Appendix 5A2 CALSIM II Model Assumptions Callouts

1 Introduction

The assumptions for all Sites model simulations are summarized in Appendix 5A1, *Model Assumptions*.

1.1 CALSIM II Modeling Assumptions Callouts

The following matrix summarizes the assumptions used for the CALSIM II models:

- No Action Alternative 051422
- Alternative 1A 051722
- Alternative 1B 051722
- Alternative 2 051722
- Alternative 3 051722

	No Action Alternative (NAA)	Alternative 1A (ALT 1A)	Alternative 1B (ALT 1B)	Alternative 2 (ALT 2)	Alternative 3 (ALT 3)
GENERAL					
Planning horizon[a]	Year 2021	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Period of simulation	82 years (1922-2003)	Same as NAA	Same as NAA	Same as NAA	Same as NAA
HYDROLOGY					
Climate Condition	Current climate conditions	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Inflows/Supplies	Modified inflows based on historical hydrology projected 2020 modifications for operations upstream of the rim reservoirs	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Level of development	Projected 2030 level[b]	Same as NAA	Same as NAA	Same as NAA	Same as NAA
DEMANDS, WATER RIGHTS, CVP/SWP CONTRACTS					
Sacramento River Region (excluding American River)					
CVP[c]	Land-use based, full build-out of contract amounts, except for Settlement Contractors represented with historical diversions.	Same as NAA	Same as NAA	Same as NAA	Same as NAA

	No Action Alternative (NAA)	**Alternative 1A (ALT 1A)**	**Alternative 1B (ALT 1B)**	**Alternative 2 (ALT 2)**	**Alternative 3 (ALT 3)**
SWP (FRSA)[d]	Land-use based, limited by contract amounts	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Non-project	Land use based, limited by water rights and SWRCB Decisions for Existing Facilities	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Antioch Water Works	Pre-1914 water right	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Federal refuges	Firm Level 2 water supply needs	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Sacramento River Region - American River[e]					
Water rights	Year 2025, full water rights	Same as NAA	Same as NAA	Same as NAA	Same as NAA
CVP	Year 2025, full contracts except for Settlement Contractors at historical diversions, including Freeport Regional Water Project	Same as NAA	Same as NAA	Same as NAA	Same as NAA
San Joaquin River Region[f]					
Friant Unit	Limited by contract amounts, based on	Same as NAA	Same as NAA	Same as NAA	Same as NAA

	No Action Alternative (NAA)	**Alternative 1A (ALT 1A)**	**Alternative 1B (ALT 1B)**	**Alternative 2 (ALT 2)**	**Alternative 3 (ALT 3)**
	current allocation policy				
Lower Basin	Land-use based, based on district level operations and constraints	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Stanislaus River	Land-use based, Stepped Release Plan (SRP)	Same as NAA	Same as NAA	Same as NAA	Same as NAA
San Francisco Bay, Central Coast, Tulare Lake and South Coast Regions (CVP/SWP project facilities)					
CVP[c]	Demand based on contract amounts	Same as NAA	Same as NAA	Same as NAA	Same as NAA
CCWD[g]	195 TAF/yr CVP contract supply, water rights and in-Delta transfers	Same as NAA	Same as NAA	Same as NAA	Same as NAA
SWP[d,h]	Demand based on Table A amounts	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Article 56	Based on 2001-08 contractor requests	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Article 21	MWD demand up to 200 TAF/month from December to March subject to conveyance capacity, KCWA	Same as NAA	Same as NAA	Same as NAA	Same as NAA

	No Action Alternative (NAA)	Alternative 1A (ALT 1A)	Alternative 1B (ALT 1B)	Alternative 2 (ALT 2)	Alternative 3 (ALT 3)
	demand up to 180 TAF/month and other contractor demands up to 34 TAF/month in all months, subject to conveyance capacity				
North Bay Aqueduct (NBA)	77 TAF/yr demand under SWP contracts, up to 43.7 cfs of excess flow under Fairfield, Vacaville and Benecia Settlement Agreement	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Federal refuges	Firm Level 2 water needs	Same as NAA	Same as NAA	Same as NAA	Same as NAA
FACILITIES					
Systemwide					
Systemwide	Existing facilities	Same as NAA	Same as NAA	Same as NAA	Same as NAA
North Coast Region					
Trinity Lake	Existing, 2,448 TAF capacity	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Sacramento River Region					
Shasta Lake	Existing, 4,552 TAF capacity	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Red Bluff Diversion Dam	Diversion dam gates out all year.	Diversion dam gates out all year.	Same as ALT 1A	Same as ALT 1A	Same as ALT 1A

