2 to 6 percent including Alameda County WD, Santa Clara Valley WD, San Luis Obispo County FC&WCD, Santa Barbara County FC&WCD, Antelope Valley-East Kern WA, Crestline-Lake Arrowhead WA, Desert WA, San Bernardino Valley MWD, San Gabriel Valley MWD and MWDSC.

Table 6-19 shows estimated *average annual* Table A and Article 21 deliveries to individual contractors under 2003 conditions with the proposed project and under the baseline scenario. The average annual deliveries are the average deliveries over the 73-year period of record between 1922 and 1994. The annual average of total Table A and Article 21 deliveries would decrease by 1 percent compared to the baseline scenario. Collectively, average annual deliveries to agricultural contractors would decrease by 11 percent and deliveries to M&I contractors would increase by 3 percent relative to the baseline scenario. As shown in Figure 6-3, the agricultural contractors' share of total deliveries would decrease from an average of 33.9 percent under the baseline scenario to 31.2 percent with the proposed project. The M&I contractors' share would increase from an average of 66.1 percent to 68.8 percent.

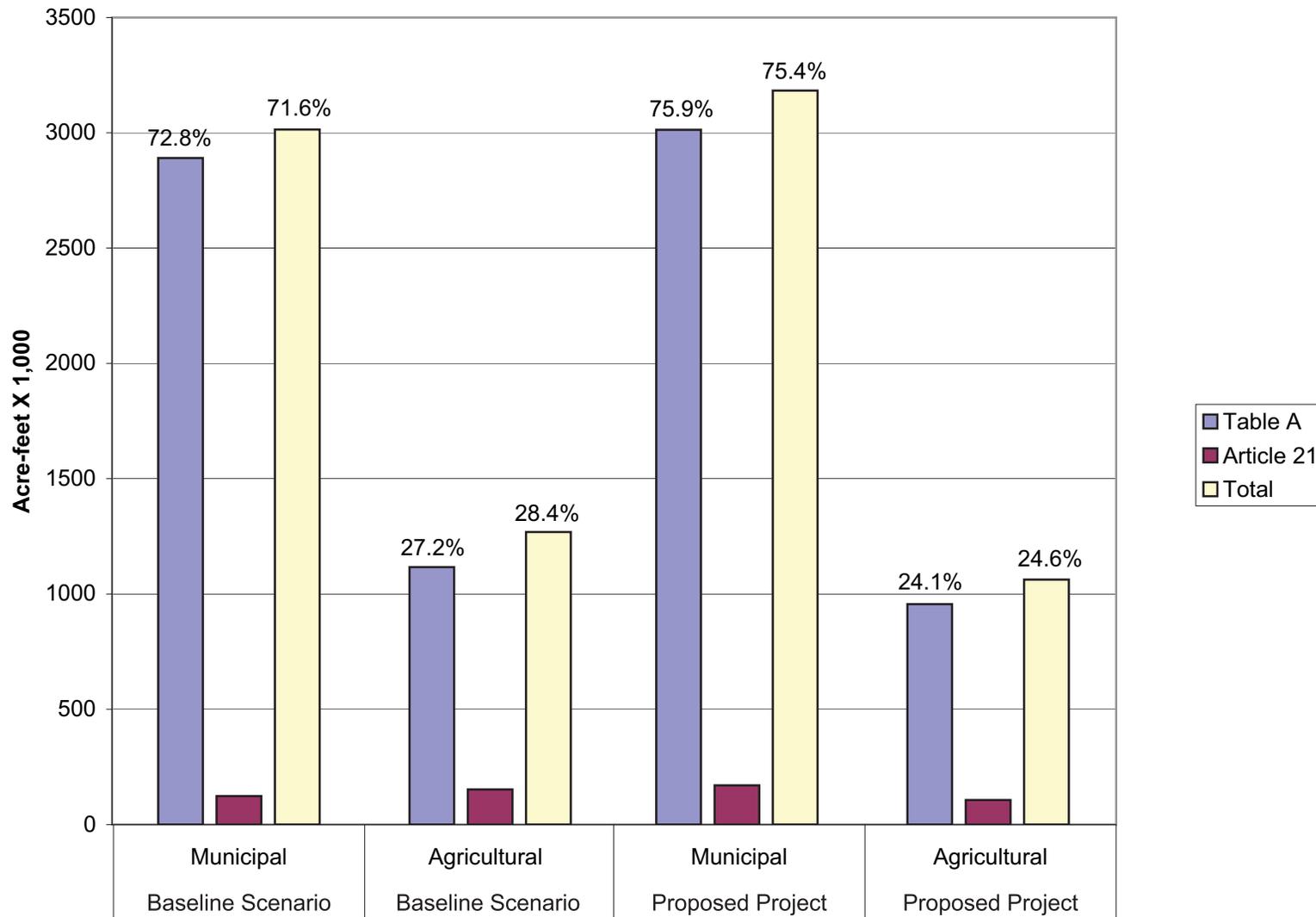
Average annual deliveries to most individual contractors would change by less than 5 percent relative to the baseline scenario. Agricultural contractors subject to large decreases in annual average deliveries include Empire West Side ID (-13 percent) and KCWA (-10 percent). M&I contractors subject to large increases in deliveries include Alameda County, Zone 7 (+46 percent) and Castaic Lake WA (+55 percent).

Table A Deliveries under 2020 Conditions

Table 6-20 shows estimated average Table A deliveries to individual contractors under 2020 conditions in *wet years* with the proposed project and under the baseline scenario. In wet years, the average of total Table A deliveries would decrease by 1 percent compared to the baseline scenario due to the Table A retirement. Collectively, average Table A deliveries to agricultural contractors in wet years would decrease by 12 percent and deliveries to M&I contractors would increase by 3 percent relative to the baseline scenario. As shown in Figure 6-4, the agricultural contractors' share of total deliveries in wet years would decrease from 27.2 percent under the baseline scenario to 24.1 percent with the proposed project. The M&I contractors' share would increase from 72.8 percent to 75.9 percent. Deliveries to M&I contractors would increase because their share of the total Table A amount would increase as a result of Table A transfers.

Table A deliveries to a little more than half of the individual contractors in wet years would change by less than 5 percent relative to the baseline scenario. The only agricultural contractor subject to a large decrease in wet year deliveries would be KCWA (-15 percent). M&I contractors subject to large increases in deliveries include Napa County FC&WCD (+15 percent), Solano County WA (+13 percent), Alameda County, Zone 7 (+72 percent), Castaic Lake WA (+76 percent), Mojave (+47 percent) and Palmdale WD (+22 percent). All are recipients of Table A transfers.

Table 6-21 shows estimated average Table A deliveries to individual contractors under 2020 conditions in *critically dry years* with the proposed project and under the baseline scenario. In critically dry years, the average of total Table A deliveries would increase by 1 percent



Source: PBS&J 2007.



FIGURE 6-4
Average Wet Year Deliveries 2020 Conditions

D50680.00

compared to the baseline scenario. This is because the retirement of Table A amount with the proposed project, and the consequent reduction in Table A deliveries in wet and average years, would cause water to accumulate in SWP reservoirs enabling increased deliveries in critically dry years. Collectively, average Table A deliveries to agricultural contractors in critically dry years would increase by 24 percent and deliveries to M&I contractors would decrease by 5 percent relative to the baseline scenario. As shown in Figure 6-5, the agricultural contractors' share of total Table A deliveries in critically dry years would increase from 20.4 percent under the baseline scenario to 25 percent with the proposed project. The M&I contractors' share would decrease from 79.6 percent to 75 percent. Table A deliveries to agricultural contractors would increase because they would no longer be subject to the agriculture-first cuts in very dry periods. Their increase in critically dry year deliveries as a result of the altered allocation procedures under Article 18 would more than offset the effects of the decrease in their share of the total Table A amount as a result of Table A transfers.

