# CalSim II Model Updates
# CalSim Model Maintenance (CM3)

CalSim II is a water operation planning model developed by the U.S. Bureau of Reclamation (Reclamation) and the California Department of Water Resources (DWR). CalSim II is used to simulate the coordinated operation of the Central Valley Project (CVP) and State Water Project (SWP) over a range of hydrologic conditions. CalSim II is a generalized reservoir-river basin simulation model that allows for specification and achievement of user-specified allocation targets, or goals.

This document outlines the updates to the CalSim II model since the 2017 DCR to prepare the CalSim Model Maintenance (CM3) study using CalSim II. The attached appendix includes (A-1) CM3 modeling assumptions table; (A-2) list of files that change between the 2017 DCR and the CM3; and (A-3) list of model inputs that change between the 2017 DCR and the CM3.

## COA Addendum 2018

In December 2018 Reclamation and DWR signed an Addendum to the Coordinated Operations Agreement about how to share obligations and exports between the federal Central Valley Project (CVP) and the State Water Project (SWP). The CalSim modeling was developed jointly by Reclamation and DWR staff. The updated code reflects the following changes:

- Article 6(c): Sharing of responsibility for meeting in-basin uses with storage withdrawals under balanced conditions:

| Water Year Type | CVP | SWP |
|---|---|---|
| Wet | 80% | 20% |
| Above Normal | 80% | 20% |
| Below Normal | 75% | 25% |
| Dry | 65% | 35% |
| Critical | 60% | 40% |

- Article 10(i): Sharing Exports when Exports are constrained
  - Balanced: 65% CVP/35% SWP
  - Excess: 60% CVP/40% SWP

COA Addendum 10(b) is not represented in this model.

## Reclamation Updates

### Friant Delivery to Exchange Contractors

In extremely dry conditions, Exchange Contractors cannot get their full delivery from the Delta Mendota Canal (DMC). When this happens, the Exchange Contractors can call on Friant to supplement their deliveries. This operation has been added to the CalSim code.

### Sacramento River Navigation Control Point (NCP)

To limit releases when Shasta storage is low, off-ramps were introduced to modify the flow requirement at the NCP based on Shasta storage.

### CVP South of Delta (SOD) Allocation

The allocation logic for CVP Allocation SOD has been updated to better reflect reality.

- Exports are estimated based on the Sacramento River Index instead of a single seasonal estimate.

- Modified the San Luis Rule Curve to encourage more efficient timing of North to South conveyance.
- Allowed a higher allocation in May if CVP San Luis is higher.
- CVP delivery allocation logic was revised to allow allocations adjustments to occur throughout the CVP contract year during exceptionally high Shasta storage conditions; previously these adjustments were limited to May only.

**Trinity**
A 50 TAF Trinity River Fall Flow release was added in August/September of Above Normal, Below Normal, Dry, and Critical water years based on the Trinity Index. This is carried over into a similar reduction of imports from Trinity to the CVP.

**B2 Actions**
The model no longer uses an old, preprocessed timeseries based on the 2008 OCAP to implement CVPIA B2 flows at Keswick or Nimbus.

**Update CVP Settlement Contractor Demands**
CVP Settlement Contractor Demands were updated to match 2000 to 2016 CVO historical annual volumes and monthly distributions.

**Disaggregate Folsom Diversions**
Separated El Dorado ID and El Dorado County from the aggregated Folsom diversions. These are now distinct deliveries with their own demands and return flows.

**Power Releases**
- Keswick capacity through the power plant was updated to 16,000 cfs
- Nimbus capacity through the power plant was updated to 5,500 cfs

**Other minor changes**
There were a few minor changes since the 2017 DCR.
- Minor Changes
    - New weight to encourage C6_Rem (units 2, 4, and 6 instead of the river valve)
    - Use Folsom Storage Level instead of a hard number in FMStandard
    - Implementation of water transfers between CCWD and in-Delta water users is turned back on in the model
    - export_ops1.wresl no longer calls the BDCP code jul_sep_prefer_td_exp.wresl
    - Implemented stricter code to implement how flood flows in the Upper San Joaquin River are split between Mendota Pool and the Chowchilla Bypass
    - Define D418 for Cycles 1-5
    - B2Action3 was updated to include an integer check and move a parenthesis
    - Reopcontinuity.wresl now uses a float (penalty 999999) to balance at Hood
    - Friant_rain_fld_est.wresl removed the initial condition for the goal compute-rainrel
- Merged Files
    - CVPcut_sys and CVPcut_s were merged into CVPcut
    - CVPSDeliveryLogicCycle1 and CVPSysDeliveryLogicCycle1 were merged into
    - CVPDeliveryLogicCycle1
- Name Changes
    - Collins_data.wresl changed some case names and comments to be more accurate
    - sum_cvp_reduced_dem.wresl uses perdel_cvpex_s instead of perdel_cvpex_sys

- American_PRJ_WR.table updated PCWASac to PCWAFol
- NDO_NDS is now NDO_MOD, and X2_prv_NDS is now X2_prv_MOD

## DWR Updates

**Oroville carryover storage target**

Update the Oroville minimum carryover target to 1.3 MAF instead of 1.0 MAF to make it consistent with the recent SWP operations.

**FRSA Winter Water Allocation**

Replace the tiered winter water allocation logic with a continuum allocation based on the previous month storage at Oroville, inflow into Oroville, minimum in-stream flow requirements on Feather River met with released from Oroville/ Thermalito Complex, and winter water demand. Under the revised logic, allocations are scaled continuously between 0% and 100% and are updated monthly between October and January.

**Banks Permitted Pumping Capacity**

Replace an outdated assumption. Under the South Delta Improvement Program (SDIP), US Army Corps performed a hydrodynamics analysis of Clifton Court Forebay and concluded that sustained pumping at 10,300 cfs for an entire month at Banks would result in scouring. However, recent operations in 2017 confirm that Banks pumping plant can sustain continuous monthly pumping at 10,300 cfs, so the Banks Permitted Pumping Capacity was set to this value to reflect recent operations and consistency with permitted diversion.

**Oroville RVOS**

Replace an outdated assumption. The Oroville River Valve Outlet System (RVOS) has since been fixed and can now utilize its full capacity of 4,000 cfs instead of the assumed 1,500 cfs capacity.

While reviewing the results, the staff noticed that water was released from the RVOS before utilizing the full capacity of units 2, 4, and 6 which sit at a higher elevation than RVOS. Updated the code to ensure proper order of release operations: (1) Units 2, 4 and 6; then, (2) Units 1, 3, and 5; and finally, RVOS.

## Head of Old River Barrier (HORB)

HORB provides additional juvenile Chinook salmon protection by preventing them from entering Old River because survival appears to be lower in Old River than it is in the mainstem San Joaquin River. HORB is assumed to be installed from September 16 to November 30. Extended the HORB gate operations to remain closed during Spring months (April-May) when the San Joaquin River flow is less than 5,000 cfs.

# Appendix A-1: CM3 modeling assumptions table

## CalSim II Modeling Assumptions for CalSim Model Maintenance (CM3)

This table represents the modeling assumptions of the CalSim Model Maintenance (CM3) August 2019.

| | Existing Condition[1] |
|---|---|
| **Planning Horizon**[1] | Year 2035 |
| **Period of Simulation** | 82 years (1922-2003) |
| **HYDROLOGY** | |
| **Level of Development (land use)** | 2030 Level[2] |
| **Inflows/Supplies** | Inflows based on Historical Hydrology[23, 25] |
| **DEMANDS** | |
| **North of Delta (excluding the American River)** | |
| CVP[3] | Land-use based, full build-out of contract amounts, except for Settlement Contractors represented with historical diversions |
| SWP (FRSA) | Land-use based, limited by contract amounts[4, 7] |
| Non-project | Land-use based, limited by water rights and SWRCB Decisions for Existing Facilities |
| Antioch Water Works | Pre-1914 water right |
| Federal refuges | Firm Level 2 water needs[5] |
| **American River Basin** | |
| Water rights | Year 2025, full water rights[6] |
| CVP | Year 2025, full contracts including Freeport Regional Water Project[23], except for Settlement Contractors at historical diversions [6] |
| **San Joaquin River Basin**[8] | |
| Friant Unit | Limited by contract amounts, based on current allocation policy[26] |
| Lower basin | Land-use based, based on district level operations and constraints[24] |
| Stanislaus River basin[9, 17] | Land-use based, Revised Operations Plan (2008 model assumptions) and NMFS BO (Jun 2009) Actions III.1.2 and III.1.3 |
| **South of Delta** | |
| CVP | Demand based on contract amounts[3] |
| Federal refuges | Firm Level 2 water needs[5] |
| CCWD | 195 TAF/yr CVP contract supply and water rights[10]<br><br>Modified the hydrology in the Los Vaqueros watershed as well as CCWD's operations to reflect the most recent studies and operational agreements |