	No Action Alternative (NAA)	**Alternative 1A (ALT 1A)**	**Alternative 1B (ALT 1B)**	**Alternative 2 (ALT 2)**	**Alternative 3 (ALT 3)**
	Pumping Plant operated to deliver CVP water with capacity of 2,000 cfs.	Pumping Plant operated to deliver CVP and Sites water with capacity of 2,500 cfs.			
Hamilton City Pump Station	Pumping plant with capacity of 3,000 cfs.	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Fremont Weir	Notched Fremont Weir as represented in Yolo Bypass Salmonid Habitat Restoration and Fish Passage EIS/EIR Alternative 1 (preferred alternative)	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Colusa Basin	Existing conveyance and storage facilities	Existing conveyance and storage facilities with Dunnigan Pipeline. Assume Sites releases through Dunnigan Pipeline are not constrained by existing operation and capacity in the Colusa Basin Drain.	Same as ALT 1A	Same as ALT 1A	Same as ALT 1A
Lake Oroville	Existing, 3,538 TAF capacity	Same as NAA	Same as NAA	Same as NAA	Same as NAA

	No Action Alternative (NAA)	**Alternative 1A (ALT 1A)**	**Alternative 1B (ALT 1B)**	**Alternative 2 (ALT 2)**	**Alternative 3 (ALT 3)**
Upper American River[e,i]	PCWA American River Pump Station	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Folsom Lake	Existing, 976 TAF capacity	Same as NAA	Same as NAA	Same as NAA	Same as NAA
American River	Existing Folsom Dam including auxiliary spillway	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Lower Sacramento River	Freeport Regional Water Project[j]	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Sites Reservoir	No reservoir	1.5 MAF reservoir	Same as ALT 1A	1.27 MAF reservoir	Same as ALT 1A
Dunnigan Pipeline	No pipeline	1,000 cfs pipeline connecting the southern end of the TC Canal to the Colusa Basin Drain.	Same as ALT 1A	1,000 cfs pipeline connecting the southern end of the TC Canal to the Sacramento River	Same as ALT 1A
San Joaquin River Region					
Millerton Lake (Friant Dam)	Existing, 520 TAF capacity	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Lower San Joaquin River	City of Stockton Delta Water Supply Project, 30-mgd capacity. SJRRP Recapture simulated at West Stanislaus ID, Patterson ID, and Banta Carbona ID	Same as NAA	Same as NAA	Same as NAA	Same as NAA

	No Action Alternative (NAA)	**Alternative 1A (ALT 1A)**	**Alternative 1B (ALT 1B)**	**Alternative 2 (ALT 2)**	**Alternative 3 (ALT 3)**
SWP Banks Pumping Plant (South Delta)[k]	Physical capacity is 10,300 cfs but 6,680 cfs permitted capacity in all months. Pumping can be up to 10,300 cfs during Dec 15 – Mar 15 depending on Vernalis flow conditions; additional capacity of 500 cfs (up to 7,180 cfs) allowed Jul – Sep for reducing impact of Spring Outflow Action on SWP	Same as NAA, with additional pumping, pending available capacity, for Sites deliveries to South of Delta Participants	Same as ALT 1A	Same as ALT 1A	Same as ALT 1A
CVP C.W. Bill Jones Pumping Plant (Tracy PP)	Permit capacity is 4,600 cfs in all months (allowed for by the Delta-Mendota Canal–California Aqueduct Intertie)	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Upper Delta-Mendota Canal Capacity	Existing plus 400 cfs Delta-Mendota Canal–California Aqueduct Intertie	Same as NAA	Same as NAA	Same as NAA	Same as NAA