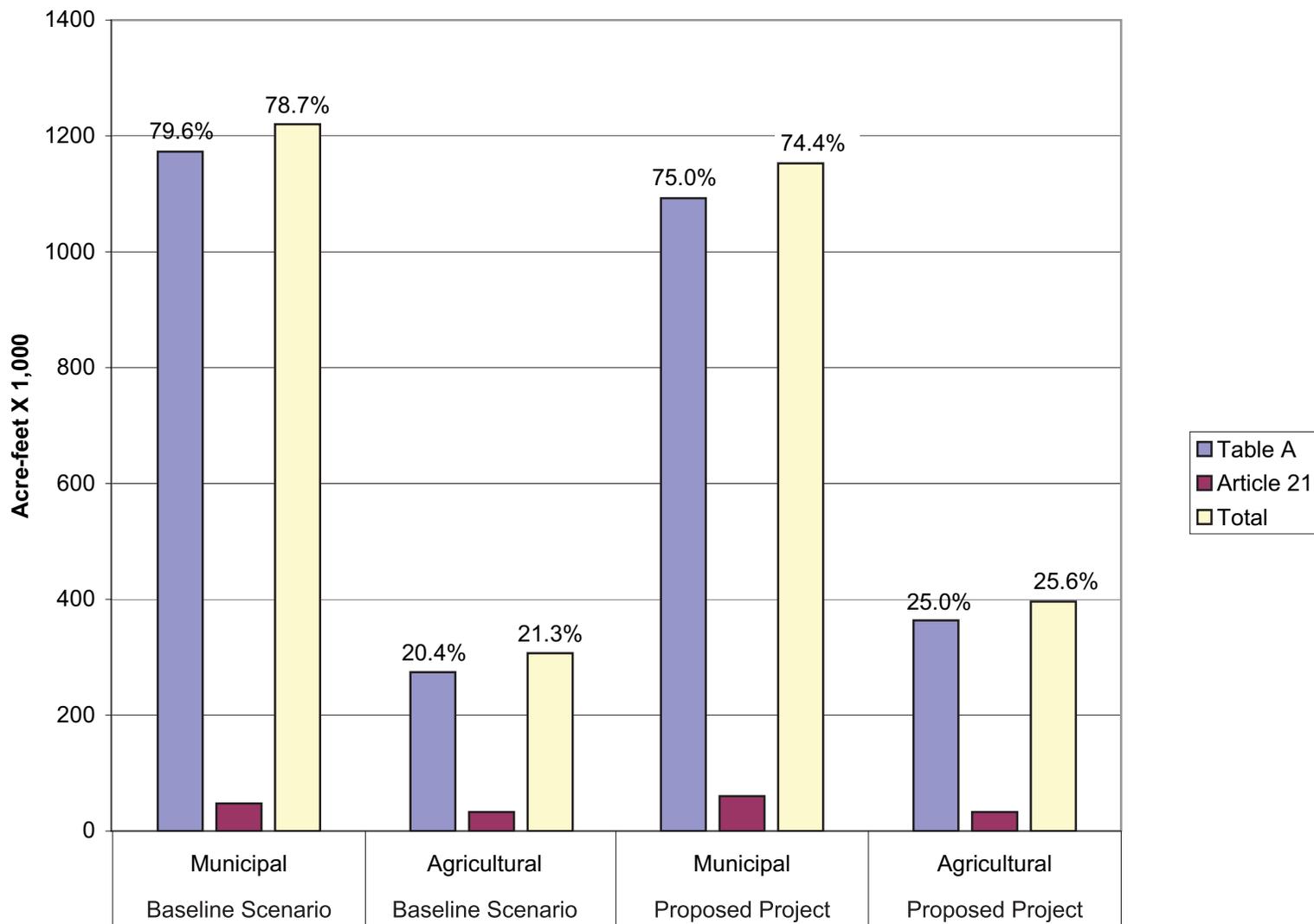
Agricultural contractors would be subject to increases in critically dry year Table A deliveries of between 20 and 48 percent. Many M&I contractors would be subject to decreases in Table A deliveries of about 10 percent. They include Alameda County WD (-9 percent), Santa Clara Valley WD (-9 percent), San Luis Obispo County FC&WCD (-9 percent), Santa Barbara County FC&WCD (-9 percent), Antelope Valley-East Kern WA (-8 percent), Crestline-Lake Arrowhead WA (-10 percent), Littlerock Creek ID (-13 percent), MWDSC (-9 percent), San Bernardino Valley MWD (-9 percent), San Gabriel Valley MWD (-10 percent), San Geronio Pass WA (-10 percent) and Ventura County FCD (-8 percent). These contractors would be subject to decreased critically dry year Table A deliveries because their reduced deliveries as a result of the altered allocation procedures would not be offset by receipt of a Table A transfer. Several M&I contractors that would receive Table A transfers would be subject to increased deliveries in critically dry years. They include Alameda County, Zone 7 (+59 percent), Castaic Lake WA (+76 percent) and Mojave WA (+36 percent).

Table 6-22 shows estimated *average annual* Table A deliveries to individual contractors under 2020 conditions with the proposed project and under the baseline scenario. The average annual deliveries are the average deliveries over the 73 years of record between 1922 and 1994. The annual average of total Table A deliveries would decrease by less than 1 percent compared to the baseline scenario due to the Table A retirement. Collectively, average annual deliveries to agricultural contractors would decrease by three percent and deliveries to M&I contractors would remain about the same relative to the baseline scenario. As shown in Figure 6-6, the agricultural contractors' share of total deliveries in average years would decrease from 25.1 percent under the baseline scenario to 24.5 percent with the proposed project. The M&I contractors' share would increase from 74.9 percent to 75.5 percent.

Average annual Table A deliveries to about half the individual contractors would change by less than five percent relative to the baseline scenario. The smaller agricultural contractors would experience increases in deliveries of 5 to 15 percent but the largest agricultural contractor, KCWA, would experience a reduction in deliveries of 5 percent. M&I contractors subject to large increases in deliveries include Alameda County, Zone 7 (+67 percent), Castaic Lake WA (+75 percent), Mojave WA (+43 percent) and Palmdale WD (+18 percent). All are recipients of Table A transfers.

Total Deliveries under 2020 Conditions

Table 6-23 shows estimated average Table A and Article 21 deliveries to individual contractors under 2020 conditions in *wet years* with the proposed project and under the baseline scenario.



