

APPENDIX 5A, SECTION B
MODELING TECHNICAL APPENDIX –
ATTACHMENT 2 – CALSIM 3 REGULATORY
ASSUMPTIONS AND STATE WATER
PROJECT/CENTRAL VALLEY PROJECT
OPERATIONS CRITERIA

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Appendix 5A, Section B
Modeling Technical Appendix – Attachment 2 –
CalSim 3 Regulatory Assumptions and State Water
Project/Central Valley Project Operations Criteria

This section presents modeling assumptions for existing conditions and no project alternative.
Modeling assumptions for the Delta Conveyance Project alternatives are described in Appendix 5A,
Section B, *Modeling Technical Appendix – Hydrology and Systems Operations Modeling*.

1 **Table 5A-B2.1. Regulatory Standards and State Water Project/Central Valley Project Operational**
2 **Assumptions in CalSim 3 for Existing Conditions and No Project Alternative**

Item	Assumption
REGULATORY STANDARDS	
Trinity River	
Minimum Flow below Lewiston Dam	Trinity EIS Preferred Alternative (369–815 TAF/yr), and releases under the Long-Term Plan to Protect Adult Salmon in the Lower Klamath River (50 TAF of releases during August–September in all but Wet years)
Trinity Reservoir end-of-September minimum storage	Trinity EIS Preferred Alternative (600 TAF, as able)
Clear Creek	
Minimum flow below Whiskeytown Dam	1963 Reclamation 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 Sacramento 40-30-30 BN, AN and Wet years and 10 TAF for Spring pulse flows in June of non-Critical years; in June of Critical years, 3-day pulse of 900 cfs ¹
Upper Sacramento River	
Shasta Lake end-of-September minimum storage	NMFS 2004 Winter-run BO (1,900 TAF in non-critical dry years), which is not explicitly modeled but is met when hydrologically feasible).
Minimum flow below Keswick Dam	State Water Board Water Right Order 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 ¹
Feather River	
Minimum flow below Thermalito Diversion Dam (Low Flow Channel)	2006 Settlement Agreement (700 Apr 1–Sep 8, 800 cfs Sep 9–Mar 31)
Minimum flow below Thermalito Afterbay outlet (High Flow Channel)	1983 DWR and CDFW agreement (750–1,700 cfs)
Yuba River	
Minimum flow below Englebright (Smartville gage) and below Daguerre Point Dam (Marysville gage)	State Water Board RD-1644 Operations/WR 2008-0014 (Lower Yuba River Accord)

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1 **Table 5A-B2.1. Regulatory Standards and State Water Project/Central Valley Project Operational**
2 **Assumptions in CalSim 3 for Existing Conditions and No Project Alternative (continued)**

Item	Assumption
REGULATORY STANDARDS	
American River	
Minimum flow below Nimbus Dam	American River Modified Flow Management Standard, per 2017 Water Forum Agreement with a planning minimum end of December storage target of 275 TAF ¹
Minimum flow at H Street Bridge	State Water Board D-893
Lower Sacramento River	
Minimum flow near Rio Vista	State Water Board D-1641
Mokelumne River	
Minimum flow below Camanche Dam	FERC 2916-029, 1996 Joint Settlement Agreement (100–325 cfs)
Minimum flow below Woodbridge Diversion Dam	FERC 2916-029, 1996 Joint Settlement Agreement (25–300 cfs)
Stanislaus River	
Minimum flow below Goodwin Dam	Flows per New Melones SRP ¹
Minimum dissolved oxygen	State Water Board D-1422
Merced River	
Minimum flow below Crocker-Huffman Diversion Dam	Cowell Agreement
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
Tuolumne River	
Minimum flow at Lagrange Bridge	FERC 2299-024, 1995 Settlement Agreement (94–301 TAF/yr)
San Joaquin River	
San Joaquin River below Friant Dam/Mendota Pool	Full San Joaquin River Restoration Program flows, not constrained by current channel capacities. Model implementation includes recapture on the lower San Joaquin River and in the Delta.
Maximum salinity near Vernalis	Stanislaus contributions per New Melones SRP ¹
Minimum flow near Vernalis	Stanislaus contributions per New Melones SRP ¹
Sacramento-San Joaquin Delta	
Delta Outflow Index (flow and salinity)	State Water Board D-1641 flow and salinity standards and Summer/Fall Delta Smelt habitat operation to meet X2 of 80 km for September and October of Sacramento 40-30-30 AN and Wet years with transitional flows in last half of August; modeled as In-Basin Use and shared according to COA Article 6(c) ^{1,2} CVP always meets its obligation from export cuts as much as possible, followed by reservoir releases. SWP meets its obligation through either reservoir releases or export cuts depending on conditions in San Luis.