	No Action Alternative (NAA)	**Alternative 1A (ALT 1A)**	**Alternative 1B (ALT 1B)**	**Alternative 2 (ALT 2)**	**Alternative 3 (ALT 3)**
CCWD Intakes	Los Vaqueros Reservoir with existing storage capacity (160 TAF), and existing intakes except for Mallard Slough Intake. Updated to be consistent with latest Los Vaqueros modeling	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Suisun March Salinity Control Gates (SMSCG)	Delta salinity conditions are adjusted for months in which the salinity control gate is operated (see operations)	Same as NAA	Same as NAA	Same as NAA	Same as NAA
San Luis Reservoir	Existing, 2,041 TAF capacity	Same as NAA	Same as NAA	Same as NAA	Same as NAA
San Francisco Bay Region					
South Bay Aqueduct (SBA)	SBA rehabilitation, 430 cfs capacity from junction with California Aqueduct to Alameda County FC&WSD Zone 7 diversion point	Same as NAA	Same as NAA	Same as NAA	Same as NAA
REGULATORY STANDARDS					
North Coast Region					

	No Action Alternative (NAA)	**Alternative 1A (ALT 1A)**	**Alternative 1B (ALT 1B)**	**Alternative 2 (ALT 2)**	**Alternative 3 (ALT 3)**
Trinity River					
Minimum flow below Lewiston Dam	Trinity EIS Preferred Alternative (369-815 TAF/yr)	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Trinity River Fall Augmentation Flows	420 cfs August 1 through September 30 in all but wet years	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Trinity Reservoir end-of-September minimum storage	Trinity EIS Preferred Alternative (600 TAF as able)	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Sacramento River Region					
Clear Creek					
Minimum flow below Whiskeytown Dam	Downstream water rights, 1963 USBR Proposal to USFWS and NPS; and 200 cfs October through May or 150 cfs in Critical years and 150 cfs June through September with 10 TAF for channel maintenance in February of BN, AN and Wet years and 10 TAF for Spring pulse flows in June of non-Critical	Same as NAA	Same as NAA	Same as NAA	Same as NAA

	No Action Alternative (NAA)	**Alternative 1A (ALT 1A)**	**Alternative 1B (ALT 1B)**	**Alternative 2 (ALT 2)**	**Alternative 3 (ALT 3)**
	years; in June of Critical years, pulse of 900 cfs.				
Upper Sacramento River					
Shasta Lake end-of-September minimum storage	1900 TAF in non-critically dry years (not explicitly modeled - achieved through project allocation profiles when hydrologically feasible)	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Minimum flow below Keswick Dam	SWRCB WR 90-5; and stabilize fall flows to reduce redd dewatering and rebuild cold water pool; and spring pulse flow up to 150 TAF if projected May 1 storage > 4.1 MAF	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Feather River					
Minimum flow below Thermalito Diversion Dam	2006 Settlement Agreement (700 / 800 cfs)	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Minimum flow below Thermalito Afterbay outlet	1983 DWR, DFG Agreement (750-1,700 cfs)	Same as NAA	Same as NAA	Same as NAA	Same as NAA

	No Action Alternative (NAA)	**Alternative 1A (ALT 1A)**	**Alternative 1B (ALT 1B)**	**Alternative 2 (ALT 2)**	**Alternative 3 (ALT 3)**
Yuba River					
Minimum flow below Daguerre Point Dam	D-1644 Operations (Lower Yuba River Accord)[m]	Same as NAA	Same as NAA	Same as NAA	Same as NAA
American River					
Minimum flow below Nimbus Dam	American River Flow Management Standard, per 2017 Water Forum Agreement with a planning minimum end of December storage target of 275 TAF	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Minimum Flow at H Street Bridge	SWRCB D-893	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Lower Sacramento River					
Minimum flow near Rio Vista	SWRCB D-1641	Same as NAA	Same as NAA	Same as NAA	Same as NAA
San Joaquin River Region					
Mokelumne River					
Minimum flow below Camanche Dam	FERC 2916-029, 1996 (Joint Settlement Agreement) (100-325 cfs)	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Minimum flow below Woodbridge Diversion Dam	FERC 2916-029, 1996 (Joint Settlement	Same as NAA	Same as NAA	Same as NAA	Same as NAA