| | Existing Condition[1] |
|---|---|
| SWP [4, 11] | Demand based on full Table A amounts |
| Article 56 | Based on 2001-2008 contractor requests |
| Article 21 | MWD demand up to 200 TAF/month (December-March) subject to conveyance capacity, KCWA demand up to 180 TAF/month, and other contractor demands up to 34 TAF/month, subject to conveyance capacity |
| North Bay Aqueduct | 77 TAF/yr demand under SWP contracts. Up to 2.635 TAF/mon of excess flow (i.e. when Standard Water Right Term 91 is not in effect, UWFE used as surrogate) under Fairfield, Vacaville and Benicia Settlement Agreement. NOD Allocation Settlement Agreement terms for Napa and Solano[15] |
| **FACILITIES** | |
| **System-wide** | Existing facilities |
| **Sacramento Valley** | |
| Red Bluff Diversion Dam | Diversion dam gates out all year, Pumping Plant operated to deliver CVP water |
| Fremont Weir | Existing Weir |
| Colusa Basin | Existing conveyance and storage facilities |
| Lower American River | Hodge criteria for diversion at Fairbairn |
| Upper American River[6,22] | PCWA American River pump station |
| Lower Sacramento River | Freeport Regional Water Project[12] |
| **Delta Export Conveyance** | |
| SWP Banks Pumping Plant (South Delta) | Physical capacity is 10,300 cfs, permitted capacity is 6,680 cfs in all months and up to 10,300 cfs during Dec 15th - Mar 15th depending on Vernalis flow conditions[18]; additional capacity of 500 cfs (up to 7,180 cfs) allowed Jul–Sep for reducing impact of NMFS BO (Jun 2009) Action IV.2.1[17] on SWP[19] |
| CVP C.W. “Bill” Jones Pumping Plant (formerly Tracy PP) | Permit capacity is 4,600 cfs in all months (allowed for by the Delta-Mendota Canal-California Aqueduct Intertie) |
| Upper Delta-Mendota Canal Capacity | Existing plus 400 cfs Delta-Mendota Canal–California Aqueduct Intertie |
| CCWD Intakes | Los Vaqueros existing storage capacity, 160 TAF, existing pump locations, Alternative Intake Project (AIP) included[13] |
| **San Joaquin River** | |
| Lower San Joaquin River | City of Stockton Delta Water Supply Project, 30 mgd capacity |
| **South of Delta (CVP/SWP project facilities)** | |

| | Existing Condition[1] |
|---|---|
| South Bay Aqueduct (SBA) | SBA rehabilitation, 430 cfs capacity from junction with California Aqueduct to Alameda County FC&WSD Zone 7 point |
| California Aqueduct East Branch | Existing capacity |
| Head of Old River Barrier (HORB) | Temporary Barrier Project operated based on San Joaquin River flow time series from CalSim II output<br>HORB installed in Fall Sep 16 – Nov 30<br>HORB also installed in Spring April 01 – May 31 when SJR flow is less than 5,000 cfs |
| **REGULATORY STANDARDS** | |
| **Trinity River** | |
| Minimum Flow below Lewiston Dam | Trinity EIS Preferred Alternative (369-815 TAF/yr, dependent on water year type) |
| Trinity Reservoir end-of-September minimum storage | Trinity EIS Preferred Alternative (600 TAF/yr as able) |
| Trinity River Fall Augmentation Flows | 420 cfs August 1 through September 30 in all but very wet years |
| **Clear Creek** | |
| Minimum flow below Whiskeytown Dam | Downstream water rights, 1963 Reclamation proposal to USFWS and NPS, predetermined Central Valley Protection Improvement Act 3406(b)(2) flows[20], and NMFS BO (Jun 2009) Action I.1.1[17] |
| **Upper Sacramento River** | |
| Shasta Lake end-of-September minimum storage | NMFS 2004 Winter-run Biological Opinion (1,900 TAF in non-critical dry years), and NMFS BO (Jun 2009) Action I.2.1[17] (NMFS BiOp storage objectives not explicitly modeled; only achievable when hydrologically possible) |
| Minimum flow below Keswick Dam | Flows for the SWRCB Water Rights Order 90-5, NMFS BO (Jun 2009) Action I.2.2 achieved as possible through other modeled actions[17] |
| **Feather River** | |
| Minimum flow below Thermalito Diversion Dam | 2006 Settlement Agreement (700 / 800 cfs) |
| Minimum flow below Thermalito Afterbay outlet | 1983 DWR, CDFW agreement (750 – 1,700 cfs) |
| **Yuba River** | |
| Minimum flow below Daguerre Point Dam | D-1644 Operations (Lower Yuba River Accord)[14] |

| | Existing Condition[1] |
|---|---|
| **American River** | |
| Minimum flow below Nimbus Dam | American River Flow Management as required by NMFS BO (Jun 2009) Action II.1[17] |
| Minimum flow at H Street Bridge | SWRCB D-893 |
| **Lower Sacramento River** | |
| Minimum flow near Rio Vista | SWRCB D-1641 |
| **Mokelumne River** | |
| Minimum flow below Camanche Dam | Federal Energy Regulatory Commission 2916-029[12], 1996 (Joint Settlement Agreement) (100 – 325 cfs) |
| Minimum flow below Woodbridge Diversion Dam | Federal Energy Regulatory Commission 2916-029[12], 1996 (Joint Settlement Agreement) (25 – 300 cfs) |
| **Stanislaus River** | |
| Minimum flow below Goodwin Dam | 1987 Reclamation, CDFW agreement, and flows required for NMFS BO (Jun 2009) Action III.1.2 and III.1.3[17] |
| Minimum dissolved oxygen | SWRCB D-1422 |
| **Merced River** | |
| Minimum flow below Crocker-Huffman Diversion Dam | Davis-Grunsky (180 – 220 cfs, Nov – Mar), and Cowell Agreement |
| Minimum flow at Shaffer Bridge | Federal Energy Regulatory Commission 2179 (25 – 100 cfs) |
| **Tuolumne River** | |
| Minimum flow at Lagrange Bridge | Federal Energy Regulatory Commission 2299-024, 1995 (Settlement Agreement) (94 – 301 TAF/yr) |
| **San Joaquin River** | |
| San Joaquin River below Friant Dam/Mendota Pool | San Joaquin River Restoration flows not included [26] |
| Maximum salinity near Vernalis | SWRCB D-1641 |
| Minimum flow near Vernalis | SWRCB D1641. VAMP is turned off since the San Joaquin River Agreement has expired[16]. NMFS BO (Jun 2009) Action IV.2.1[17] Phase II flows not provided due to lack of agreement for purchasing water |
| **Sacramento-San Joaquin Delta** | |
| Delta Outflow Index (flow and salinity) | SWRCB D-1641 and FWS BO (Dec 2008) Action 4[17] |
| Delta Cross Channel gate operation | SWRCB D-1641 with additional days closed from Oct 1-Jan 31 based on NMFS BO (Jun 2009) Action IV.1.2[17] (closed during flushing flows from Oct 1-Dec 14 unless adverse water quality conditions) |