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Table 5A-B2.1. Regulatory Standards and State Water Project/Central Valley Project Operational Assumptions in CalSim 3 for Existing Conditions and No Project Alternative (continued)

Item	Assumption
REGULATORY STANDARDS	
Sacramento-San Joaquin Delta	
Delta Cross Channel gate operation	State Water Board D-1641 with additional days closed from October 1–January 31 based on Knights Landing or Sacramento Catch Index (October 1–November 30 only) and Delta water quality conditions. ¹
South Delta exports (Jones PP and Banks PP)	State Water Board D-1641 export limits (E/I ratio export cap and April-May pulse period 1:1 Vernalis flow), with additional 500 cfs allowed for July-September for reducing impact on SWP. ³ Export capacity shared according to COA Article 10(i).
Combined Flow in Old and Middle River	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 6 days of -6,250 cfs when increased pumping due to storm is possible, following the “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 Sacramento 40-30-30 non-Critical years. Health and Safety off-ramp when exports are low. ² Export capacity shared according to COA Article 10(i).
Spring Outflow Requirement	Met through San Joaquin River Inflow to Export Ratio (SJR IE). Applied to SWP only, under ITP. Maximum allowable SWP export is the maximum of 600 cfs or 40% of the total export under SJR IE in April-May, applied when Delta Outflow is less than 44,500 cfs. SJR IE limits total exports to a proportion of Vernalis flow (1:1 Critical, 2:1 Dry, 3:1 BN, 4:1 AN or Wet, using SJR 60-20-20 year type), with adjustments for multi-year droughts. Export reduction limited to 150 TAF (after allowing 30 TAF export before reduction) in Sacramento 40-30-30 Wet years. ²
Additional 100 TAF for Delta Outflow under ITP	SWP 100 TAF developed through export cut in Sacramento 40-30-30 Wet and AN years during spring, summer, or fall months to provide a flexible water block to enhance Delta Outflow. The 100 TAF can be deployed in the current year or carried over for use in later years (subject to spill). ²
Montezuma Slough Salinity Control Gates (October-May)	Operate to meet SWRCB D-1641 water quality standards in Montezuma Slough during salinity control season October through May.
Montezuma Slough Salinity Control Gates (Summer-Fall action)	Summer/Fall Delta Smelt habitat operate for up to 60 days June through October of Sacramento 40-30-30 BN, AN, and Wet years; CVP and SWP meet the flow requirement to maintain the salinity ^{1,2}
Montezuma Slough Salinity Control Gates (Summer action)	Additional SWP summer action for a 30- or 60-day control gate operation during a Sacramento 40-30-30 Dry year following a BN year (30 days) or following an AN or Wet year with sufficient carryover of 100 TAF (60 days). SWP only provides the flow required to offset salinity costs or the remainder of 100 TAF storage ²
Jersey Point Water Quality	D-1641 salinity standard from April through August, plus extended guidance September through January to help manage central Delta salinity and Rock Slough standard.

Table 5A-B2.1. Regulatory Standards and State Water Project/Central Valley Project Operational Assumptions in CalSim 3 for Existing Conditions and No Project Alternative (continued)

Item	Assumption
OPERATIONAL RULES:	
Location-Specific	
Upper Sacramento River	
Flow objective for navigation (Wilkins Slough)	Flow objective of 3,250–5,000 cfs based on month, CVP NOD agricultural allocation, and Shasta storage to reflect CVP operations for local delivery
American River	
Folsom Dam flood control	Fixed 400 TAF flood control diagram
Stanislaus River	
Flow below Goodwin Dam	Flows per New Melones SRP ¹
Delta Export Conveyance	
SWP Banks Pumping Plant	Physical capacity is 10,300 cfs but 6,680 cfs permitted capacity in all months; up to 10,300 cfs during December 15–March 15, depending on Vernalis flow conditions; ⁴ additional capacity of 500 cfs (up to 7,180 cfs) allowed July–September for reducing impact of export restrictions for ESA or CESA. ³ Capacity additionally limited by unit outages based on historical outage data.
CVP C.W. “Bill” Jones Pumping Plant (formerly Tracy PP)	Permit capacity is 4,600 cfs in all months (allowed for by 4,200 cfs capacity on the DMC and 400 cfs on the DMC–California Aqueduct Intertie)
OPERATIONAL RULES:	
Systemwide	
CVP Water Allocation	
CVP settlement and exchange	100% (75% in Shasta Critical Years)
CVP designated refuges	100% (75% in Shasta Critical Years)
CVP agriculture	0%-100% based on supply. SOD allocations are additionally limited due to State Water Board D-1641 and ROC LTO export restrictions. ¹
CVP municipal & industrial	50%-100% based on supply (model applies allocation to full contract amount not historical water use). SOD allocations are additionally limited due to State Water Board D-1641 and ROC LTO export restrictions ¹
Feather River Service Area	
DWR settlement agreement	Up to 50% cut based on April-July unimpaired runoff at Oroville or cumulative Oroville inflow deficiency below 2.5 MAF in current and past water years. Cuts limited to total of 100% in seven years.
Winter flood-up	0-100% based on maintaining Oroville storage above 900 TAF.
SWP Water Allocation	
North-of-Delta (including FRSA)	Contract-specific. NOD Allocation Settlement Agreement terms for Napa and Solano ⁵
South-of-Delta (including North Bay Aqueduct)	0% - 100% based on supply; allocations are limited due to State Water Board D-1641, ROC LTO, and ITP export restrictions. ^{1,2} NOD Allocation Settlement Agreement terms for Napa and Solano. ⁵