	No Action Alternative (NAA)	**Alternative 1A (ALT 1A)**	**Alternative 1B (ALT 1B)**	**Alternative 2 (ALT 2)**	**Alternative 3 (ALT 3)**
	Agreement) (25-300 cfs)				
Stanislaus River					
Minimum flow below Goodwin Dam	Flows per New Melones SRP	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Minimum dissolved oxygen	SWRCB D-1422	Model representation same as NAA	Model representation same as NAA	Model representation same as NAA	Model representation same as NAA
Merced River					
Minimum flow below Crocker-Huffman Diversion Dam	Cowell Agreement	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Minimum flow at Shaffer Bridge	FERC 2179 (25-100 cfs) with 12.5 TAF in October based on 2002 Merced ID and CDFW Memorandum of Understanding	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Tuolumne River					
Minimum flow at Lagrange Bridge	FERC 2299-024, 1995 (Settlement Agreement) (94-301 TAF/yr)	Same as NAA	Same as NAA	Same as NAA	Same as NAA

	No Action Alternative (NAA)	**Alternative 1A (ALT 1A)**	**Alternative 1B (ALT 1B)**	**Alternative 2 (ALT 2)**	**Alternative 3 (ALT 3)**
San Joaquin River					
San Joaquin River below Friant Dam/ Mendota Pool	San Joaquin River Restoration-full flows, not constrained by current river capacity, model implementation includes recapture in the San Joaquin River and in the Delta	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Maximum salinity near Vernalis	Stanislaus contribution per New Melones SRP	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Minimum flow near Vernalis	Stanislaus contribution per New Melones SRP	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Sacramento River–San Joaquin Delta Region					
Delta Outflow Index (Flow, NDOI)	SWRCB D-1641 and for Summer/Fall Delta Smelt habitat operate to meet X2 of 80 km for September and October of AN, and Wet years with transitional flows in last half of August. SWP to allow up to	Same as NAA	Same as NAA	Same as NAA	Same as NAA

	No Action Alternative (NAA)	**Alternative 1A (ALT 1A)**	**Alternative 1B (ALT 1B)**	**Alternative 2 (ALT 2)**	**Alternative 3 (ALT 3)**
	150 TAF of Delta outflow in April and May. Spring outflow action shall not exceed 150 TAF and is subject to a 44,500 cfs Delta Outflow off-ramp. SWP to release 100 TAF block of water in Jun through Sep of Wet and Above Normal years.				
Delta Cross Channel gate operation	Gate operations per Multi Year Study Program; model representation as SRWCB D-1641 with additional days closed from Oct 1 – Jan 31 based on NMFS BO (Jun 2009) Action IV.1.2 (closed during flushing flows from Oct 1 – Dec 14 unless adverse water quality conditions would result)	Same as NAA	Same as NAA	Same as NAA	Same as NAA

	No Action Alternative (NAA)	**Alternative 1A (ALT 1A)**	**Alternative 1B (ALT 1B)**	**Alternative 2 (ALT 2)**	**Alternative 3 (ALT 3)**
South Delta export limits (Jones PP and Banks PP)	SWRCB D-1641 Vernalis flow-based export limits Apr 1 – May 31, (additional 500 cfs allowed for Jul – Sep for reducing impact on SWP)	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Combined Flow in Old and Middle River (OMR)	OMR target of -5,000 cfs January through June except for 5 days of -2,000 cfs when turbidity bridge occurs (turbidity bridge consideration only January through March) and 7 days of -6,000 cfs when increased pumping due to storm is possible, followed by "first flush" action if it occurs in December or January (14 days of -2,000 cfs), and OMR target of -3,500 cfs in March, April, and May of non-Critical years.	Same as NAA	Same as NAA	Same as NAA	Same as NAA

	No Action Alternative (NAA)	Alternative 1A (ALT 1A)	Alternative 1B (ALT 1B)	Alternative 2 (ALT 2)	Alternative 3 (ALT 3)
	Health and Safety off-ramp when exports are low.				
OPERATIONS CRITERIA: RIVER-SPECIFIC					
Sacramento River Region					
Upper Sacramento River: Flow objective for navigation (Wilkins Slough)	Flow objective for Wilkins Slough based on month, CVP allocation, and Shasta storage condition to reflect CVP operations for local delivery	Same as NAA	Same as NAA	Same as NAA	Same as NAA
American River: Folsom Dam flood control	Variable 400/600 flood control diagram (without outlet modifications)	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Feather River: Flow at Mouth of Feather River (above Verona)	Maintain DFW/DWR flow target of 2,800 cfs for Apr – Sep when flows available dependent on Oroville inflow and FRSA allocation	Same as NAA	Same as NAA	Same as NAA	Same as NAA