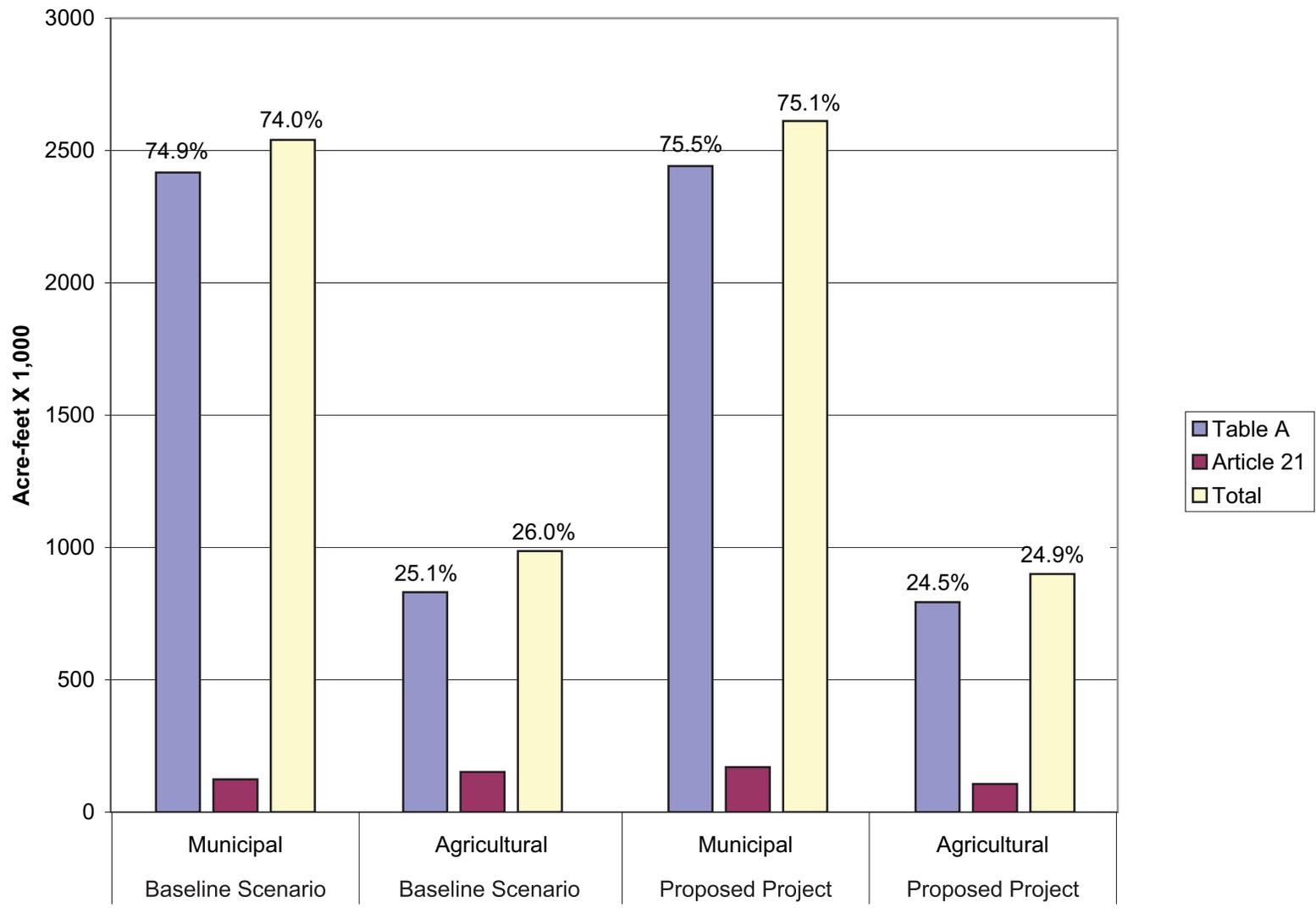
Source: PBSJ, 2007.



FIGURE 6-5
Average Critical Year Deliveries 2020 Conditions

D50680.00

Monterey Amendment and Settlement Agreement DEIR



Source: PBSJ, 2006.



FIGURE 6-6
Average Annual Deliveries 2020 Conditions

D50680.00

In wet years, the average of total Table A and Article 21 deliveries would decrease by 1 percent compared to the baseline scenario. Collectively, average deliveries to agricultural contractors in wet years would decrease by 14 percent and deliveries to M&I contractors would increase by 4 percent relative to the baseline scenario. As shown in Figure 6-4, the agricultural contractors' share of total deliveries in wet years would decrease from 28.4 percent under the baseline scenario to 24.6 percent with the proposed project. The M&I contractors' share would increase from 71.6 percent to 75.4 percent. Deliveries to M&I contractors would increase because their share of the total Table A amount would increase as a result of Table A transfers and because they would receive more Article 21 water under the altered allocation procedures in Article 18 and 21.

Deliveries to a little more than half of the individual contractors in *wet years* would change by less than 5 percent relative to the baseline scenario. Agricultural contractors subject to large decreases in wet year deliveries include Empire West Side ID (-21 percent), KCWA (-15 percent) and Tulare Lake Basin WSD (-10 percent). M&I contractors subject to large increases in deliveries include Napa County FC&WCD (+21 percent), Solano County WA (+16 percent), Alameda County, Zone 7 (+74 percent), Castaic Lake WA (+100 percent), Coachella Valley WD (+10 percent), Mojave WA (+47 percent) and Palmdale WD (+22 percent). All are recipients of Table A transfers.

Table 6-24 shows estimated average Table A and Article 21 deliveries to individual contractors under 2020 conditions in *critically dry years* with the proposed project and under the baseline scenario. In critically dry years, the average of total Table A and Article 21 deliveries would increase by 1 percent compared to the baseline scenario. Collectively, average deliveries to agricultural contractors in wet years would increase by 21 percent and deliveries to M&I contractors would decrease by 5 percent relative to the baseline scenario. As shown in Figure 6-5, the agricultural contractors' share of total deliveries in critically dry years would increase from 21.3 percent under the baseline scenario to 25.6 percent with the proposed project. The M&I contractors' share would decrease from 78.7 percent to 74.4 percent. Deliveries to agricultural contractors would increase because they would no longer be subject to the agriculture-first cuts in very dry periods. Their increase in critically dry year deliveries as a result of the altered allocation procedures under Article 18 would more than offset the effects of the decrease in their share of the total Table A amount as a results of Table A transfers.

All agricultural contractors would be subject to increases in critically dry year deliveries. Contractors experiencing the greatest increases include Oak Flat WD (+38 percent), Dudley Ridge WD (+34 percent), KCWA (+18 percent) and Tulare Lake Basin WSD (+35 percent). Many M&I contractors would be subject to decreases in deliveries of about 10 percent. They include Alameda County WD (-9 percent), Santa Clara Valley WD (-11 percent), San Luis Obispo County FC&WCD (-9 percent), Santa Barbara County FC&WCD (-9 percent), Antelope Valley-East Kern WA (-8 percent), Crestline-Lake Arrowhead WA (-10 percent), Littlerock Creek ID (-13 percent), MWDSC (-9 percent), San Bernardino Valley MWD (-9 percent), San Gabriel Valley MWD (-10 percent), San Geronio Pass WA (-10 percent) and Ventura County FCD (-8 percent). These contractors would be subject to decreased critically dry year deliveries because their reduced deliveries as a result of the altered allocation procedures would not be offset by receipt of a Table A transfer. Several M&I contractors that would receive Table A transfers would be subject to increased deliveries in critically dry years. They include Napa County FCWCD (5 percent), Solano County WA (3 percent), Alameda County, Zone 7 (+57 percent), Castaic Lake WA (+80 percent), Mojave WA (+36 percent) and Palmdale WD (11 percent).