Table 5A-B2.1. Regulatory Standards and State Water Project/Central Valley Project Operational Assumptions in CalSim 3 for Existing Conditions and No Project Alternative (continued)

Item	Assumption
OPERATIONAL RULES:	
Systemwide	
Sharing of responsibility for in-basin use	2018 Addendum to the 1986 Coordinated Operations Agreement (CVP:SWP responsibility for in-basin use 80:20 Wet and AN, 75:25 BN, 65:35 Dry, 60:40 C, based on Sacramento 40-30-30 year type). Though not in COA, the modeling assumption is that FRWP, EBMUD, and two-thirds of the North Bay Aqueduct diversions are considered as Delta export, and one-third of the North Bay Aqueduct diversion is considered as in-basin use.
Sharing of unstored flows	2018 Addendum to the 1986 Coordinated Operations Agreement (CVP:SWP allowable diversion of unstored water allocated 55:45).
Sharing of restricted export capacity for project-specific priority pumping	Sharing of export capacity under State Water Board D-1641, ROC LTO, and ITP export restrictions ^{1,2} as defined in the paragraph 10(i) of the 2018 Addendum to the 1986 Coordinated Operations Agreement
CVP/SWP Coordinated Operations	
Water transfers	LYRA included for SWP contractors. ³ No other water transfers modeled.
Sharing of export capacity for lesser priority and wheeling-related pumping	Cross Valley Canal (CVC) wheeling (maximum of 128 TAF/yr) and CALFED ROD defined Joint Point of Diversion (JPOD). Only Delta surplus can be wheeled under JPOD. No CVC or JPOD wheeling allowed in months when there is an ITP export cut.
San Luis Reservoir	San Luis Reservoir is allowed to operate to a minimum storage of 100 TAF
CVPIA 3406(b)(2)	
Policy decision	Not applicable
Actions	No (b)(2) actions modeled

Notes:

1. Regulations under 2019 USFWS and NMFS Biological Opinions issued under the 2016 Reinitiation of Consultation on Long-Term Operations of the CVP and SWP. <https://www.usbr.gov/mp/bdo/lto/index.html>
2. Regulations under the 2020 Incidental Take Permit for the Long-Term Operation of the SWP issued by the California Department of Fish and Wildlife. <https://water.ca.gov/News/News-Releases/2020/March-20/CDFW-Issues-Permit-to-DWR-for-Long-Term-Operations>
3. Acquisitions of Component 1 water under the LYRA, and use of 500 cfs dedicated capacity at Banks PP during July–September, are assumed to be used to reduce as much of the impact of the April–May Delta export actions on SWP Contractors as much as possible.
4. The current U.S. Army Corps of Engineers permit for Banks Pumping Plant (limit on Clifton Court Forebay inflow) allows for an average diversion rate of 6,680 cfs in all months. Diversion rate can increase up to one-third of the rate of San Joaquin River flow at Vernalis from December 15 to March 15, up to a maximum diversion of 10,3000 cfs, if Vernalis flow exceeds 1,000 cfs.
5. The model includes logic for the updated Allocation Settlement Agreement for four NOD contractors: Butte, Yuba, Napa, and Solano.

Key:

- AN = above normal
- BN = below normal
- BO = Biological Opinion
- CALFED = CALFED Bay-Delta Program
- CDFW = California Department of Fish and Wildlife
- cfs = cubic feet per second

1	COA = Coordination Operations Agreement
2	CVP = Central Valley Project
3	CVPIA = Central Valley Project Improvement Act
4	Delta = Sacramento-San Joaquin Delta
5	DMC = Delta-Mendota Canal
6	DWR = California Department of Water Resources
7	D-xxxx = State Water Resources Control Board Water Right Decision No. xxxx
8	EBMUD = East Bay Municipal Utility District
9	E/I = export to inflow
10	EIS = Environmental Impact Statement
11	FERC = Federal Energy Regulatory Commission
12	FRSA = Feather River Service Area
13	FRWP = Freeport Regional Water Project
14	ID = Irrigation District
15	ITP = Incidental Take Permit
16	JPOD = Joint Point of Diversion
17	km = kilometer
18	LYRA = Lower Yuba River Accord
19	MAF = million acre-feet
20	M&I = municipal and industrial
21	NMFS = National Marine Fisheries Service
22	NOD = North of Delta
23	OMR = Old and Middle River
24	PP = Pumping Plant
25	Reclamation = U.S. Department of the Interior, Bureau of Reclamation
26	ROC LTO = Re-Initiation of Consultation on Long-Term Operations of the SWP and CVP
27	ROD = Record of Decision
28	SRP = Stepped Release Plan
29	State Water Board = State Water Resources Control Board
30	SWP = State Water Project
31	TAF = thousand acre-feet
32	USFWS = U.S. Fish and Wildlife Service