| | Existing Condition[1] |
|---|---|
| South Delta exports (Jones PP and Banks PP) | SWRCB D-1641, Vernalis flow-based export limits Apr 1 – May 31 as required by NMFS BO (Jun 2009) Action IV.2.1[17] (additional 500 cfs allowed for Jul-Sep for reducing impact on SWP)[19] |
| Combined Flow in Old and Middle River (OMR) | FWS BO (Dec 2008) Actions 1 through 3 and NMFS BO (Jun 2009) Action IV.2.3 |
| **OPERATIONS CRITERIA: RIVER-SPECIFIC** | |
| **Upper Sacramento River** | |
| Flow objective for navigation (Wilkins Slough) | Revised flow objective for Wilkins Slough. Flow objective for Wilkins Slough based on month, CVP allocation, and Shasta storage condition to reflect CVP operations for local delivery |
| **American River** | |
| Folsom Dam flood control | Variable 400/600 flood control diagram |
| **Feather River** | |
| Flow at mouth of Feather River (above Verona) | Maintain the CDFW /DWR flow target of 2,800 cfs for Apr - Sep dependent on Oroville inflow and FRSA allocation |
| **Stanislaus River** | |
| Flow below Goodwin Dam | 1987 USBR, CDFW agreement, and flows required for NMFS BO (Jun 2009) Action III.1.2 and III.1.3[17] |
| **San Joaquin River** | |
| Salinity at Vernalis | Grasslands Bypass Project (full implementation) |
| **OPERATIONS CRITERIA: SYSTEMWIDE** | |
| **CVP Water Allocation** | |
| CVP settlement and exchange | 100% (75% in Shasta critical years) |
| CVP refuges | 100% (75% in Shasta critical years) |
| CVP agriculture | 100% - 0% based on supply. South-of-Delta allocations are additionally limited due to D-1641, FWS BO (Dec 2008), and NMFS BO (Jun 2009) export restrictions[17] |
| CVP municipal & industrial | 100% - 50% based on supply. South-of-Delta allocations are additionally limited due to D-1641, FWS BO (Dec 2008), and NMFS BO (Jun 2009) export restrictions[17] |
| **SWP Water Allocation** | |
| North of Delta (FRSA) | Contract-specific<br>NOD Allocation Settlement Agreement terms for Napa and Solano[15] |
| South of Delta (including North Bay Aqueduct) | Based on supply; equal prioritization between Ag and M&I based on Monterey Agreement; allocations are limited due to D-1641, FWS BO (Dec 2008), and NMFS BO (Jun 2009) export restrictions[27,17]<br>NOD Allocation Settlement Agreement terms for Napa and Solano[15] |

| | Existing Condition[1] |
|---|---|
| **CVP/SWP Coordinated Operations** | |
| Sharing of responsibility for in-basin use | According to Coordinated Operations Agreement (2018), sharing responsibility for meeting Sacramento Valley In-basin use during balance condition with water year type in percentage for CVP and SWP, respectively are:<br>80/20 in AN and W<br>75/25 in BN<br>65/35 in D<br>60/40 in C<br>As per NAPA agreement, FRWP and EBMUD 2/3 of the North Bay Aqueduct diversions are considered as Delta export, 1/3 of the North Bay Aqueduct diversion is considered as in-basin use |
| Sharing of surplus flows | According to Coordinated Operations Agreement (2018), CVP and SWP sharing responsibility during Unstored Water for Export (UWFE) during balanced condition for all year type is 55% and 45%, respectively. |
| Sharing of restricted export capacity for project-specific priority pumping | The percentage sharing of export capacity under export limits due to (1) SWRCB D-1641 (export/inflow ratio, Vernalis 1:1), (2) 2008 USFWS and 2009 NMFS biological opinions Old and Middle River flow requirements, or (3) 2009 NMFS biological opinion San Joaquin River i:e ratio[27,17]<br>60/40 CVP/SWP during excess conditions<br>65/35 CVP/SWP during balanced conditions<br>No restrictions on Inter-tie use to meet these shares |
| Water transfers | Acquisitions by SWP contractors are wheeled at priority in Banks Pumping Plant over non-SWP users; LYRA included for SWP contractors[19] |
| 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) |
| San Luis Reservoir | San Luis Reservoir is allowed to operate to a minimum storage of 100 TAF |
| **CVPIA 3406(b)(2)** | |
| Policy decision | Per May 2003 Department of Interior decision |
| Allocation | 800 TAF, 700 TAF in 40-30-30 dry years, and 600 TAF in 40-30-30 critical years as a function of Ag allocation |
| Actions | Pre-determined upstream fish flow objectives below Whiskeytown Dams, non-discretionary NMFS BO (Jun 2009) actions for the American and Stanislaus Rivers, and NMFS BO (Jun 2009) and FWS BO (Dec 2008) actions leading to export restrictions[17] |
| Accounting adjustments | Releases for non-discretionary FWS BO (Dec 2008) and NMFS BO (Jun 2009)[17] actions may or may not always be deemed (b)(2) actions; in general, it is anticipated, that accounting of these actions using (b)(2) metrics, the sum would exceed the (b)(2) allocation in many |

| | Existing Condition[1] |
|---|---|
| | years; therefore no additional actions are considered and no accounting logic is included in the model |
| **WATER MANAGEMENT ACTIONS** | |
| **Water Transfer Supplies (long term programs)** | |
| Lower Yuba River Accord[19, 25] | Yuba River acquisitions for reducing impact of NMFS BO export restrictions[17] on SWP |
| Phase 8 | None |

**Notes:**

[1] These assumptions have been developed under the direction of CM3 baseline development purpose.

[2] 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.

[3] CVP contract amounts have been reviewed and updated according to existing and amended contracts, as appropriate. Assumptions regarding CVP agricultural and M&I service contracts and Settlement Contract amounts are listed in table 1, table 2 and table 3 in respect of NOD, American River and SOD accordingly. Summary of CVP contract amounts are tabulated below.

| Project<br>Contractor Type | North-of-the-Delta<br>(TAF) | South-of-the-Delta<br>(TAF) |
|---|---|---|
| CVP Contractors | | |
| Settlement/Exchanges | 2291 | 840 |
| Water Service Contractor | | |
| Agriculture | 358 | 1937 |
| M&I | 360 | 164 |
| Refuges | 191 | 281 |

[4] SWP contract amounts have been updated as appropriate based on recent Table A transfers/agreements. The contractors' table A entitlement is obtained from Bulletin 132. Assumptions regarding SWP agricultural and M&I contract amounts are listed in table 4, table 5 and table 6 in respect of NOD, Delta and SOD accordingly. Summary of SWP contract amounts are tabulated below.

| Project<br>Contractor Type | North-of-the-Delta<br>(TAF) | South-of-the-Delta<br>(TAF) |
|---|---|---|
| SWP Contractors | | |
| Feather River Area + Delta | 1087 | 0 |
| Table A | 114 | 4056 |
| Agriculture | 0 | 1012 |
| M&I | 114 | 3044 |

[5] Water needs for Federal refuges have been reviewed and updated, as appropriate. Assumptions regarding firm Level 2 refuge water are listed in table 1 and table 3. Refuge Level 4 (and incremental Level 4) water is not included.

[6] Assumptions regarding American River water rights and CVP contracts with the Sacramento River Water Reliability Project are listed in table 2. The Sacramento Area Water Forum agreement, its dry year diversion reductions, Middle Fork Project operations and water is not included.

[7] Demand for rice straw decomposition water from Thermalito Afterbay was added to the model and updated to reflect historical diversion from Thermalito in the October through January period.

[8] The new CalSim-II representation of the San Joaquin River has been included in this model package (CalSim-II San Joaquin River Model, Reclamation, 2005). Updates to the San Joaquin River have been included since the preliminary model release in August 2005. The model reflects the difficulties of 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 result

[9] The CALSIM II model representation for the Stanislaus River does not necessarily represent Reclamation's current or future operational policies. A suitable plan for supporting flows has not been developed for NMFS BO (Jun 2009) Action III.1.3.

[10] A portion of East Contra Costa Irrigation District's (ECCID's) service area overlaps with a portion of CCWD's service area, and ECCID, CCWD, and DWR have a 1991 agreement to allow CCWD to divert water under ECCID's water right at CCWD's intakes. Additionally, the City of Brentwood is within ECCID's service area and has a long-term agreement with ECCID to serve Brentwood's residents water diverted under ECCID's water right; a portion of this supply may be wheeled through CCWD's intakes. CCWD's and Brentwood's use of ECCID water is not included in the VA CalSim model, but the water transfers between CCWD and in-Delta water users that are simulated in the VA CalSim model serve a similar role.

[11] 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.

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

[13] The CCWD Alternate Intake Project, an intake at Victoria Canal, which operates as an alternate Delta diversion for Los Vaqueros Reservoir.

[14] 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.

[15] This includes draft logic for the updated Allocation Settlement Agreement for four NOD contractors: Butte, Yuba, Napa and Solano.

[16] It is assumed that D-1641 requirements will be in place in 2030, and VAMP is turned off.

[17] 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).

[18] 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.

[19] Acquisitions of Component 1 water under the Lower Yuba River Accord and use of 500 cfs dedicated capacity at Banks PP during Jul – Sep, are assumed to be used to reduce as much of the impact of the Apr-May Delta export actions on SWP contractors as possible.

[20] 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. It appears the integration of BO RPA actions will likely exceed the 3406(b)(2) allocation in all water year types. 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 No Action baselines respectively. The procedures for dynamic operation and accounting of CVPIA 3406(b)(2) are not included in the CALSIM II model.