Table 6-25 shows estimated *average annual* Table A and Article 21 deliveries to individual contractors under 2020 conditions with the proposed project and under the baseline scenario. The average annual deliveries are the average deliveries over the 73 years of record between 1922 and 1994. The annual average of total Table A and Article 21 deliveries would decrease by less than 1 percent compared to the baseline scenario. Collectively, average annual deliveries to agricultural contractors would decrease by 5 percent and deliveries to M&I contractors would increase by 1 percent relative to the baseline scenario. As shown in Figure 6-6, the agricultural contractors' share of total deliveries in average years would decrease from 26.0 percent under the baseline scenario to 24.9 percent with the proposed project. The M&I contractors' share would increase from 74.0 percent to 75.1 percent.

Average annual deliveries to about half the individual contractors would change by less than 5 percent relative to the baseline scenario. Agricultural contractors subject to decreases in annual average deliveries include Empire West Side ID (-4 percent) and KCWA (-7 percent). The other agricultural contractors would experience increases in average annual deliveries. M&I contractors subject to large increases in deliveries include Alameda County, Zone 7 (+68 percent), Castaic Lake WA (+77 percent), Mojave WA (+43 percent) and Palmdale WD (+18 percent). All are recipients of Table A transfers.

Comparison Between CALSIM II Simulation and the Historical Allocation Analysis

No exact comparison can be made between the results of CALSIM II simulations (Study No.4) and the historical allocation analysis (Study No.1) because the former uses a 73-year period of hydrologic record while the latter uses data from a ten-year period. The ten-year period of record is not as representative of long-term hydrologic conditions as the 73-year period of record. Also, the CALSIM II simulations estimate Table A deliveries, whereas the historical allocation analysis calculates Table A allocations. However, comparison of actual Table A allocations to contractors between 1996 and 2005 (Tables 6-10, 6-11, 6-12 and 6-13) with CALSIM II simulations of average annual Table A deliveries (Tables 6-16 and 6-22) reveals similar patterns. Contractors that received increased Table A allocations as a result of the proposed project (historical analysis – Study No. 1) also received increased Table A deliveries (CALSIM II simulations - Study No. 4).

6.4.3 Changes in SWP Operations and Deliveries Induced Primarily by Water Supply Management Practices

The Monterey Amendment contains several provisions, other than the altered water allocation procedures and the transfers and retirements of Table A amounts, that affect deliveries to contractors. Article 54 of the Monterey Amendment permits certain contractors to borrow water from Castaic Lake and Lake Perris in addition to their allocated SWP supplies and describes the rules governing the borrowing and replacement of water by these contractors. Article 56 of the Monterey Amendment allows contractors to store SWP water outside their service areas for later use within their service areas. This could include storage in groundwater banks or storage in surface water reservoirs owned by the SWP or others. Another provision of Article 56 establishes a turnback pool for annual transfers of Table A water among contractors.

Article 55 clarifies the terms and conditions for conveyance of non-SWP water using SWP facilities but has no effect on deliveries of SWP water. Because the Department is required by the California Water Code to transport water for others in SWP facilities when capacity is available to do so, this provision neither increases nor decreases the contractors' ability to convey non-SWP water using SWP facilities. Because Article 55 has no effect on SWP

deliveries or the use of SWP facilities to deliver non-SWP water it would have no environmental effects and is consequently not analyzed in the following section.

The water supply management practices alter SWP operations and deliveries to contractors but they are not simulated by the CALSIM II model. Consequently, their effects are not reflected in the delivery estimates contained in Tables 6-14 through 6-25. The changes in SWP operations and deliveries to contractors induced by the water supply management practices were characterized by examining historical data for the period 1996 to 2004. The changes in SWP operations and deliveries contractors induced by the water supply management practices between 1996 and 2004 offer insight into and enable projection of likely future operational changes.

One of the historical operations analyses for the period 1996 to 2004 (Study No. 2) examined the effects of the water supply management practices in combination with most of the other provisions of the Monterey Amendment, including the Table A retirements provided for by Article 53, on SWP deliveries. Like the water supply management practices the Table A retirements affect SWP deliveries. The permanent Table A retirements provided for under Article 53 result in lower deliveries to agricultural contractors that retired Table A amount and to lower overall SWP deliveries. The altered water allocation procedures were not accounted for in the analysis for two reasons. First, it is difficult to do so without making difficult-to-supports assumptions. Second, the altered allocation procedures provided for by Articles 18 and 21 result primarily in a shift in deliveries from one contractor to another and do not affect total deliveries they were not accounted for in the historical operations analysis. The permanent transfers of Table A amounts provided for in Article 53 may result in a temporary reduction in deliveries because the immediate water demands of some of the M&I contractors receiving transfers are less than those of the agricultural contractors that were the source of the transfers. Some M&I contractors acquired Table A amount to meet future water demands and to improve dry year supply. By 2020, these M&I contractors are expected to need their full Table A amounts and therefore the transfers would have little or no effect on total deliveries by that time.

The second historical operations analysis was used to determine the effects of the water supply management practices in the future (Study No. 3). It used data from the period 1996 to 2004 and examined the effects of the water supply management practices on SWP deliveries in isolation.

Deliveries Between 1996 and 2003

Changes in SWP Operations and Deliveries Induced by Water Supply Management Practices

Prior to the 1990s, the contractors had little interest in storing SWP water outside their service areas because there was no need to do so; water demands were lower than they are currently and water supplies were generally adequate. In the early 1990s, contractors' interest in the concept grew as the balance between demand and supply became less favorable in a series of dry years. Article 12(e) was added to most contractors' long term water supply contracts in 1991. Article 12(e) allowed contractors to store water outside their service areas by carrying over Table A water in San Luis Reservoir from one year to the next under certain conditions. But Department approval for out-of-service area storage in groundwater basins or surface water reservoirs other than San Luis Reservoir had to be obtained on a case-by-case basis. Only one contractor, MWDSC, had obtained Department approval for an out-of-service area storage, in this case in a groundwater basin, prior to the Monterey Amendment. Article 56 of the Monterey

Amendment provided for storage of SWP water outside contractors' service areas for later use within their service areas.

Groundwater storage

Opportunities for storage outside contractors' service areas were greatest in Kern County where geological characteristics are suitable for the creation and operation of groundwater banks. Also, the groundwater bodies underlying the southern San Joaquin Valley portion of Kern County have been historically overdrafted. Banking of water from outside Kern County could help to reduce groundwater extraction and overdrafting.

The creation of groundwater banks in Kern County in which contractors could store SWP water increases the amount of south of Delta storage available to the SWP and its contractors. An increase in south of Delta storage has the potential to increase average SWP deliveries and deliveries to certain of its contractors. The increase in average deliveries would occur because new groundwater banks provide a new place to store SWP water south of the Delta in wetter years when large volumes of water are available in the Delta.

As noted earlier, Semitropic WSD, a KCWA member agency, developed an in-lieu water bank in Kern County with a capacity of one million AF in the early 1990s. MWDSC acquired rights to about a one-third share of the capacity of the water bank and received the Department's permission to store water there prior to the Monterey Amendment. Although other contractors were considering participation in this and other similar groundwater banking programs, MWDSC was the first contractor to request Department approval to do so and the only contractor to receive approval prior to the Monterey Amendment. Because MWDSC had received the Department's approval of storage in Semitropic Water Storage District's groundwater bank before the Monterey Amendment was executed it is included in the baseline scenario.

