

Appendix 5A-5 CalSim II Model Delivery Specifications

1 Introduction

The assumptions for all Sites model simulations are summarized in Appendix 5A Attachment 1 Model Assumptions. This compilation of delivery specifications for the CalSim II model provides additional detail in support of Appendix 5A Attachment 1.

2 Delivery Specifications

The delivery specifications for the CalSim II model include Central Valley Project (CVP) and State Water Project (SWP) contract amounts, and other water rights assumptions used. These specifications are detailed in the following tables:

- Tables 1a through 1d. CVP North-of-the-Delta – Future Conditions
- Tables 2a and 2b. CVP American River – Future Conditions
- Table 3. CVP/SWP Delta – Future Conditions
- Tables 4a through 4f. CVP South-of-the-Delta – Future Conditions
- Tables 5a and 5b. SWP North-of-the-Delta – Future Conditions
- Tables 6a through 6c. SWP South-of-the-Delta – Future Conditions

Table 1a. CVP North-of-the-Delta - Future Conditions

CVP Contractor	Geographic Location	CVP Water Service Contracts (TAF/yr)		Settlement / Exchange Contractor (TAF/yr)	Water Rights/ Non-CVP (TAF/yr)	Level 2 Refuges ¹ (TAF/yr)
		AG	M&I			
Anderson Cottonwood ID	Sacramento River Redding Subbasin			128.0		
Clear Creek CSD		13.8	1.5			
Bella Vista WD		22.1	2.4			
Shasta CSD			1.0			
Sac R. Misc. Users				3.4		
Redding, City of				21.0		
City of Shasta Lake		2.5	0.3			
Mountain Gate CSD			0.4			
Shasta County Water Agency		0.5	0.5			
Redding, City of/Buckeye			6.1			
Total			38.9	12.2	152.4	0.0
Corning WD	Corning Canal	23.0				
Proberta WD		3.5				
Thomes Creek WD		6.4				
Total			32.9	0.0	0.0	0.0

Table 1b. CVP North-of-the-Delta - Future Conditions

CVP Contractor	Geographic Location	CVP Water Service Contracts (TAF/yr)		Settlement / Exchange Contractor (TAF/yr)	Water Rights/ Non-CVP (TAF/yr)	Level 2 Refuges ¹ (TAF/yr)
		AG	M&I			
Kirkwood WD	Tehama-Colusa Canal	2.1				
Glide WD		10.5				
Kanawha WD		45.0				
Orland-Artois WD		53.0				
Colusa, County of		20.0				
Colusa County WD		62.2				
Davis WD		4.0				
Dunnigan WD		19.0				
La Grande WD		5.0				
Westside WD		65.0				
Total			285.8	0.0	0.0	0.0
Sac. R. Misc. Users ²	Sacramento River			1.5		
Glenn Colusa ID	Glenn-Colusa Canal			441.5		
				383.5		
Sacramento NWR						54.5
Delevan NWR						24.6
Colusa NWR					29.3	
Colusa Drain M.W.C.	Colusa Basin Drain			7.7		
					62.3	
Total		0.0	0.0	895.0	0.0	108.4

Table 1c. CVP North-of-the-Delta - Future Conditions

CVP Contractor	Geographic Location	CVP Water Service Contracts (TAF/yr)		Settlement / Exchange Contractor (TAF/yr)	Water Rights/ Non-CVP (TAF/yr)	Level 2 Refuges ¹ (TAF/yr)
		AG	M&I			
Princeton-Cordova-Glenn ID	Sacramento River			67.8		
Provident ID				54.7		
Maxwell ID				1.8		
				16.2		
Sycamore Family Trust				31.8		
Roberts Ditch IC				4.4		
Sac R. Misc. Users ²				4.9		
				9.5		
Total			0.0	0.0	191.2	0.0
Reclamation District 108	Sacramento River			12.9		
				219.1		
River Garden Farms				29.8		
Meridian Farms WC				35.0		
Pelger Mutual WC				8.9		
Reclamation District 1004				71.4		
Carter MWC				4.7		
Sutter MWC				226.0		
Tisdale Irrigation & Drainage Co.				9.9		
Sac R. Misc. Users ²				103.4		
				0.9		
Feather River WD export			20.0			
Total			20.0	0.0	722.1	0.0