[21] Only acquisitions of Lower Yuba River Accord Component 1 water are included.

[22] PCWA American River pumping facility upstream of Folsom Lake is included.

[23] Since the release of DCR 2017, EBMUD has replaced their monthly timestep planning model with a physically based, daily timestep model. To be consistent with EBMUD's planning model, the CalSim II inputs related to the EBMUD operations – Mokelumne River inflow into Delta and allocations from the Freeport Regional Water Project – are updated to match the outputs from Model Run #8079. Key modeling assumptions include: projected 2040 level of development; average demand of 230 MGD; and FWRP operations based on the 2016 Drought Management Program Guidelines.

[24] For consistency, the CalSim II Tuolumne River operations – New Don Pedro storage along with diversions and channel flows downstream of the New Don Pedro dam – are fixed to the Tuolumne operations modeled in the Water Supply Effect (WSE) spreadsheet model of the State Water Resource Control Board (SWRCB). The model inputs to the WSE model were developed from DCR 2017existing conditions CalSim II model run.

[25] Yuba Water Agency (YWA) has recently converted their operations model from a monthly timestep to daily timestep as part of their FERC Relicensing process for a more accurate representation of Yuba River Development Project (YRDP) operations. To be consistent with YWA's planning model, Yuba River Development Project Model (YRDPM), the CalSim II inputs related to the Yuba River operations have been updated, including Yuba River flow above Daguerre Point Dam and Daguerre Point Dam diversion, and the Yuba River transfer operations.

[26] The SJRR flows represented in the CalSim II model so far reflected the long-term flow schedule. A timeseries that reflects the near-term flows is being developed. The near-term SJRR flows can be recaptured using the current facilities before reaching the Delta, which is closer to a CalSim II model run without SJRR flows in terms of the Delta flow and salinity conditions as well as the Delta outflow. As a result, San Joaquin River Restoration flows are turned off.

[27] Fall X2 is considered in-basin-use (IBU) even the Delta outflow requirement under X2 condition is met though export restriction.

Table 1. CVP North of Delta Contract Amounts as modeled in CSII

| CVP CONTRACTOR | Geographic Location | CALSIM II Representation | | CVP Water Service Contracts (TAF/yr) | | Settlement / Exchange Contractor (TAF/yr) | Water Rights/Non-CVP (TAF/yr) | Level 2 Refuges (TAF/yr) |
|---|---|---|---|---|---|---|---|---|
| | | Diversion Arc | Region | AG | M&I | | | |
| | | | | | | | | |
| Anderson Cottonwood ID | Sacramento River Redding Subbasin | D104A | DSA 58 | | | 128.0 | | |
| Clear Creek CSD | | D104B | DSA 58 | 13.8 | 1.5 | | | |
| Bella Vista WD | | D104C | DSA 58 | 22.1 | 2.4 | | | |
| Shasta CSD | | D104D | DSA 58 | | 1.0 | | | |
| Sac R. Misc. Users | | D104F | DSA 58 | | | 3.4 | | |
| Redding, City of | | D104G | DSA 58 | | | 21.0 | | |
| City of Shasta Lake | | D104H | DSA 58 | 2.5 | 0.3 | | | |
| Mountain Gate CSD | | D104I | DSA 58 | | 0.4 | | | |
| Shasta County Water Agency | | D104J | DSA 58 | 0.5 | 0.5 | | | |
| Redding, City of/Buckeye | | D104K | DSA 58 | | 6.1 | | | |
| Total | | D104 | | 38.9 | 12.2 | 152.4 | | 0.0 |
| | | | | | | | | |
| Corning WD | Corning Canal | D171 | WBA 4 | 23.0 | | | | |
| Proberta WD | | D171 | WBA 4 | 3.5 | | | | |
| Thomes Creek WD | | D171 | WBA 4 | 6.4 | | | | |
| Total | | | | 32.9 | 0.0 | 0.0 | | 0.0 |
| | | | | | | | | |
| Kirkwood WD | Tehama-Colusa Canal | D172 | WBA 4 | 2.1 | | | | |
| Glide WD | | D174 | WBA 7N | 10.5 | | | | |
| Kanawha WD | | D174 | WBA 7N | 45.0 | | | | |
| Orland-Artois WD | | D174 | WBA 7N | 53.0 | | | | |
| Colusa, County of | | D178 | WBA 7S | 20.0 | | | | |
| Colusa County WD | | D178 | WBA 7S | 62.2 | | | | |
| Davis WD | | D178 | WBA 7S | 4.0 | | | | |
| Dunnigan WD | | D178 | WBA 7S | 19.0 | | | | |
| La Grande WD | | D178 | WBA 7S | 5.0 | | | | |
| Westside WD | | D178 | WBA 7S | 65.0 | | | | |
| Total | | | | 285.8 | 0.0 | 0.0 | | 0.0 |
| | | | | | | | | |
| Sac. River Misc. Users | Sacramento River | D113A | WBA 4 | | | 1.2 | | |

Table 1. CVP North of Delta Contract Amounts as modeled in CSII (cont.)

| CVP CONTRACTOR | Geographic Location | CALSIM II Representation | | CVP Water Service Contracts (TAF/yr) | | Settlement / Exchange Contractor (TAF/yr) | Water Rights/Non-CVP (TAF/yr) | Level 2 Refuges(TAF/yr) |
|---|---|---|---|---|---|---|---|---|
| | | Diversion Arc | Region | AG | M&I | | | |
| Glenn Colusa ID | Glenn-Colusa Canal | D143A | WBA 8NN | | | 441.5 | | |
| | | D145A | WBA 8NS | | | 383.5 | | |
| Sacramento NWR | | D143B | WBA 8NN | | | | | 54.5 |
| Delevan NWR | | D145B | WBA 8NS | | | | | 24.6 |
| Colusa NWR | | D182B | WBA 8NS | | | | | 29.3 |
| Colusa Drain M.W.C. | Colusa Basin Drain | D180 | WBA 8NN | | | 0.0 | | |
| | | D182A/ D18302 | WBA 8NS | | | Average ~41.2 | | |
| Total | | | | 0.0 | 0.0 | 866.2 | | 108.4 |
| | | | | | | | | |
| Princeton-Cordova-Glenn ID / Provident ID / Maxwell ID / Sac R. Misc. Users | Sacramento River | D122A | WBA 8NS | | | 149.9 | | |
| Maxwell ID / Sycamore Family Trust / Roberts Ditch IC / Reclamation District 108 / Sac R. Misc. Users | | D122B | WBA 8NS | | | 149.8 | | 0.0 |
| Total | | | | | | 299.7 | | |
| | | | | | | | | |
| Reclamation District 108 / River Garden Farms / Sac R. Misc. Users | Sacramento River | D129A | WBA 8S | | | 261.2 | | |
| Meridian Farms WC / Pelger Mutual WC / Reclamation District 1004 / Carter MWC / Sutter MWC / Tisdale Irrigation & Drainage Co. | | D128 | DSA 15 | | | 479.31 | | |
| Feather River WD export | | D128 | DSA 15 | 0.0 | | | | |
| Total | | | | 0.0 | 0.0 | 740.5 | | 0.0 |

Table 1. CVP North of Delta Contract Amounts as modeled in CSII (cont.)

| CVP CONTRACTOR | Geographic Location | CALSIM II Representation | | CVP Water Service Contracts (TAF/yr) | | Settlement / Exchange Contractor (TAF/yr) | Water Rights/Non-CVP (TAF/yr) | Level 2 Refuges(TAF/yr) |
|---|---|---|---|---|---|---|---|---|
| | | Diversion Arc | Region | AG | M&I | | | |
| Sutter NWR | Sutter bypass water for Sutter NWR | C136B | DSA 69 | | | | | 25.7 |
| Gray Lodge WMA | Feather River | C216B | DSA 69 | | | | | 41.3 |
| Butte Sink Duck Clubs | | C221 | DSA 69 | | | | | 15.6 |
| Total | | | | 0.0 | 0.0 | 0.0 | | 82.6 |
| | | | | | | | | |
| Sac R. Misc. Users | Sacramento River | D163 | DSA 65 | | | 56.8 | | |
| City of West Sacramento | | D165 | DSA 65 | | | 23.6 | | |
| Davis-Woodland Water Supply Project | | D165 | DSA 65 | | | | | |
| Total | | | | 0.0 | 0.0 | 80.4 | | 0.0 |
| | | | | | | | | |
| Sac R. Misc. Users | Lower Sacramento River | D162A | DSA 70 | | | 4.8 | | |
| Natomas Central MWC | | D162B | DSA 70 | | | 120.2 | | |
| Pleasant Grove-Verona MWC | | D162C | DSA 70 | | | 26.3 | | |
| City of Sacramento | | D162D | DSA 70 | | 0.0 | | 0.0 | |
| Placer County Water Agency (Sac Suburban, Roseville and others) | | D162E | DSA 70 | | 0.0 | | 0.0 | |
| Total | | | | | 0.0 | 151.3 | 0.0 | |
| | | | | | | | | |
| Total CVP North-of-Delta | | | | 357.6 | 12.2 | 2291.7 | 0.0 | 191.1 |