From 1996 through 2003, six contractors delivered a total of 1,092,647 AF of SWP water for storage in groundwater banks outside their service areas. Pursuant to its pre-Monterey Amendment acquisition of rights to store water in Semitropic WSD's groundwater bank, and the Department's approval of the arrangement, MWDSC delivered 406,290 acre-feet of SWP water for storage there. Thus, 686,357 AF more water was delivered for storage in groundwater banks with the proposed project than would have been delivered for storage under the baseline scenario. When the contractors withdraw the additional water from the groundwater banks it would add to their deliveries of SWP water in the year they make the withdrawal. The amounts of water delivered to storage in groundwater banks outside their service areas by individual contractors from 1996 through 2003, excluding storage by MWDSC in the Semitropic WSD's bank, are shown in Table 6-26.

If the 686,357 AF of SWP water had not been placed in groundwater storage outside the contractors' service areas it might have been stored or used by contractors within their service areas, stored by the Department or allowed to remain in the Delta. Any water that would have remained in the Delta under the baseline scenario but which was diverted from the Delta with the proposed project in place would represent additional SWP water that the contractors would not otherwise have had available to them.

Extended Carryover in San Luis Reservoir

Article 12(e) of the long-term water supply contracts allows contractors to carryover Table A water from one year to next under certain conditions. The water is temporarily stored or carried over in SWP reservoirs, primarily San Luis Reservoir. Article 56 of the Monterey Amendment

TABLE 6-26

SWP WATER DELIVERED TO STORAGE AND RECOVERED FROM GROUNDWATER BASINS OUTSIDE CONTRACTORS' SERVICE AREAS (AF)

Year Type ^a	Water Delivered to Storage ^b									Water Recovered Through 2003	Balance in Storage ^c 2003
	1996 W	1997 W	1998 W	1999 W	2000 AN	2001 D	2002 D	2003 AN	Total		
MWDSC ^d	0	1,486	29,734	62,162	149,731	0	0	60,765	303,878	33,180	270,698
Alameda Co. FC&WCD, Zone 7	0	0	1,970	22,910	23,940	5,000	13,484	6,500	73,804	1,807	71,997
Alameda County WD	6,200	10,000	3,780	16,100	13,380	0	2,083	18,800	70,343	0	70,343
Santa Clara Valley WD	45,000	35,000	23,800	30,000	23,730	0	3,311	33,000	193,841	30,000	163,841
Dudley Ridge WD	4,131	5,342	5,925	1,321	953	1,733	736	350	20,491	4,954	15,537
Castaic Lake WA	0	0	0	0	0	0	24,000	0	24,000	0	24,000
Totals	55,331	51,828	65,209	132,493	211,734	6,733	43,614	119,415	686,357	69,941	616,416

Notes:

- a. Based on Sacramento Valley water year types as wet (W), above normal (AN), below normal (BN), dry (D), and critically dry (CD), in accordance with SWRCB D-1641.
- b. All water delivered to storage and recovered from groundwater basins in Kern County.
- c. The storage balances shown here overstate the amount of water available for recovery by the storing contractor because they do not account for losses within the groundwater basin. Losses differ by storage program but are typically of the order of 10 percent so about 90 percent of the water delivered to storage is available for recovery.
- d. Deliveries by MWDSC to the Semitropic WSD groundwater banking program are excluded from these deliveries because MWDSC's participation in the program predated the Monterey Amendment.

Source: California Department of Water Resources.

expanded the circumstances under which contractors could carry over or temporarily store water in San Luis Reservoir. However, contractors must take delivery of carryover water before storage space in San Luis Reservoir is needed by the SWP. Any carryover water remaining in the reservoir when the SWP needs the storage capacity reverts to the SWP.

From 1996 through 2004, contractors requested about 1,680,000 AF of water be placed in extended carryover storage and took delivery of approximately 1,280,000 AF. About 400,000 AF of the carryover water reverted to the SWP. Under the baseline scenario, no Table A water would have been placed in Article 56 extended carryover storage.

Some contractors use extended carryover to improve their SWP water supply during dry years. If a contractor has more Table A water in a given year (Year 1) than it needs it may choose to store some or all of the excess in San Luis Reservoir. If the following year (Year 2) is dry, the contractor is able to supplement its reduced SWP allocation with SWP water carried over from the previous year (Year 1). If Year 2 is wet, the contractor typically uses the SWP water carried over from Year 1 early in the year to prevent it reverting to the SWP. This reduces the contractor's need for SWP water in Year 2, increasing the chance it will be able to carry over some of its Year 2 SWP allocation in San Luis Reservoir for use in Year 3. Extended carryover affects deliveries to individual contractors. Prior to the Monterey Amendment, in a year (Year 1) when a contractor did not need its full, allocated Table A amount, the water it did not take reverted to the SWP. The SWP either allocated the water to other contractors in Year 1 or carried it over in San Luis Reservoir for allocation to contractors in the following year (Year 2). The Monterey Amendment enabled a contractor to defer delivery of part of its Year 1 SWP allocation so that it could use it in Year 2. Routine use of carryover storage enables a contractor to slightly increase its share of SWP water at the expense of contractors that do not carry over SWP water from one year to the next.

Extended carryover in San Luis Reservoir could increase total deliveries of SWP water if any of the water placed in carryover storage in a year when the storing contractors had more water than they needed would otherwise have flowed out of the Delta. It would not increase total deliveries of SWP water if the water placed in carryover storage would have been reallocated and used by other contractors or used to increase storage in SWP facilities.

Turnback pool

Contractors have often requested more Table A water than they ultimately needed for several reasons. By October 1, when the initial requests are made for the following calendar year, contractors cannot know how weather will affect demand for water in their service areas, how much local water supply will be available, or how much water will be allocated to them by the SWP. A reasonable strategy for a contractor is to estimate the range of likely water demand and then request a Table A amount sufficient to meet demand at the high end of the range. Although this is prudent practice for an individual contractor it does not optimize benefits for the SWP as a whole. If a contractor discovers in the spring that it needs only a portion of its requested Table A water, it may be too late for another contractor or the Department to put the unneeded water to use. The turnback pool was created to provide a financial incentive to a contractor that does not need all of its requested Table A water to turn that water back for sale to another contractor or the Department early enough in the year for it to be put to use.

From 1996 through 2004, numerous contractors and the Department used the turnback pool to buy and sell Table A water. The turnback pool was used to transfer 1,285,318 AF of Table A water between 1996 and 2004, including 289,222 AF purchased by the Department and 999,096 AF purchased by contractors. The water purchased by the Department remained in

storage for use in a subsequent year. Of the water purchased by contractors, 922,697 AF was actually delivered. If this amount of Table A water had not been delivered to contractors via the turnback pool, it might have been used by the contractor it was originally allocated to, allocated to another contractor, stored by the Department in Lake Oroville or San Luis Reservoir, or it might have flowed out of the Delta. Any water that would have flowed out of the Delta under the baseline scenario but which was diverted from the Delta with the proposed project in place would represent additional SWP water that the contractors would not have had available to them. When the contractors purchased water through the turnback pool that would otherwise have flowed out of the Delta it would add to their deliveries of SWP water.

Flexible storage in Castaic Lake and Lake Perris

Castaic Lake (gross capacity 323,700 AF) and Lake Perris (gross capacity 131,500 AF) are located respectively at the termini of the West and East branches of the California Aqueduct. Their purpose is to meet peak demands for water and to provide emergency storage. The Department uses the reservoirs to meet peak summertime water demand in southern California when the California Aqueduct is operating at its maximum capacity. When the California Aqueduct is out of service in emergencies, or when it is closed or is subject to flow reductions for maintenance, the Department can supply some contractors with water from Castaic Lake and Lake Perris. The Department refills the reservoir when water and energy conditions are favorable.