Table 1d. CVP North-of-the-Delta - Future Conditions

CVP Contractor	Geographic Location	CVP Water Service Contracts (TAF/yr)		Settlement / Exchange Contractor (TAF/yr)	Water Rights/ Non-CVP (TAF/yr)	Level 2 Refuges ¹ (TAF/yr)
		AG	M&I			
Sutter NWR	Sutter bypass water for Sutter NWR					25.7
Gray Lodge WMA	Feather River					41.3
Butte Sink Duck Clubs						15.6
Total		0.0	0.0	0.0	0.0	82.6
Sac. R. Misc. Users ²	Sacramento River DSA 65			56.8		
City of West Sacramento				23.6		
Davis-Woodland Water Supply Project						
Total		0.0	0.0	80.4	0.0	0.0
Sac R. Misc. Users	Lower Sacramento River			4.8		
Natomas Central MWC				120.2		
Pleasant Grove-Verona MWC				26.3		
City of Sacramento (PCWA)			0.0		0.0	
PCWA (Water Rights)			0.0		0.0	
Total		0.0	0.0	151.3	0.0	0.0
Total CVP North-of-Delta		377.6	12.2	2193.8	0.0	191.0

Notes:

1. Level 4 Refuge water needs are not included.

Table 2a American River – Future Conditions

	Diversion Location	CVP M&I¹ Contracts (maximum¹)	Water Rights (maximum)	Diversion Limit (maximum capacity)
Placer County Water Agency ²	Auburn Dam Site		65.0	65.0
Total		0.0	65.0	65.0
Sacramento Suburban Water District ²	Folsom Reservoir		0	0
City of Folsom - includes P.L. 101-514		7	27	34
Folsom Prison			5	5
San Juan Water District (Placer County)			25	25
San Juan Water District (Sac County) - includes P.L. 101-514		24.2	33	57.2
El Dorado Irrigation District		7.55	17	24.55
City of Roseville		32	30	62.0
Placer County Water Agency		35		35
El Dorado County - P.L.101-514		15		15
Total		120.75	137.0	257.75
So. Cal WC/Arden Cordova WC		Folsom South Canal		5
California Parks and Recreation	5			5
SMUD	30		15	45
Canal Losses			1	1
Total	35		21	56
City of Sacramento	Lower American River		230	230
Carmichael Water District			12	12
Total		0.0	242	242
Total American River Diversions		155.75	465	620.75

Table 2b American River – Future Conditions

	Diversion Location	CVP M&I¹ Contracts (maximum¹)	Water Rights (maximum)	Diversion Limit (maximum capacity)
Sacramento River Diversions				
City of Sacramento	Lower Sacramento River		81.8	81.8
Sacramento County Water Agency		10		10
Sacramento County Water Agency - P.L. 101-514 / FRWP		35		35
Sacramento County Water Agency - water rights and acquisitions			varies ⁴ , average ~32	varies ⁴ , average ~32
East Bay Municipal Utilities District		133		varies ⁵ , average 14.6
Total Sacramento River Diversions		178	113.8	173.4
Total American and Sacramento River Diversions		333.75	578.8	794.15

Notes:

- 1 When the CVP Contract quantity exceeds the quantity of the Diversion Limit minus the Water Right (if any), the diversion modeled is the quantity allocated to the CVP Contract (based on the CVP contract quantity shown times the CVP M&I allocation percentage) plus the Water Right (if any), but with the sum limited to the quantity of the Diversion Limit
- 2 Diversion at Folsom Dam for Sacramento Suburban WD, up to 29 TAF, is allowed if and when Mar-Nov Folsom Unimpaired Inflow (FUI) exceeds 1600 TAF; when diversion at Folsom Dam is allowed, Placer County WA diversion at the Auburn Dam Site is reduced by the amount diverted at Folsom Dam
- 4 SCWA targets 68 TAF of surface water supplies annually. The portion unmet by CVP contract water is assumed to come from two sources:
 - (1) Delta “excess” water- averages 17.5 TAF annually, but varies according to availability. SCWA is assumed to divert excess flow when it is available, and when there is available pumping capacity.
 - (2) “Other” water- derived from transfers and/or other appropriated water, averaging 14.5 TAF annually but varying according remaining unmet demand.
- 5 EBMUD CVP diversions are governed by the Amendatory Contract, stipulating:
 - (1) 133 TAF maximum diversion in any given year
 - (2) 165 TAF maximum diversion amount over any 3 year period
 - (3) Diversions allowed only when EBMUD total storage drops below 500 TAF
 - (4) 155 cfs maximum diversion rate

Table 3. CVP/SWP Delta - Future Conditions

CVP/ SWP Contractor	Geographic Location	Water Right (TAF/yr)	SWP Table A Amount (TAF)		SWP Article 21 Demand (TAF/yr Maximum)	CVP Water Service Contracts (TAF/yr)	
			Ag	M&I		AG	M&I
North Delta							
City of Vallejo	City of Vallejo						16.0
CCWD ¹	Contra Costa County						195.0
Napa County FC&WCD	North Bay Aqueduct			29.03	7.71		
Solano County WA	North Bay Aqueduct			47.76	21.83		
Fairfield, Vacaville and Benicia Agreement	North Bay Aqueduct	31.60					
City of Antioch	City of Antioch	18.0					
Total		49.6	0.0	76.79	29.54	0.0	211.0
South Delta							
Delta Water Supply Project	City of Stockton	32.4					
Total		32.4	0.0	0.0	0.0	0.0	0.0
Total North and South Delta		82.0	0.0	76.79	29.54	0.0	211.0

Notes:

1. The Los Vaqueros module in CalSim II is used to determine the range of demands that are met by CVP contracts or other water rights

Table 4a. CVP South-of-the-Delta - Future Conditions

CVP Contractor	Geographic Location	CVP Water Service Contracts (TAF/yr)		Settlement/ Exchange Contractor (TAF/yr)	Water Rights/ Non-CVP (TAF/yr)	Level 2 Refuges ¹ (TAF/yr)	Losses (TAF/yr)	
		AG	M&I					
Byron-Bethany ID	Upper DMC	20.6						
Tracy, City of			10.0					
				5.0				
				5.0				
Banta Carbona ID		20.0						
Total		40.6	20.0	0.0	0.0	0.0	0.0	
Del Puerto WD	Upper DMC	12.1						
Davis WD		5.4						
Foothill WD		10.8						
Hospital WD		34.1						
Kern Canon WD		7.7						
Mustang WD		14.7						
Orestimba WD		15.9						
Quinto WD		8.6						
Romero WD		5.2						
Salado WD		9.1						
Sunflower WD		16.6						
West Stanislaus WD		50.0						
Patterson WD		16.5				6.0		
Total			206.7	0.0	0.0	6.0	0.0	0.0

Table 4b. CVP South-of-the-Delta - Future Conditions

CVP Contractor	Geographic Location	CVP Water Service Contracts (TAF/yr)		Settlement/ Exchange Contractor (TAF/yr)	Water Rights/ Non-CVP (TAF/yr)	Level 2 Refuges ¹ (TAF/yr)	Losses (TAF/yr)
		AG	M&I				
Upper DMC Loss	Upper DMC						18.5
Panoche WD	Lower DMC Volta	6.6					
San Luis WD		65.0					
Laguna WD		0.8					
Eagle Field WD		4.6					
Mercy Springs WD		2.8					
Oro Loma WD		4.6					
Total		84.4	0.0	0.0	0.0	0.0	0.0
Central California ID		Lower DMC Volta			140.0		
Grasslands via CCID						81.8	
Los Banos WMA						11.2	
Kesterson NWR						10.5	
Freitas - SJBAP						6.3	
Salt Slough - SJBAP						8.6	
China Island - SJBAP						7.0	
Volta WMA						13.0	
Grassland via Volta Wasteway						23.2	
Total	0.0		0.0	140.0	0.0	161.5	0.0