	No Action Alternative (NAA)	**Alternative 1A (ALT 1A)**	**Alternative 1B (ALT 1B)**	**Alternative 2 (ALT 2)**	**Alternative 3 (ALT 3)**
Sites Reservoir					
Bend Bridge Pulse Protection	N/A	Initiation: 3-day average Sacramento River must exceed 8,000 cfs; 3-day average tributary flow must exceed 2,500 cfs Duration: 7 days upon initiation, or exceedance of 25,000 cfs at Sacramento River at Bend Bridge Re-set: After completion of pulse protection period, resetting criteria must be met for another pulse protection period to commence: 3-day Sacramento River flow must go below 7,500 cfs for 7 consecutive days; 3-day moving average tributary flow must go below	Same as ALT 1A	Same as ALT 1A	Same as ALT 1A

	No Action Alternative (NAA)	**Alternative 1A (ALT 1A)**	**Alternative 1B (ALT 1B)**	**Alternative 2 (ALT 2)**	**Alternative 3 (ALT 3)**
		2,500 cfs for 7 consecutive days			
Fully Appropriated StreamflowWilkins Slough Bypass Flow	N/A	Diversions are only permitted Sep 1-Jun 15	Same as ALT 1A	Same as ALT 1A	Same as ALT 1A
Wilkins Slough Bypass Flow	N/A	10,700 cfs Oct-Jun; all other times, 5,000 cfs	Same as ALT 1A	Same as ALT 1A	Same as ALT 1A
Shasta Exchange – Coldwater Pool Management	N/A	Sites may release water in April through June of Dry and Critically Dry water years in lieu of Shasta. In August through November, Shasta may release water for delivery to Sites Storage Partners.	Same as ALT 1A	Same as ALT 1A	Same as ALT 1A
Shasta Exchange – Spring Pulse Releases	N/A	N/A	Sites exchange water may be released in May to support the spring pulse flow action (described in Minimum flow below Keswick Dam). Exchange water may be released in Wet and Above Normal	N/A	Same as ALT 1B

	No Action Alternative (NAA)	Alternative 1A (ALT 1A)	Alternative 1B (ALT 1B)	Alternative 2 (ALT 2)	Alternative 3 (ALT 3)
			years when end of April Shasta storage is greater than 4.1 MAF and Sites storage is greater than 80% of total active storage volume.		
Shasta Exchange – Fall Stability Flow Releases	N/A	Exchange water may be released for Fall Flow Stability when end of May Sites storage is greater than 80% of total active capacity, previous month Shasta storage is greater than 3.2 MAF, and the Fall Flow Stability action is already active.	Same as ALT 1A	Same as ALT 1A	Same as ALT 1A
Oroville Exchange	N/A	Sites may release water in June and July of Below Normal, Dry and Critically Dry water years in lieu of Oroville. In August through November, Oroville may release	Same as ALT 1A	Same as ALT 1A	Same as ALT 1A

	No Action Alternative (NAA)	Alternative 1A (ALT 1A)	Alternative 1B (ALT 1B)	Alternative 2 (ALT 2)	Alternative 3 (ALT 3)
		water for delivery to Sites Storage Partners. Maximum Feather River flow may not exceed 4,000 cfs in Oct and 2,250 cfs in November. Unused Sites water in Oroville is subject to spill.			
KLOG Flap Gate	N/A	Releases to the Sacramento River cannot be made through the Dunnigan Pipeline while Sacramento River flows are high (flow at Wilkins Slough > 15,000 cfs) and the flap gate at Knights Landing is closed	Same as ALT 1A	Same as ALT 1A	Same as ALT 1A
CVP Operational Flexibility	N/A	None	101 TAF in Sites may be used to serve CVP operational flexibility	None	360 TAF in Sites may be used to serve CVP operational flexibility
San Joaquin River Region					
Stanislaus River: Flow below Goodwin Dam	Flows per New Melones SRP	Same as NAA	Same as NAA	Same as NAA	Same as NAA