The Department also uses the reservoirs to reduce its electrical power costs. The cost of electrical power reaches its seasonal maximum on hot summer days. By supplying water to some contractors from the reservoirs at such times rather than purchasing power at peak rates to pump water from the California Aqueduct, the Department is able to reduce its power costs.

Article 54 of the Monterey Amendment provides that the three contractors that can obtain water from Castaic Lake and Lake Perris may borrow water from the reservoirs provided the borrowing contractor replaces the water within five years. This is referred to as the flexible storage provision. MWDSC is the only contractor that can withdraw water from Lake Perris. See Chapter 4, Section 4.4.4 for further discussion of the flexible storage provision. The borrowing and replacement of water that occurred between 1996 and 2003 is shown in Table 6-27.

For a variety of reasons, including recent wetter than normal hydrology, the Department has been able to reduce its summer drawdown of Castaic Lake and Lake Perris compared to pre-Monterey Amendment conditions. The higher water level enables the Department to accommodate possible borrowing of water by contractors under the flexible storage provision without compromising the other purposes of the reservoirs; that is, meeting peak demands, providing water in emergencies and during maintenance and increasing the efficiency of energy use.

When water has been borrowed from the reservoirs, the Department has often refilled the reservoirs, as water and off-peak energy become available to it, before the contractors wished to replace the water they had borrowed. If the reservoirs were full by the time the contractors wished to replace the water, the Department credited the contractors with the replacement water and that water became part of the SWP's supply.

The flexible storage provision enables some contractors to temporarily increase the amount of water they obtain from the SWP. A contractor using the provision can obtain its allocation of SWP water under all other provisions of its SWP contract plus the water borrowed from Castaic

TABLE 6-27

USE OF FLEXIBLE STORAGE 1996-2003

Borrower	Reservoir	Purpose	Amount AF	Withdrawal Date	Replacement Date
Castaic Lake WA	Castaic	Water quality improvement	1,256	November-December, 1996	November-December, 1997
Castaic Lake WA	Castaic	Water quality improvement	2,589	November-December, 2000	December, 2001
MWDSC	Castaic	Environmental Water Account	50,000	March-April, 2001	March-July, 2002 and October-November, 2002
MWDSC	Castaic	Cost savings to MWDSC	14,300	December, 2001	November-December, 2002
Castaic Lake WA	Castaic	Water quality improvement	395	December, 2002	January, 2006
MWDSC	Castaic	Water quality improvement during facility outage	77,804	Jan-Feb 2003	Feb-Apr 2003
MWDSC	Perris	Water quality improvement	8,181	Mar-May 2000	Jun 2000 and Mar 2001
MWDSC	Perris	Cost savings to MWDSC	10,692	Dec 2001	May-Jul 2002 and Nov-Dec 2002
MWDSC	Perris	Water quality improvement during facility outage	17,993	Jan-Feb 2003	Feb-Apr 2003

Sources: MWDSC, California Department Of Water Resources.

Lake or Lake Perris. The effects of flexible storage on SWP deliveries depend on how the water is replaced. It might be paid back by the contractor increasing its use of one of its other water sources and taking less SWP water than its full allocation under the other provisions of the SWP contracts. If this were the case, then flexible storage would have no effect on the total deliveries of water by the SWP. Alternatively, a contractor might pay it back by requesting a greater proportion of its Table A amount or more Article 21 water than it otherwise would request. In this case, if Table A allocations were less than 100 percent or the Article 21 supply available was less than demand for it, the increase in deliveries to that contractor would be offset by reduced allocations to other contractors with no effect on total deliveries of SWP. The repayment of water would only affect total deliveries of SWP water if it occurred when Table A allocations were 100 percent or Article 21 water was available in excess of demand for it. That is, when Delta pumping was cut back because all other demands for SWP water were being met and all SWP storage reservoirs were full or at their storage targets. If repayment occurred under these conditions it could increase total deliveries of SWP water and decrease total Delta outflow.

Summary of Effects of Water Supply Management Practices and Table A Retirements

The historical operations analysis (Study No. 2) estimated the effects of nearly all the provisions of the Monterey Amendment with the potential to affect SWP operations and deliveries, namely the water supply management practices and the Table A retirements. As noted earlier, the effects of the altered allocation procedures are not included because they have a negligible effect on deliveries. The effects of the Table A transfers are not included because they are difficult to estimate accurately. The effects of the transfer of the Kern Fan Element property from state to local ownership are included but were determined to be inconsequential between 1996 and 2004. The results of the analysis are summarized below; detailed results are contained in Appendix K.

In the historical operations analysis, contractor deliveries between 1996 and 2004 under each provision of the Monterey Amendment were reviewed and an assessment made of whether these deliveries would or would not have occurred under the baseline scenario. To construct the baseline scenario, it was assumed that water associated with the retired Table A amount would have been delivered but that none of the deliveries stemming from the water supply management practices would have been made with the exception of deliveries to out-of-service area storage. Deliveries to out-of-service area were examined to determine whether the contractors delivering water to out-of-service area storage would otherwise have delivered some or all of the water to other storage facilities available to them. The determination was based on a telephone survey of contractors conducted by the Department. The net change in deliveries was then reflected in changes in storage in San Luis Reservoir. If the result were to be an increase in storage in San Luis Reservoir, then the Department would allocate more Table A water to the contractors and would make Article 21 water available earlier than it did with the proposed project. The additional amount of water that would be made available to the contractors under the baseline scenario was estimated taking account of the limits to the contractors' demands for SWP water. Once the SWP's share of storage in San Luis Reservoir was full and all contractors' demands were met, it was assumed that diversions at the Banks Pumping Plant would be reduced.

The historical operations analysis showed that the Monterey Amendment resulted in an increase in deliveries of 44,000 acre-feet during the period from 1996 to 2004 compared to the baseline scenario. The estimated increase in deliveries and the corresponding increase in total diversions at the Banks Pumping Plant occurred in six months of the nine-year period (108 months), typically in the wetter months of wet years.

As noted earlier, the historical operations analysis did not include the effects of the permanent Table A transfers, which probably would have decreased deliveries in some years between 1996 and 2003. This is because some of the M&I contractors receiving the transfers had less immediate use for the water than the agricultural contractors that transferred Table A amounts. Thus, the actual increase in deliveries was probably less than 44,000 AF between 1996 and 2004.

The difference between deliveries with the proposed project and under the baseline scenario between 1996 and 2004 was small primarily because the contractors that took advantage of the provision of the Monterey Amendment that enabled out-of-service area storage had other storage available to them in that time period. They placed water in storage outside their service areas in order to diversify their water sources rather than to increase their total amount of water in storage.

Future Deliveries

Changes in SWP operations expected to be induced by water supply management practices

Groundwater Storage

As described earlier, between 1996 and 2003, six contractors delivered 686,357 AF more SWP water for groundwater storage outside their service areas than they would have under the baseline scenario. By creating a reserve of SWP water stored outside their service areas, which could be used during dry periods, these contractors increased the reliability of their SWP water supplies. It is expected that between 2003 and 2020 these and other contractors would

place SWP water into groundwater storage outside their service areas when it is available to them and would recover it from storage as needed.