Table 2. CVP Contract and Water Right Amounts for American River as modeled in CSII

| CVP CONTRACTOR | Geographic Location | CALSIM II Diversion Arc | CVP Water Service Contracts (TAF/yr) | | Settlement/ Exchange Contractor (TAF/yr) | Water Rights/ Non-CVP (TAF/yr) | Diversion Limit Capacity) (TAF/Yr) |
|---|---|---|---|---|---|---|---|
| | | | AG | M&I1 | | | |
| Placer County Water Agency | Auburn Dam Site | D300 | | 0.0 | | 65.0 | 65.0 |
| | | | | | | | |
| Sacramento Suburban Water District2 | Folsom Reservoir | D8A | | | | 0.0 | 0.0 |
| City of Folsom (includes P.L. 101-514) | | D8B | | 7.0 | | 27.0 | 34.0 |
| Folsom Prison | | D8C | | | | 5.0 | 5.0 |
| San Juan Water District (Placer County) | | D8D | | | | 25.0 | 25.0 |
| San Juan Water District (Sac County) (includes P.L. 101-514) | | D8E | | 24.2 | | 33.0 | 57.2 |
| El Dorado Irrigation District | | D8F | | 7.55 | | 17.0 | 7.55 |
| City of Roseville | | D8G | | 32.0 | | 30.0 | 62.0 |
| Placer County Water Agency | | D8H | | 35.0 | | | 35 |
| El Dorado County (P.L. 101-514) | | D8I | | 15.0 | | | 0.0 |
| Total | | | 0.0 | 120.8 | 0.0 | 137.0 | 225.8 |
| | | | | | | | |
| So. Cal WC/ Arden Cordova WC | Folsom South Canal | D9AA | | | | 5.0 | 5.0 |
| California Parks and Recreation | | D9AB | | 5.0 | | | 5.0 |
| SMUD (export) | | D9B | | 30.0 | | 15.0 | 45.0 |
| Canal Losses | | D9A | | | | 1.0 | 1.0 |
| Total | | | 0.0 | 35.0 | 0.0 | 21.0 | 56.0 |
| | | | | | | | |
| City of Sacramento | Lower American River | D302A | | | | 230.0 | 230.0 |
| Carmichael Water District | | D302C | | | | 12.0 | 12.0 |
| Total | | | 0.0 | 0.0 | 0.0 | 240 | 240 |
| | | | | | | | |
| City of Sacramento | Lower Sacramento River | D167A | | 0.0 | | 81.8 | 311.8 |
| Sacramento County Water Agency (includes SMUD transfer) | | D167B | | 10.0 | | | 10 |
| | | D168C | | 35.0 | | | 35. |
| Sacramento County Water Agency (P.L. 101-514) | | D168C | | 15.0 | | | 15 |
| Sacramento County Water Agency - assumed Appropriated Water | | D168C | | | | Varies Average ~17 TAF | 18 |
| EBMUD (export) | | D168B | | 133.0 | | | |
| Total | | | 0.0 | 193.0 | 0.0 | 98.8 | 522.8 |
| | | | | | | | |
| Total (American R) | | | 0.0 | 348.8 | 0.00 | 551.8 | 1109.6 |

Table 3. CVP South of Delta Contract Amounts as modeled in CSII

| CVP CONTRACTOR | Geographic Location | CALSIM II Diversion Arc | CVP Water Service Contracts (TAF/yr) | | Settlement / Exchange Contractor (TAF/yr) | Water Rights / Non-CVP (TAF/yr) | Level 2 Refugesa (TAF/yr) | Losses (TAF/yr) |
|---|---|---|---|---|---|---|---|---|
| | | | AG | M&I | | | | |
| Byron-Bethany ID | Upper DMC | D700 | 20.6 | | | | | |
| Tracy, City of | | D700 | | 10.0 | | | | |
| | | D700 | | 5.0 | | | | |
| | | D700 | | 5.0 | | | | |
| Banta Carbona ID | | D700 | 20.0 | | | | | |
| Total | | D700 | 40.6 | 20.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | |
| Del Puerto WD | Upper DMC | D701 | 12.1 | | | | | |
| Davis WD | | D701 | 5.4 | | | | | |
| Foothill WD | | D701 | 10.8 | | | | | |
| Hospital WD | | D701 | 34.1 | | | | | |
| Kern Canon WD | | D701 | 7.7 | | | | | |
| Mustang WD | | D701 | 14.7 | | | | | |
| Orestimba WD | | D701 | 15.9 | | | | | |
| Quinto WD | | D701 | 8.6 | | | | | |
| Romero WD | | D701 | 5.2 | | | | | |
| Salado WD | | D701 | 9.1 | | | | | |
| Sunflower WD | | D701 | 16.6 | | | | | |
| West Stanislaus WD | | D701 | 50.0 | | | | | |
| Patterson WD | | D701 | 16.5 | | | 6.0 | | |
| Total | | D701 | 206.7 | 0.0 | 0.0 | 6.0 | 0.0 | 212.7 |
| | | | | | | | | |
| Upper DMC Loss | Upper DMC | D702 | | | | | | 18.5 |
| | | | | | | | | |
| Panoche WD | Lower DMC Volta | D706 | 6.6 | | | | | |
| San Luis WD | | D706 | 65.0 | | | | | |
| Laguna WD | | D706 | 0.8 | | | | | |
| Eagle Field WD | | D706 | 4.6 | | | | | |
| Mercy Springs WD | | D706 | 2.8 | | | | | |
| Oro Loma WD | | D706 | 4.6 | | | | | |
| Total | | D706 | 84.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | |
| Upper DMC Exchange Contractors | Lower DMC Volta | D707 | | | | | | |
| Central California ID | | D707 | | | 140.0 | | | |

Table 3. CVP South of Delta Contract Amounts as modeled in CSII (cont.)

| CVP CONTRACTOR | Geographic Location | CALSIM II Diversion Arc | CVP Water Service Contracts (TAF/yr) | | Settlement / Exchange Contractor (TAF/yr) | Water Rights / Non-CVP (TAF/yr) | Level 2 Refuges (TAF/yr) | Losses (TAF/yr) |
|---|---|---|---|---|---|---|---|---|
| | | | AG | M&I | | | | |
| Grasslands via CCID | Lower DMC Volta | D708 | | | | | 81.8 | |
| Los Banos WMA | | D708 | | | | | 11.2 | |
| Kesterson NWR | Lower DMC Volta | D708 | | | | | 10.5 | |
| Freitas - SJBAP | | D708 | | | | | 6.3 | |
| Salt Slough - SJBAP | | D708 | | | | | 8.6 | |
| China Island - SJBAP | | D708 | | | | | 7.0 | |
| Volta WMA | | D708 | | | | | 13.0 | |
| Grassland via Volta Wasteway | | D708 | | | | | 23.2 | |
| Total | | D708 | 0.0 | 0.0 | 140.0 | 0.0 | 161.5 | 0.0 |
| | | | | | | | | |
| Fresno Slough WD | San Joaquin River at Mendota Pool | D607A | 4.0 | | | 0.9 | | |
| James ID | | D607A | 35.3 | | | 9.7 | | |
| Coelho Family Trust | | D607A | 2.1 | | | 1.3 | | |
| Tranquility ID | | D607A | 13.8 | | | 20.2 | | |
| Tranquility PUD | | D607A | 0.1 | | | 0.1 | | |
| Reclamation District 1606 | | D607A | 0.2 | | | 0.3 | | |
| Exchange Contractors | | D607B | | | | | | |
| Central California ID | | D607B | | | 392.4 | | | |
| Columbia Canal Co. | | D607B | | | 59.0 | | | |
| Firebaugh Canal Co. | | D607B | | | 85.0 | | | |
| San Luis Canal Co. | | D607B | | | 23.6 | | | |
| M.L. Dudley Company | | D607B | | | | 2.3 | | |
| Grasslands WD | | D607C | | | | | 29.0 | |
| Mendota WMA | | D607C | | | | | 27.6 | |
| Losses | | D607D | | | | | | 101.5 |
| Total | | D607 | 55.5 | 0.0 | 560.0 | 34.8 | 56.6 | 101.5 |
| | | | | | | | | |
| Exchange Contractors | San Joaquin River at Sack Dam | D608B | | | | | | |
| San Luis Canal Co. | | D608B | | | 140.0 | | | |
| Grasslands WD | | D608C | | | | | 2.3 | |
| Los Banos WMA | | D608C | | | | | 12.4 | |
| San Luis NWR | | D608C | | | | | 19.5 | |
| West Bear Creek NWR | | D608C | | | | | 7.5 | |
| East Bear Creek NWR | | D608C | | | | | 8.9 | |
| Total | | D608 | 0.0 | 0.0 | 140.0 | 0.0 | 50.6 | 0.0 |