Table 4c. CVP South-of-the-Delta - Future Conditions

CVP Contractor	Geographic Location	CVP Water Service Contracts (TAF/yr)		Settlement/ Exchange Contractor (TAF/yr)	Water Rights/ Non-CVP (TAF/yr)	Level 2 Refuges ¹ (TAF/yr)	Losses (TAF/yr)
		AG	M&I				
Fresno Slough WD	San Joaquin River at Mendota Pool	4.0			0.9		
James ID		35.3			9.7		
Coelho Family Trust		2.1			1.3		
Tranquillity ID		13.8			20.2		
Tranquillity PUD		0.1			0.1		
Reclamation District 1606		0.2			0.3		
Central California ID					392.4		
Columbia Canal Co.					59.0		
Firebaugh Canal Co.					85.0		
San Luis Canal Co.					23.6		
M.L. Dudley Company						2.3	
Grasslands WD							29.0
Mendota WMA							27.6
Losses							
Total		55.5	0.0	560.0	34.8	56.6	101.5
San Luis Canal Co.				140.0			
Grasslands WD						2.3	
Los Banos WMA						12.4	
San Luis NWR						19.5	
West Bear Creek NWR						7.5	
East Bear Creek NWR						8.9	
Total			0.0	0.0	140.0	0.0	50.6

Table 4d. CVP South-of-the-Delta - Future Conditions

CVP Contractor	Geographic Location	CVP Water Service Contracts (TAF/yr)		Settlement/ Exchange Contractor (TAF/yr)	Water Rights/ Non-CVP (TAF/yr)	Level 2 Refuges ¹ (TAF/yr)	Losses (TAF/yr)
		AG	M&I				
San Benito County WD (Ag)	San Felipe Aqueduct	35.6					
Santa Clara Valley WD (Ag)		33.1					
Pajaro Valley WD		6.3					
San Benito County WD (M&I)			8.3				
Santa Clara Valley WD (M&I)				119.4			
Total			74.9	127.7	0.0	0.0	0.0
San Luis WD	CA reach 3	60.1					
CA, State Parks and Rec		2.3					
Affonso/Los Banos Gravel Co.		0.3					
Total			62.6	0.0	0.0	0.0	0.0
Panoche WD	CVP Dos Amigos PP/ CA reach 4	87.4					
Pacheco WD		10.1					
Total			97.5	0.0	0.0	0.0	0.0

Table 4e. CVP South-of-the-Delta - Future Conditions

CVP Contractor	Geographic Location	CVP Water Service Contracts (TAF/yr)		Settlement/ Exchange Contractor (TAF/yr)	Water Rights/ Non-CVP (TAF/yr)	Level 2 Refuges ¹ (TAF/yr)	Losses (TAF/yr)
		AG	M&I				
Westlands WD (Centinella)	CA reach 4	2.5					
Westlands WD (Broadview WD)		27.0					
Westlands WD (Mercy Springs WD)		4.2					
Westlands WD (Widern WD)		3.0					
Total		36.7	0.0	0.0	0.0	0.0	0.0
Westlands WD: CA Joint Reach 4	CA reach 4	219.0					
Westlands WD: CA Joint Reach 5	CA reach 5	570.0					
Westlands WD: CA Joint Reach 6	CA reach 6	219.0					
Westlands WD: CA Joint Reach 7	CA reach 7	142.0					
Total		1150.0	0.0	0.0	0.0	0.0	0.0
Avenal, City of	CA reach 7		3.5		3.5		
Coalinga, City of			10.0				
Huron, City of			3.0				
Total		0.0	16.5	0.0	3.5	0.0	0.0