The advantages of groundwater storage outside contractors' service areas are likely to grow in the future as water demand increases in the M&I contractors' service areas and shortages become more frequent. However, opportunities to place SWP water in groundwater storage outside contractors' service areas are likely to be less frequent in the future than they were between 1996 and 2003. There are two reasons for this conclusion. The period between 1996 and 2003 was wetter than average and included four wet years, two above normal years and two dry years. As a result, more SWP water in excess of contractors' immediate needs was available than there would be in a more typical sequence of hydrologic years. The second reason is that as demand grows in the M&I contractors' service areas they will need more of their SWP water to meet their immediate needs and less will be available to place in storage.

Extended carryover in San Luis Reservoir

Between 1996 and 2004, contractors placed about 1,680,000 AF of water in extended carryover storage. The use of extended carryover storage enables contractors to increase their supplies of SWP water in dry years. Because use of extended carryover storage is a strategy that offers advantages, particularly to contractors with no or limited access to groundwater supplies, it is expected that it would be increasingly used in the future.

As noted earlier, extended carryover in San Luis Reservoir could increase total deliveries of SWP water if any of the water placed in carryover storage in a year when the storing contractors had more water than they needed would otherwise have flowed out of the Delta. It would not increase total deliveries of SWP water if the water placed in carryover storage would have been reallocated and used by other contractors or used to increase storage in SWP facilities.

Turnback pool

Between 1996 and 2004, numerous contractors and the Department took advantage of the turnback pool to buy and sell Table A water but use of the turnback pool began to decline toward the end of the period. The decline is attributable to M&I contractors needing more of their Table A water for their own use and their use of other methods to manage their SWP supplies. The decline in use of the turnback pool is expected to continue in the future as demand increases still further in the M&I contractors' service areas and the M&I contractors need more of their SWP water for their own use. By 2020, when all contractors are expected to need their full Table A amounts, it is expected that little or no water would be bought or sold via the turnback pool.

Flexible Storage in Castaic Lake and Lake Perris

Two contractors, MWDSC and Castaic Lake WA, borrowed water from Castaic Lake pursuant to Article 54 between 1996 and 2003. MWDSC also borrowed water from Lake Perris. It is expected that the three contractors that are able to borrow water from the terminal reservoirs pursuant to Article 54 would do so in the future. MWDSC provided an estimate of its future use of flexible storage, which is shown in Table 6-28. Future borrowing may draw down the two reservoirs to a greater extent than occurred between 1996 and 2003, a relatively wet period.

As noted earlier, the effects of flexible storage depend on how borrowed water is replaced. It might be replaced by the contractor increasing its use of one of its other water sources and

TABLE 6-28

EXPECTED FUTURE USE OF FLEXIBLE STORAGE BY MWDSC

Purposes for Use	Estimated Amount of Withdrawal	Estimated Duration of Withdrawal	Estimated Frequency of Occurrence
Supply source shift for:			
	Castaic: up to 100,000 AF		
Environmental Water Account		Less than 1 year to 2 years	Once every 1 to 3 years
Water quality benefit	Perris: up to 40,000 AF		
Operational flexibility			
Cost savings to MWDSC			
Provide supply for:	Castaic: up to 100,000 AF		
Environmental Water Account		Less than 1 year to 2 years	Once every 3 to 5 years
Exchange	Perris: up to 40,000 AF		
Make up shortage during:			
	Castaic: up to 153,940 AF		
Emergency		1 to 5 years	Once every 7 to 10 years
System outage	Perris: up to 65,000 AF		
Single critically dry year			
Multi-year drought			

Source: MWDSC.

taking less SWP water than its full allocation under the other provisions of the SWP contracts. If this were to be the case, then flexible storage would have no effect on the total deliveries of water by the SWP. Alternatively, a contractor might pay it back by requesting a greater proportion of its Table A amount or more Article 21 water than it otherwise would request. In this case, if Table A allocations are less than 100 percent and more Article 21 water was available in excess of demand, the increase in Table A delivery to that contractor would be offset by reduced allocations to other contractors with no effect on total deliveries of SWP water. The repayment of water would only affect total deliveries of SWP water if it occurred when Table A allocations were 100 percent or Article 21 water was available in excess of demand for it. That is, if Delta pumping was cut back because all other demands for SWP water were being met and all SWP storage facilities were full or at its storage targets. Under these conditions, repayment would increase total deliveries of SWP water.

If the contractors borrowed the maximum amounts of water permitted under Article 54, 160,000 AF would be borrowed from Castaic Lake and 65,000 AF would be borrowed from Lake Perris, in each case about half the maximum capacity of the reservoir. The reservoirs could remain drawn down for a maximum of five years. Although this "worst-case" condition could occur, it is unlikely because it is in the interests of the Department, and the contractors that receive water from the two reservoirs, that borrowed water be replaced as soon as practicable. The terminal reservoirs fulfill their function best when they are kept full or close to full.

With the flexible storage provision in place, the Department would continue to operate Castaic Lake and Lake Perris as it has done historically. The functions of the reservoirs would remain the same. Depending on future conditions, the Department may be able to continue the practice of reducing annual summer drawdown of the reservoirs compared to pre-Monterey Amendment conditions.

In June 2001, the Department, MWDSC, the California Department of Parks and Recreation, the CDFG and the California Department of Boating and Waterways signed a memorandum of understanding regarding development of operations guidelines for Lake Perris. The purpose of the operations guidelines was to optimize benefits for recreation, fish and wildlife, water supply and water quality. The Department and MWDSC agreed to fill or refill and maintain the lake at a minimum elevation of 1,584 feet during the summer for recreational use and boat ramp access. Elevation changes would be minimized from mid-March to the beginning of May to protect fish spawning. In 2005, the memorandum of agreement was amended in recognition of the potential for liquefaction at the Perris Dam foundation. The parties agreed that Lake Perris would be operated between elevation 1,558 feet and 1,563 feet year round but could be lowered an additional five feet between Labor Day and Memorial Day if necessary in the event of a water shortage, a SWP outage or other unusual circumstances.

Summary of Effects of Water Management Practices

To estimate the effects of the water management practices in the future, the Department used historical data from 1996 through 2004 in a historical operations analysis (Study No. 3) similar to the one described earlier (Study No. 2). There are two differences between Study No. 3 and Study No. 2. Study No. 2 included the Table A retirements; Study No. 3 did not. Also, Study No. 3 includes different assumptions with respect to the availability of storage to contractors after 2004. In Study No. 2, it was assumed that if a contractor that delivered SWP water to storage outside the contractor's service area with the proposed project had other storage options available to it then it would have delivered the water to its alternative storage programs under the baseline scenario. Study No. 2, which was partly based on a survey of contractors, determined that most of the contractors taking advantage of storage outside their service areas from 1996 through 2004 had capacity in other storage programs available to them. Consequently, it was estimated that deliveries to storage were similar with the proposed project and under the baseline scenario. At some point in the future, however, capacity in the other storage programs would be exhausted and storage outside contractors' service areas would be the contractors' only storage option. In Study No. 3, it was assumed that the alternative storage programs available to the contractors from 1996 through 2004 are full and that any SWP water delivered to storage outside contractors' service areas with the proposed project represents deliveries that would not take place under the baseline scenario.