Table 3. CVP South of Delta Contract Amounts as modeled in CSII (cont.)

| CVP CONTRACTOR | Geographic Location | CALSIM II Diversion Arc | CVP Water Service Contracts (TAF/yr) | | Settlement / Exchange Contractor (TAF/yr) | Water Rights / Non-CVP (TAF/yr) | Level 2 Refuges (TAF/yr) | Losses (TAF/yr) |
|---|---|---|---|---|---|---|---|---|
| | | | AG | M&I | | | | |
| San Benito County WD (Ag) | San Felipe | D710 | 35.6 | | | | | |
| Santa Clara Valley WD (Ag) | | D710 | 33.1 | | | | | |
| Pajaro Valley WD | | D710 | 6.3 | | | | | |
| San Benito County WD (M&I) | | D711 | | 8.3 | | | | |
| Santa Clara Valley WD (M&I) | | D711 | | 119.4 | | | | |
| Total | | D710/D711 | 74.9 | 127.7 | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | |
| San Luis WD | CA reach 3 | D833 | 60.1 | | | | | |
| CA, State Parks and Rec | | D833 | 2.3 | | | | | |
| Affonso/Los Banos Gravel Co. | | D833 | 0.3 | | | | | |
| Total | | D833 | 62.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | |
| Panoche WD | CVP Dos Amigos PP/ CA reach 4 | D835 | 87.4 | | | | | |
| Pacheco WD | | D835 | 10.1 | | | | | |
| Total | | D835 | 97.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | |
| Westlands WD (Centinella WD) | CA reach 4 | D836 | 2.5 | | | | | |
| Westlands WD (Broadview WD) | | D836 | 27.0 | | | | | |
| Westlands WD (Mercy Springs WD) | | D836 | 4.2 | | | | | |
| Westlands WD (Widern WD) | | D836 | 3.0 | | | | | |
| Total | | D836 | 36.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | |
| Westlands WD: CA Joint Reach 4 | CA reach 4 | D837 | 219.0 | | | | | |
| Westlands WD: CA Joint Reach 5 | CA reach 5 | D839 | 570.0 | | | | | |
| Westlands WD: CA Joint Reach 6 | CA reach 6 | D841 | 219.0 | | | | | |
| Westlands WD: CA Joint Reach 7 | CA reach 7 | D843 | 142.0 | | | | | |
| Total | | | 1150.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | |
| Avenal, City of | CA reach 7 | D844 | | 3.5 | | 3.5 | | |
| Coalinga, City of | | D844 | | 10.0 | | | | |
| Huron, City of | | D844 | | 3.0 | | | | |
| Total | | D844 | 0.0 | 16.5 | 0.0 | 3.5 | 0.0 | 0.0 |

Table 3. CVP South of Delta Contract Amounts as modeled in CSII (cont.)

| CVP CONTRACTOR | Geographic Location | CALSIM II Diversion Arc | CVP Water Service Contracts (TAF/yr) | | Settlement / Exchange Contractor (TAF/yr) | Water Rights / Non-CVP (TAF/yr) | Level 2 Refuges (TAF/yr) | Losses (TAF/yr) |
|---|---|---|---|---|---|---|---|---|
| | | | AG | M&I | | | | |
| CA Joint Reach 3 - Loss | CVP Dos Amigos PP/CA reach 3 | D834 | | | | | | 2.5 |
| CA Joint Reach 4 - Loss | CA reach 4 | D838 | | | | | | 10.1 |
| CA Joint Reach 5 - Loss | CA reach 5 | D840 | | | | | | 30.1 |
| CA Joint Reach 6 - Loss | CA reach 6 | D842 | | | | | | 12.5 |
| CA Joint Reach 7 - Loss | CA reach 7 | D845 | | | | | | 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 | | D855 | 3.0 | | | | | |
| Hills Valley ID-Amendatory | | D855 | 3.3 | | | | | |
| Kern-Tulare WD | | D855 | 40.0 | | | | | |
| Lower Tule River ID | | D855 | 31.1 | | | | | |
| Pixley ID | | D855 | 31.1 | | | | | |
| Rag Gulch WD | | D855 | 13.3 | | | | | |
| Tri-Valley WD | | D855 | 1.1 | | | | | |
| Tulare, County of | | D855 | 5.3 | | | | | |
| Kern NWR | | D856 | | | | | 11.0 | |
| Pixley NWR | | D856 | | | | | 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 | 281.1 | 183.7 |

Table 4. SWP North of Delta Contract Amounts as modeled in CSII

| SWP CONTRACTOR | Geographic Location | CALSIM II Diversion Arc | FRSA Amount (TAF) | Water Right (TAF/yr) | Table A Amount (TAF) | | Article 21 Demand (TAF/mon) | Other (TAF/yr) |
|---|---|---|---|---|---|---|---|---|
| | | | | | Ag | M&I | | |
| **Feather River** | | | | | | | | |
| Palermo | FRSA | D6 | | 17.6 | | | | |
| | | | | | | | | |
| County of Butte | Feather River | D201 | | | | 27.5 | | |
| Thermalito | FRSA | D202 | | 8.0 | | | | |
| Western Canal | FRSA | D7A | 150.0 | 145.0 | | | | |
| Joint Board | FRSA | D7B | 550.0 | 5.0 | | | | |
| | | | | | | | | |
| City of Yuba City | Feather River | D204 | | | | 9.6 | | |
| | | | | | | | | |
| Feather WD | FRSA | D206A | 17.0 | | | | | |
| Garden, Oswald, Joint Board | FRSA | D206B | | | | | | |
| Garden | FRSA | D206BA | 12.9 | 5.1 | | | | |
| Oswald | FRSA | D206BB | 2.9 | | | | | |
| Joint Board | FRSA | D206BC | 50.0 | | | | | |
| Plumas, Tudor | FRSA | D206C | | | | | | |
| Plumas | FRSA | D206CA | 8.0 | 6.0 | | | | |
| Tudor | FRSA | D206CB | 5.1 | 0.2 | | | | |
| Rice Decom | FRSA | D7C | 291.1 | | | | | |
| Total Feather River Area | | | 1086.9 | 186.9 | 0.0 | 37.1 | | |
| | | | | | | | | |
| **Other** | | | | | | | | |
| Yuba County Water Agency | Yuba River | D230 | | | | | | Variable 296.3 |
| Camp Far West ID | Yuba River | D285 | | | | | | 12.6 |
| Bear River Exports | American R/DSA70 | D283 | | | | | | Variable 95.2 |
| Feather River Exports to American River | American R/DSA70 | D223 | | 11.0 | | | | |

Table 5. SWP Delta Contract Amounts as modeled in CSII

| SWP CONTRACTOR | Geographic Location | CALSIM II Diversion Arc | Water Right (TAF/yr) | SWP Table A Amount (TAF) | | SWP Article 21 Demand (TAF/mon) | CVP Water Service Contracts (TAF/yr) | |
|---|---|---|---|---|---|---|---|---|
| | | | | Ag | M&I | | AG | M&I |
| | | | | | | | | |
| **North Delta** | | | | | | | | |
| City of Vallejo | City of Vallejo | D403A | | | | | | 16.0 |
| CCWD | Contra Costa County | D420 | | | | | | 195.0 |
| Napa County FC&WCD | North Bay Aqueduct | D403B | | | 29.02 | 2.0 | | |
| Solano County WA | North Bay Aqueduct | D403C | | | 47.76 | | | |
| Fairfield, Vacaville and Benicia Agreement | North Bay Aqueduct | D403D | 31.60 | | | | | |
| City of Antioch | City of Antioch | D406B | 18.0 | | | | | |
| Total North Delta | | | 49.6 | 0.0 | 76.78 | 2.0 | 0.0 | 211.0 |
| | | | | | | | | |
| **South Delta** | | | | | | | | |
| Delta Water Supply Project | City of Stockton | D514A | 32.4 | | | | | |
| Total South Delta | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | | | | | | | | |
| Total | | | 82.0 | 0.0 | 76.78 | 2.0 | 0.0 | 211.0 |