Table 4f. CVP South-of-the-Delta - Future Conditions

CVP Contractor	Geographic Location	CVP Water Service Contracts (TAF/yr)		Settlement/ Exchange Contractor (TAF/yr)	Water Rights/ Non-CVP (TAF/yr)	Level 2 Refuges ¹ (TAF/yr)	Losses (TAF/yr)	
		AG	M&I					
CA Joint Reach 3 - Loss	CVP Dos Amigos PP/CA reach 3						2.5	
CA Joint Reach 4 - Loss	CA reach 4						10.1	
CA Joint Reach 5 - Loss	CA reach 5						30.1	
CA Joint Reach 6 - Loss	CA reach 6						12.5	
CA Joint Reach 7 - Loss	CA reach 7						8.5	
Total		0.0	0.0	0.0	0.0	0.0	63.7	
Cross Valley Canal - CVP	CA reach 14							
Fresno, County of		3.0						
Hills Valley ID-Amendatory		3.3						
Kern-Tulare WD		40.0						
Lower Tule River ID		31.1						
Pixley ID		31.1						
Rag Gulch WD		13.3						
Tri-Valley WD		1.1						
Tulare, County of		5.3						
Kern NWR							11.0	
Pixley NWR							1.3	
Total			128.3	0.0	0.0	0.0	12.3	0.0
Total CVP South-of-Delta			1937.1	164.2	840.0	44.3	281.0	183.7

Notes:

1. Level 4 Refuge water needs are not included.

Table 5a. SWP North-of-the-Delta - Future Conditions

SWP CONTRACTOR	Geographic Location	FRSA Amount (TAF)	Water Right (TAF/yr)	Table A Amount (TAF)		Article 21 Demand (TAF/yr Maximum)	Other (TAF/yr)
				Ag	M&I		
Feather River							
Palermo	FRSA		17.6				
County of Butte	Feather River				27.5		
Thermalito	FRSA		8.0				
Western Canal	FRSA	150.0	145.0				
Joint Board	FRSA	550.0	5.0				
City of Yuba City	Feather River				9.6	1.43	
Feather WD	FRSA	17.0					
Garden, Oswald, Joint Board	FRSA						
Garden	FRSA	12.9	5.1				
Oswald	FRSA	2.9					
Joint Board	FRSA	50.0					
Plumas, Tudor	FRSA						
Plumas	FRSA	8.0	6.0				
Tudor	FRSA	5.1	0.2				
Total Feather River Area		795.8	186.9	0.0	37.1	1.43	0.0

Table 5b. SWP North-of-the-Delta – Future Conditions

SWP CONTRACTOR	Geographic Location	FRSA Amount (TAF)	Water Right (TAF/yr)	Table A Amount (TAF)		Article 21 Demand (TAF/yr Maximum)	Other (TAF/yr)
				Ag	M&I		
Other							
Yuba County Water Agency	Yuba River						Variable
							333.6
Camp Far West ID	Yuba River						12.6
Bear River Exports	American R/DSA70						Variable
							95.2
Feather River Exports to American River (left bank to DSA70)	American R/DSA70		11.0				

Table 6a. SWP South-of-the-Delta –Future Conditions

SWP Contractor	Geographic Location	Table A Amount (TAF)		Article 21 Demand (TAF/yr Maximum)	Losses (TAF/yr)
		Ag	M&I		
Alameda Co. FC&WCD, Zone 7	SBA reaches 1-4		47.60	1.09	