	No Action Alternative (NAA)	**Alternative 1A (ALT 1A)**	**Alternative 1B (ALT 1B)**	**Alternative 2 (ALT 2)**	**Alternative 3 (ALT 3)**
San Joaquin River: Salinity at Vernalis	Grasslands Bypass Project (full implementation)	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Sacramento – San Joaquin River Delta Region					
Suisun Marsh Salinity Control Gates	Operate to meet SWRCB D-1641 water quality standards in Montezuma Slough during salinity control season October through May; and for Summer/Fall Delta Smelt habitat operate for up to 60 days June through October of Below Normal, Above Normal, and Wet years. SWP facilitates operations for up to 60 days in June through October of Dry years.	Same as NAA	Same as NAA	Same as NAA	Same as NAA

	No Action Alternative (NAA)	Alternative 1A (ALT 1A)	Alternative 1B (ALT 1B)	Alternative 2 (ALT 2)	Alternative 3 (ALT 3)
OPERATIONS CRITERIA: SYSTEMWIDE					
CVP water allocation					
Settlement / Exchange	100% (75% in Shasta critical years)	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Refuges	100% (75% in Shasta critical years)	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Agriculture Service	100%-0% based on supply, South-of-Delta allocations are additionally limited due to D-1641 and OMR action	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Municipal & Industrial Service	100%-50% based on supply, South-of-Delta allocations are additionally limited due to D-1641and OMR action	Same as NAA	Same as NAA	Same as NAA	Same as NAA
SWP water allocation					
North of Delta (FRSA)	Contract specific	Same as NAA	Same as NAA	Same as NAA	Same as NAA

	No Action Alternative (NAA)	**Alternative 1A (ALT 1A)**	**Alternative 1B (ALT 1B)**	**Alternative 2 (ALT 2)**	**Alternative 3 (ALT 3)**
South of Delta (including North Bay Aqueduct)	Based on supply; equal prioritization between Ag and M&I based on Monterey Agreement; allocations are additionally limited due to D-1641 and OMR action and Spring Outflow Action.	Same as NAA	Same as NAA	Same as NAA	Same as NAA
CVP-SWP coordinated operations					
Sharing of responsibility for in-basin-use	Revised Coordinated Operations Agreement	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Sharing of surplus flows	Revised Coordinated Operations Agreement	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Sharing of restricted export capacity for project- specific priority pumping	Revised Coordinated Operations Agreement	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Water transfers	Acquisitions by SWP contractors are wheeled at priority in Banks Pumping Plant over	Same as NAA	Same as NAA	Same as NAA	Same as NAA

	No Action Alternative (NAA)	**Alternative 1A (ALT 1A)**	**Alternative 1B (ALT 1B)**	**Alternative 2 (ALT 2)**	**Alternative 3 (ALT 3)**
	non-SWP users; LYRA included for SWP contractors				
Sharing of export capacity for lesser priority and wheeling-related pumping	Cross Valley Canal wheeling (max of 128 TAF/yr), CALFED ROD defined Joint Point of Diversion (JPOD)	Same as NAA	Same as NAA	Same as NAA	Same as NAA
San Luis Reservoir	San Luis Reservoir is allowed to operate to a minimum storage of 100 TAF	Same as NAA	Same as NAA	Same as NAA	Same as NAA
CVPIA 3406(b)(2)[l,n]					
Policy Decision	N/A	N/A	N/A	N/A	N/A
Allocation	No B2 Allocation modeled	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Actions	Pre-determined upstream fish flow objectives below Whiskeytown Dam	Same as NAA	Same as NAA	Same as NAA	Same as NAA
Accounting[m]	No B2 Accounting modeled	Same as NAA	Same as NAA	Same as NAA	Same as NAA
WATER MANAGEMENT ACTIONS					
Water Transfer Supplies (long term programs)					
Lower Yuba River Accord[m]	Yuba River acquisitions for	Same as NAA	Same as NAA	Same as NAA	Same as NAA

	No Action Alternative (NAA)	Alternative 1A (ALT 1A)	Alternative 1B (ALT 1B)	Alternative 2 (ALT 2)	Alternative 3 (ALT 3)
	reducing impact of D-1641 and OMR Action export restrictions on SWP				
Phase 8	None	None	None	None	None

Notes:

[a] These assumptions have been developed under the direction of the Bureau of Reclamation (Reclamation) management team for the Re-initiation of Consultation on long-term operations of the Central Valley Project (CVP) and State Water Project (SWP).