Study No. 3 showed that, with the assumptions described above, the water supply management practices would have resulted in an increase in SWP deliveries of 449,000 AF over the nine-year period from 1996 through 2004, or an average of 50,000 AF per year. The increases would have occurred in 11 months of the nine-year (108-month period). Assuming hydrologic conditions in the future are similar to those that occurred from 1996 through 2004, then the water supply management practices would increase SWP deliveries by an average of 50,000 AF in the future. This may overstate the effects of the water management practices because overall hydrologic conditions during the period 1996 through 2004 were wetter than average and the availability of SWP water in excess of contractors immediate needs was greater than it is likely to be in the future.

6.4.4 Transfer of the Kern Fan Element and SWP Operations

In 1988, the Department purchased approximately 20,000 acres of land in Kern County with the intention of constructing one element of a larger groundwater bank that would be a part of the SWP storage/conveyance system. This element became known as the Kern Fan Element and the land was referred to as the Kern Fan Element property. Transfer of the land to KCWA as

part of the Monterey Amendment eliminated the possibility that a state-owned groundwater bank would be developed on the Kern Fan Element property. If the Department had retained ownership to the property it may have built a groundwater bank as part of the SWP. This possibility is described and analyzed in Chapter 11.

6.4.5 Summary of Monterey-Amendment-Induced Changes on SWP Operations and Deliveries

The Table A transfers and retirements and altered water allocation procedures that are a part of the Monterey Amendment would have a small effect on average annual total SWP deliveries (Study No. 4). They would result in a one-percent decrease in average annual total SWP deliveries (Table A + Article 21) under 2003 conditions (Table 6-19) and about a 0.5 percent decrease by 2020 (Table 6-25). The decrease under 2003 conditions is due to the retirement of 45,000 AF of Table A amount and the fact that some M&I contractors receiving Table A transfers had less immediate need for water than the agricultural contractors that made the transfers. The decrease under 2020 conditions is solely due to the retirement of 45,000 AF of Table A amount.

The Table A transfers and retirements and altered water allocation procedures would have a greater effect on the proportional delivery of SWP water to agricultural and M&I contractors as groups. On an average annual basis with the proposed project in place, Table A deliveries to agricultural contractors under 2020 conditions would decrease by about three percent relative to the baseline scenario. Deliveries to M&I contractors would be about the same as they are under the baseline scenario. On an average annual basis with the proposed project in place, total SWP deliveries of Table A and Article 21 water to agricultural contractors under 2020 conditions would decrease by about five percent relative to the baseline scenario. Deliveries to M&I contractors would increase by about one percent. Agricultural contractors would increase their share of Table A and total SWP deliveries in critically dry years compared to the baseline scenario. Municipal contractors would increase their share of Table A and total SWP deliveries in wet years compared the baseline scenario.

The Table A transfers and retirements and altered water allocation procedures would affect deliveries to individual contractors. M&I contractors that received a transfer of Table A amount would increase their average annual deliveries substantially. M&I contractors that did not receive a Table A transfer would experience a slight decline in their average annual deliveries. KCWA would experience a reduction in average annual deliveries because it retired and transferred a substantial Table A amount.

Some of the water supply management practices that are a part of the Monterey Amendment would affect deliveries of SWP water. Between 1996 and 2003, the Department, in its historical operations analysis (Study No. 2), estimated that the water supply management practices and the Table A retirements analyzed together increased total deliveries of SWP water by 44,000 AF or about 0.2 percent compared to the baseline scenario. Because the analysis did not account for the Table A transfers it probably overstates the increase in deliveries. Overall, the Monterey Amendment probably had little effect on deliveries between 1996 and 2003.

In the future, it is estimated that the water supply management practices would increase average annual deliveries of SWP water by 50,000 AF per year. The estimate was made by reanalyzing historical data from 1996 to 2004 but using different assumptions with respect to storage available to the contractors (Study No. 3). In the period 1996 to 2004, it was determined that most of the contractors taking advantage of storage outside their service areas

had capacity in other storage programs available to them. Consequently, it was estimated that deliveries to storage were similar with the proposed project and under the baseline scenario. In the future, it is expected that the other storage programs would fill and that storage outside contractors' storage areas was assumed to be the contractors' only storage option. The estimate is conservative, that is, it probably overstates the actual increase in deliveries attributable to the Monterey Amendment for several reasons. The estimate was based on 1996 through 2004 hydrology which was a wetter than usual. Also, the estimate does not account for the reduction in deliveries that would occur in some years as a result of the Table A retirements. In years when Table A allocations are less than 100%, the retirements would have no effect on deliveries but in years when Table A allocations are 100% there may be a reduction in deliveries. Finally, as demand increases in contractors' service areas, the contractors will need their SWP water to meet immediate needs, making less SWP water available for storage outside-their service areas.

6.5 POST SETTLEMENT AGREEMENT SWP OPERATIONS

Table 6-29 lists and summarizes the provisions of the Settlement Agreement entered into in *Planning and Conservation League et al vs. California Department of Water Resources*. The Settlement Agreement alters how the Department administers the long-term water supply contracts and provides information to the public on SWP operations. It does not affect how the Department operates the SWP except in Plumas County. The Settlement Agreement reduces Plumas County's exposure to cutbacks in SWP supplies during droughts; however, the amounts of water involved are so small that the changes would have no operational effect on the rest of the SWP. (Plumas County's Table A amount in 2020 is less than 0.1 percent of the total Table A amount.)

TABLE 6-29		
POTENTIAL EFFECTS OF SETTLEMENT AGREEMENT ON SWP OPERATIONS		
Article	Summary	Potential Change in SWP or Contractor Operations
I	Provides definitions of terms used in settlement agreement	No
II	Allows the Department to operate in accordance with the Monterey Amendment on an interim basis until court order is issued discharging writ of mandate	No
III	Describes content of new EIR and procedures for preparing it	No
IV A & B	Specifies payments to Plumas County and establishes a forum and program to undertake watershed improvements with emphasis on Feather River watershed	No
IV C & D	Changes SWP deliveries to Plumas County in water shortages and commits the Department to confer with Plumas County regarding reoperation of SWP facilities to increase benefits to Plumas County	Yes
IV E & F	Relates to future relations between the Department and Plumas County and resumption of Plumas County's SWP payments	No
V	Limits use of Kern Fan Element lands including prohibiting development of 490 acres that can be developed under HCP	No
VI	Provides plaintiffs with funding	No
VII A	Prevents the Department or contractors from approving any new project based on 1995 EIR	No
VII B	Provides for execution of an amendment to the SWP contracts that redefines several terms including "Annual Table A Amounts," eliminates use of the term "entitlement" and requires the Department to prepare and distribute a report of SWP delivery capability every two years	No
VII C	Provides for filing settlement agreement with court	No
VII D	Requires the Department to adopt new policies, procedures, and guidelines that clarify procedures for review of SWP contract amendments and establish principles for public participation in SWP contract negotiations	No
VII D, E, F, G, H, I, J, K, & L	Specifies various legal procedures	No
VIII	Calls for arbitration to establish attorney's fees	No
IX	Specifies procedures for dispute resolution	No
X	Specifies various legal procedures	No

ENDNOTES

- 1 After the transfer took place the adequacy of the CEQA compliance documents for the transfer were challenged. Castaic Lake WA prepared and certified a new EIR on the transfer, which became the subject of new litigation brought by PCL and the California water Impact Network in Los Angeles Superior Court.
- 2 The transfers from KCWA to Coachella Valley WD and Desert WA were executed in September, 2007. When this EIR is certified the Department may designate them as Monterey Amendment transfers.