SWP Contractor	Geographic Location	Table A Amount (TAF)		Article 21 Demand (TAF/yr Maximum)	Losses (TAF/yr)
		Ag	M&I		
	SBA reaches 5-6		33.02		
	Total Alameda Co. FC&WCD, Zone 7		80.62	1.09	0.0
Alameda County WD	SBA reaches 7-8		42.00	2.35	
Santa Clara Valley WD	SBA reach 9		100.00	32.12	
Oak Flat WD	CA reach 2A	5.70		0.05	
County of Kings	CA reach 8C	9.31		13.58	
Dudley Ridge WD	CA reach 8D	45.35		37.32	
Empire West Side ID	CA reach 8C	3.00		2.16	
Kern County Water Agency	CA reaches 3, 9-13B	608.86	134.60		
	CA reaches 14A-C	99.20		543.69	
	CA reaches 15A-16A	59.40			
	CA reach 31A	80.67			
	Total KCWA	848.13	134.60	543.69	0.0
Tulare Lake Basin WSD	CA reaches 8C-8D	87.47		69.67	
San Luis Obispo Co. FC&WCD	CA reaches 33A-35		25.00	0.99	
Santa Barbara Co. FC&WCD	CA reach 35		45.49	8.17	
Antelope Valley-East Kern WA	CA reaches 19-20B, 22A-B		144.84	26.52	
Santa Clarita Valley WA	CA reach 31A	12.70		2.94	
	CA reach 30		82.50		
	Total SCVWA	12.70	82.50	2.94	0.0

Table 6b. SWP South-of-the-Delta –Future Conditions

SWP Contractor	Geographic Location	Table A Amount (TAF)		Article 21 Demand (TAF/yr Maximum)	Losses (TAF/yr)
		Ag	M&I		
Coachella Valley WD	CA reach 26A		138.35	14.54	
Crestline-Lake Arrowhead WA	CA reach 24		5.80		
Desert WA	CA reach 26A		55.75	5.86	

SWP Contractor	Geographic Location	Table A Amount (TAF)		Article 21 Demand (TAF/yr Maximum)	Losses (TAF/yr)
		Ag	M&I		
Littlerock Creek ID	CA reach 21		2.30		
Mojave WA	CA reaches 19, 22B-23		85.80		
Metropolitan WDSC	CA reach 10A, 12E, and 14C		675.11		
	CA reach 26A		302.03	129.78	
	CA reach 30		580.65	107.03	
	CA reaches 28G-H		224.82	39.49	
	CA reach 28J		128.89	9.87	
	Total MWDSC		0.0	1911.50	286.17
Palmdale WD	CA reaches 20A-B		21.30	1.98	
San Bernardino Valley MWD	CA reach 26A		102.60	4.41	
San Gabriel Valley MWD	CA reach 26A		28.80	5.52	
San Geronio Pass WA	CA reach 26A		17.30	0.02	
Ventura County FCD	CA reach 29H		3.15		
	CA reach 30		16.85	40.92	
	Total VCFCFCD	0.0	20.00	40.92	0.0

Table 6c. SWP South-of-the-Delta –Future Conditions

SWP Contractor	Geographic Location	Table A Amount (TAF)		Article 21 Demand (TAF/yr Maximum)	Losses (TAF/yr)
		Ag	M&I		
SWP Losses	CA reaches 1-2				7.70
	SBA reaches 1-9				0.60
	CA reach 3				10.80
	CA reach 4				2.60
	CA reach 5				3.90
	CA reach 6				1.20
	CA reach 7				1.60
	CA reaches 8C-13B				11.90
	Wheeler Ridge PP and CA reaches 14A-C				3.60
	Chrisman PP and CA reaches 15A-18A				1.80
	Pearblossom PP and CA reaches 17-21				5.10
	Mojave PP and CA reaches 22A-23				4.00
	REC and CA reaches 24-28J				1.40
	CA reaches 29A-29F				1.90
	Castaic PWP and CA reach 29H				3.10
	REC and CA reach 30				2.40
	Total				
Total SWP South-of-the-Delta		1011.66	3044.55	1098.98	63.60