[b] The Sacramento Valley hydrology used in the Future Conditions CALSIM II model reflects 2020 land-use assumptions associated with Bulletin 160-98. The San Joaquin Valley hydrology reflects draft 2030 land-use assumptions developed by Reclamation. Development of Future-level projected land-use are being coordinated with the California Water Plan Update for future models.

[c] Refer to Appendix 5A5, *CALSIM II Model Delivery Specifications*, for contract specific details

[d] Refer to Appendix 5A5, *CALSIM II Model Delivery Specifications*, for contract specific details

[e] Assumptions regarding American River water rights and CVP contracts with the Sacramento River Water Reliability Project are documented in the Delivery Specifications appendix. The Sacramento Area Water Forum agreement, its dry year diversion reductions, Middle Fork Project operations and water is not included. Refer to Appendix 5A5, *CALSIM II Model Delivery Specifications*, for contract specific details

[f] The CALSIM II representation of the San Joaquin River reflects the difficulties on-going groundwater overdraft problems. The 2030 level of development representation of the San Joaquin River Basin does not make any attempt to offer solutions to groundwater overdraft problems. In addition a dynamic groundwater simulation is not yet developed for the San Joaquin River Valley. Groundwater extraction/ recharge and stream-groundwater interaction are static assumptions and may not accurately reflect a response to simulated actions. These limitations should be considered in the analysis of results.

[g] The actual amount diverted is operated is conjunction with supplies from the Los Vaqueros project. The existing Los Vaqueros storage capacity is 160 TAF. Associated water rights to fill Los Vaqueros with Delta excess flows are included, but CCWD's water right permit and water right license on Mallard Slough are not included.

h It is assumed that SWP Contractors can take delivery of all Table A allocations and Article 21 supplies. Article 56 provisions are assumed and allow for SWP Contractors to manage storage and delivery conditions such that full Table A allocations can be delivered. Detailed analysis of the South Coast and Tulare regions support these assumptions. NBA Article 21 deliveries are dependent on excess conditions only, all other Article 21 deliveries also require that San Luis Reservoir be at capacity and that Banks PP and the California Aqueduct has available capacity to divert from the Delta for direct delivery.

i PCWA American River pumping facility upstream of Folsom Lake is included.

j Mokelumne River flows are modified to reflect modified operations associated with EBMUD supplies from the Freeport Regional Water Project.

k Current ACOE permit for Banks PP allows for an average diversion rate of 6,680 cfs in all months. Diversion rate can increase up to 1/3 of the rate of San Joaquin River flow at Vernalis during Dec 15th – Mar 15th up to a maximum diversion of 10,300 cfs, if Vernalis flow exceeds 1,000 cfs.

l Delta actions, under USFWS discretionary use of CVPIA 3406(b)(2) allocations, are no longer dynamically operated and accounted for in the CALSIM II model. The Combined Old and Middle River Flow and Delta Export restrictions under the FWS BO (Dec 15th 2008) and the NMFS BO (June 4th 2009) severely limit any discretion that would have been otherwise assumed in selecting Delta actions under the CVPIA 3406(b)(2) accounting criteria. Therefore, it is anticipated that CVPIA 3406(b)(2) account availability for upstream river flows below Whiskeytown, Keswick and Nimbus Dams would be very limited. The future of these operations is uncertain. For these baseline simulations, upstream flows on the Clear Creek and Sacramento River are pre-determined based on CVPIA 3406(b)(2) based operations from the Aug 2008 BA Study 7.0 and Study 8.0 for Existing and Future Conditions respectively. The procedures for dynamic operation and accounting of CVPIA 3406(b)(2) are not included in the CALSIM II model.

m D-1644 and the Lower Yuba River Accord is assumed to be implemented. The Yuba River is not dynamically modeled in CALSIM II. Yuba River hydrology and availability of water acquisitions under the Lower Yuba River Accord are based on modeling performed and the Lower Yuba River Accord EIS/EIR study team.

n In cooperation with Reclamation, National Marine Fisheries Service, Fish and Wildlife Service, and Ca Department of Fish and Game, the Ca Department of Water Resources has developed assumptions for implementation of the FWS BO (Dec 15th 2008) and NMFS BO (June 4th 2009) in CALSIM II. The FWS BO and NMFS BO assumptions are documented in the Appendix 5A of the LTO EIS (Reclamation 2015b).