Table 6. SWP South of Delta Contract Amounts as modeled in CSII

| SWP CONTRACTOR | Geographic Location | CALSIM II Diversion Arc | Table A Amount (TAF) Ag | Table A Amount (TAF) M&I | Article 21 Demand (TAF/mon) | Losses (TAF/yr) |
|---|---|---|---|---|---|---|
| Alameda Co. FC&WCD, Zone 7 | SBA reaches 1-4 | D810 | | 80.62 | 1.00 | |
| | SBA reaches 5-6 | D813 | | | None | |
| | | Total | | 80.62 | 1.00 | |
| | | | | | | |
| Alameda County WD | SBA reaches 7-8 | D814 | | 42.00 | 1.00 | |
| Santa Clara Valley WD | SBA reach 9 | D815 | | 100.00 | 4.00 | |
| Oak Flat WD | CA reach 2A | D802 | 5.70 | | None | |
| County of Kings | CA reach 8C | D847 | 9.31 | | None | |
| Dudley Ridge WD | CA reach 8D | D849 | 45.35 | | 1.00 | |
| Empire West Side ID | CA reach 8C | D846 | 3.00 | | 1.00 | |
| | | | | | | |
| Kern County Water Agency | CA reaches 3, 9-13B | D851 | 566.03 | 134.60 | None | |
| | CA reaches 14A-C | D859 | 66.25 | | 180.00 | |
| | CA reaches 15A-16A | D863 | 133.52 | | None | |
| | CA reach 31A | D867 | 82.33 | | None | |
| | | Total | 848.13 | 134.60 | 180.00 | |
| | | | | | | |
| Tulare Lake Basin WSD | CA reaches 8C-8D | D848 | 87.47 | | 15.00 | |
| San Luis Obispo Co. FC&WCD | CA reaches 33A-35 | D869 | | 25.00 | None | |
| Santa Barbara Co. FC&WCD | CA reach 35 | D870 | | 45.49 | None | |
| Antelope Valley-East Kern WA | CA reaches 19-20B, 22A-B | D877 | | 144.84 | 1.00 | |
| | | | | | | |
| Castaic Lake WA | CA reach 31A | D868 | 12.70 | | 1.00 | |
| | CA reach 30 | D896 | | 82.50 | None | |
| | | Total | 12.70 | 82.50 | 1.00 | |
| | | | | | | |
| Coachella Valley WD | CA reach 26A | D883 | | 138.35 | 2.00 | |
| Crestline-Lake Arrowhead WA | CA reach 24 | D25 | | 5.80 | None | |
| Desert WA | CA reach 26A | D884 | | 55.57 | 5.00 | |
| Littlerock Creek ID | CA reach 21 | D879 | | 2.30 | None | |
| Mojave WA | CA reaches 19, 22B-23 | D881 | | 85.80 | None | |

Table 6. SWP South of Delta Contract Amounts as modeled in CSII (cont.)

| SWP CONTRACTOR | Geographic Location | CALSIM II Diversion Arc | Table A Amount (TAF) Ag | Table A Amount (TAF) M&I | Article 21 Demand (TAF/mon) | Losses (TAF/yr) |
|---|---|---|---|---|---|---|
| Metropolitan WDSC | CA reach 26A | D885 | | 1911.50 | 90.70 | |
| | CA reach 30 | D895 | | | 74.80 | |
| | CA reaches 28G-H | D899 | | | 27.60 | |
| | CA reach 28J | D27 | | | 6.90 | |
| | | Total | | 1911.50 | 200.00 | |
| | | | | | | |
| Palmdale WD | CA reaches 20A-B | D878 | | 21.30 | None | |
| San Bernardino Valley MWD | CA reach 26A | D886 | | 102.60 | None | |
| San Gabriel Valley MWD | CA reach 26A | D887 | | 28.80 | None | |
| San Gorgonio Pass WA | CA reach 26A | D888 | | 17.30 | None | |
| | | | | | | |
| Ventura County FCD | CA reach 29H | D28 | | 3.15 | None | |
| | CA reach 30 | D29 | | 16.85 | None | |
| | | Total | | 20.00 | | |
| | | | | | | |
| SWP Losses | CA reaches 1-2 | D803 | | | | 7.70 |
| | SBA reaches 1-9 | D816 | | | | 0.60 |
| | CA reach 3 | D824 | | | | 10.80 |
| | CA reach 4 | D826 | | | | 2.60 |
| | CA reach 5 | D827 | | | | 3.90 |
| | CA reach 6 | D828 | | | | 1.20 |
| | CA reach 7 | D829 | | | | 1.60 |
| | CA reaches 8C-13B | D854 | | | | 11.90 |
| | Wheeler Ridge PP and CA reaches 14A-C | D862 | | | | 3.60 |
| | Chrisman PP and CA reaches 15A-18A | D864 | | | | 1.80 |
| | Pearblossom PP and CA reaches 17-21 | D880 | | | | 5.10 |
| | Mojave PP and CA reaches 22A-23 | D882 | | | | 4.00 |
| | REC and CA reaches 24-28J | D889 | | | | 1.40 |
| | CA reaches 29A-29F | D891 | | | | 1.90 |
| | Castaic PWP and CA reach 29H | D893 | | | | 3.10 |
| | REC and CA reach 30 | D894 | | | | 2.40 |
| Total | | | | | | 63.60 |
| | | | | | | |
| Total | | | 1011.66 | 3044.37 | 412.00 | 63.6 |

**Key:**

ACOE = Army Corps of Engineers
Ag = agricultural
BDCP = Bay-Delta Conservation Plan
BO = Biological Opinion
CALFED = CALFED Bay-Delta Program
CCWD = Contra Costa Water District
cfs = cubic feet per second
CVP = Central Valley Project
CVPIA = Central Valley Project Improvement Act
D-xxxx = Water Right Decision
CDFW = California Department of Fish and Game
DMC = Delta-Mendota canal
DWR = California Department of Water Resources
EBMUD = East Bay Municipal Utility District
EIS = Environmental Impact Statement
FC&WSD = Flood Control and Water Service District
FERC = Federal Energy Regulatory Commission
FRSA = Feather River Service Area
FRWP = Freeport Regional Water Project
FWS = Fish and Wildlife Service
KCWA = Kern County Water Agency
LYRA = Lower Yuba River Accord
MAF/yr = million acre-feet per year
M&I = municipal and industrial
MWD = Metropolitan Water District
NAA = No Action Alternative
NEPA = National Environmental Policy Act
NMFS = National Marine Fisheries Service
NPS = National Park Service
PCWA = Placer County Water Agency
PP = Pumping Plant
Reclamation = United States Department of the Interior, Bureau of Reclamation
ROD = Record of Decision
SBA = South Bay Aqueduct
SWP = State Water Project
SWRCB = State Water Resources Control Board
TAF = thousand acre-feet
TAF/month = thousand acre-feet per month
TAF/yr = thousand acre-feet per year
USFWS = United States Fish and Wildlife Service
VAMP = Vernalis Adaptive Management Plan
WR = water right
yr = year

# Appendix A-2: List of files that change between the 2017 DCR and the CM3

**BASE STUDY:** DCR 2017 Existing Conditions
**ALTERNATIVE STUDY:** CM3 2019

| Document Name | Type | Folder Name | Status | Component |
|---|---|---|---|---|
| mainCONV_SA | wresl | .\CONV\Run | Modified | Added cycles Delta_Srpls and Delta to implement 2018 COA Addendum operations<br><br>Updated files references, as needed, to implement the code updates<br><br>(CCWD Delta Island Water Transfers) Re-activated the Delta Island water transfers to CCWD |
| mainCONVWSI | wresl | .\CONV\Run | Modified | |
| 2020D09ESV | dss | .\common\DSS | Modified | See *Changes in Model Inputs* |
| 2020D09EINIT | dss | .\common\DSS | Modified | |
| wsi_di_swp | table | .\CONV\Run\Lookup | Modified | Retrained WSI-DI |
| wsi_di_cvp_sys | table | .\CONV\Run\Lookup | Modified | |
| april_may_maxexport | wresl | .\common\Export_Ops | Modified | (COA Addemdum 2018) New sharing ratio for inbasin uses with storage withdrawals under balanced conditions and new sharing ration for exports when exports are constrained according to the December 2018 Coordinated Operation Agreement Addemdum. |
| EXP_constraint | wresl | .\common\Export_Ops | Modified | |
| OMR_constraint | wresl | .\common\Export_Ops\OMR | Modified | |
| coa_BO | wresl | .\CONV\Run\COA | Modified | |
| coa | wresl | .\CONV\Run\COA | Modified | Activated OMR Flow Health and Safety (H&S) requirement |
| coa_PRESETUP | wresl | | Modified | |
| april_may_maxexport_BO | wresl | .\common\Export_Ops | New | |
| SharingRatios_BO | wresl | .\CONV\Run\COA | New | |
| coa_DELTA_SRPLS | wresl | .\CONV\Run\COA | New | |
| EXP_constraint_DELTA_SRPLS | wresl | .\common\Export_Ops | New | |
| SharingRatios | wresl | .\CONV\Run\COA | New | |
| DELTA_RPA2_DELTA_SRPLS | wresl | .\common\Export_Ops | New | |
| OMR_constraint_DELTA_SRPLS | wresl | .\common\Export_Ops\OMR | New | |
| ShrngRatios | table | .\CONV\Run\Lookup | New | |
| delcar_cvp_s | wresl | .\CONV\Run\DeliveryLogic | Modified | (Reclamation Updates) Updated CVP SOD allocation |
| cvprule | wresl | .\common\Rulecurve | Modified | |
| ExportEstimate_CVP | table | .\CONV\Run\Lookup | Modified | |
| EstCvpExpSAdj | wresl | .\common\cvp_dellogic\cvp_dellogic_sys | Modified | |
| EstExpCVP | table | .\CONV\Run\Lookup | New | |
| SeasCVPSODdem | table | .\CONV\Run\Lookup | New | |
| NimbusPower | wresl | .\common\NorthOfDelta\American | Modified | (Reclamation Updates) Update the amount of water that can go through the powerplant to 5,500 cfs (prev 5,000 cfs) |
| KeswickPower | wresl | .\common\NorthOfDelta\Sacramento | Modified | (Reclamation Updates) Update the amount of water that can go through the powerplant to 16,000 cfs (prev 15,000 cfs) |
| wytypes | table | .\CONV\Run\Lookup | Modified | (Reclamation Updates) TUCP "DriestYrs" (All 0's, so TUCP logic is off) |

| Document Name | Type | Folder Name | Status | Component |
|---|---|---|---|---|
| friant_rain_fld_est | wresl | .\common\SanJoaquin\Friant | Modified | (Reclamation Updates) removed the initial condition of compute_rain_rel |
| trinity_import | table | .\CONV\Run\Lookup | Modified | (Reclamation Updates) Reduce Trinity Import |
| export_ops1 | wresl | .\common\Export_Ops | Modified | (Reclamation Updates) no longer call jul_sep_prefer_td_exp.wresl since this is not a CWF run |
| sum_cvp_reduced_dem | wresl | .\common\cvp_dellogic\cvp_dellogic_sys\demands_sys | Modified | (Reclamation Updates) Name change (perdel_cvpex_s instead of perdel_cvpex_sys) |
| lastX2_ANN | wresl | .\common\Delta\Mrdo\X2 | Modified | (Reclamation Updates) Name change (_NDS updated to _MOD) |
| X2req_KM | wresl | .\common\Delta\Mrdo\X2 | Modified | |
| NODOS_div_x2limit | wresl | .\common\NorthOfDelta\Sacramento\NODOS\WQ | Modified | |
| demands_69 | wresl | .\common\hydrology\DEMANDS | Modified | (Reclamation Updates) Moved Feather River Service Area (FRSA) Winter Water Allocation to feather_special |
| FMStandard | wresl | .\common\NorthOfDelta\American | Modified | (Reclamation Updates) Minor change (using more accurate reservoir level instead of number) |
| SJR_restrict | wresl | .\common\SanJoaquin\Various\definitions | Modified | (Reclamation Updates) Minor change (split high flows between Mendota pool and Chowchilla bypass) |
| reopcontinuity | wresl | .\common\ReOperations | Modified | (Reclamation Updates) Minor change (goal zeroReopSurp_Bal should fix ReopSurp_Bal_Err not Reop_Rel_Bal_Err); adds some float to balance at Hood (999999 penalty for any float) |
| B2Action3 | wresl | .\common\B2Actions | Modified | (Reclamation Updates) Minor change (adds an integer check and corrects the location of a parenthesis) |
| CvpSysDeliveryLogicCycle1 | wresl | .\CONV\Run\DeliveryLogic | Deleted | (Reclamation Updates) Merged Files and correction to the CVP allocation logic during high Shasta storage conditions |
| CvpSDeliveryLogicCycle1 | wresl | .\CONV\Run\DeliveryLogic | Deleted | |
| cvpcut_s | wresl | .\CONV\Run\DeliveryLogic | Deleted | |
| cvpcut | wresl | .\CONV\Run\DeliveryLogic | Modified | |
| CvpDeliveryLogicCycle1 | wresl | .\CONV\Run\DeliveryLogic | New | |
| ShastaNCPlevel | table | .\CONV\Run\Lookup | New | (Reclamation Updates) Logic to allow flexibilities to Sacramento Navigation Control Point (NCP) flow based on Shasta storage |
| SouthernSJR_dems | wresl | .\common\SanJoaquin\SouthernSJR | Modified | (Reclamation Updates) Friant delivery to Exchange Contractors; Comments (new logic commented out in development) |
| Weight-table | wresl | .\CONV\Run\System\SystemTables_ALL | Modified | (Reclamation Updates) Friant delivery to Exchange Contractors |
| shortage_cvp_s | wresl | .\common\SHORTAGE | Modified | |
| friant_delivery | wresl | .\common\SanJoaquin\Friant | Modified | |
| friant_wsf | wresl | .\common\SanJoaquin\Friant | Modified | |
| SJR_ChannelSplits | wresl | .\common\SanJoaquin\Various\definitions | Modified | |
| Weight-table | wresl | .\common\System\SystemTables_SJR | Modified | |
| friant_operation | wresl | .\common\SanJoaquin\Friant | Modified | |
| friant_allocation | wresl | .\common\SanJoaquin\Friant | Modified | |
| Exchange_Monthly_Demand | table | .\CONV\Run\Lookup | New | |
| Delivery-table | wresl | .\common\System\SystemTables_SJR | Modified | |
| Connectivity-table | wresl | .\common\System\SystemTables_SJR | Modified | |
| Weight-table | wresl | .\CONV\Run\System\SystemTables_ALL | Modified | (Reclamation Updates) Friant delivery to Exchange Contractors<br><br>(Reclamation Updates) New weight to encourage C6_Rem (units 2, 4, and 6 instead of the river valve); New weight on D8_ed PRJ |

| Document Name | Type | Folder Name | Status | Component |
|---|---|---|---|---|
| tot_del_CVP_n | wresl | .\common\wsi_di_gen\CVP | Modified | (Reclamation Updates) Folsom disaggregation |
| demands_70 | wresl | .\common\hydrology\DEMANDS | Modified | |
| shortage_cvp_n | wresl | .\common\SHORTAGE | Modified | |
| ncp_with_relax | table | .\CONV\Run\Lookup | Modified | (Reclamation Updates) Flexibilities to Sacramento Navigation Control Point (NCP) flow based on Shasta storage |
| ncp_relax | wresl | .\common\NorthOfDelta\Sacramento | Modified | |
| ReOpsVarDefine | wresl | .\common\ReOperations | Modified | (Reclamation Updates) defines the float variables used in reopcontinuity |
| Cycle1thru5SystemDefsLocal | wresl | .\common | Modified | (Reclamation Updates) Defines D418 for Cycles 1-5 |
| wytypes | wresl | .\common\Wytypes | Modified | (Reclamation Updates) Defines a wyt_Driest to implement TUCPs (unused in COS) |
| American_PRJ_WR | table | .\CONV\Run\Lookup | Modified | (Reclamation Updates) Comment change; name change (PCWASac updated to PCWAFol) |
| BaseStudyResults | wresl | .\CONV\Run\BaseStudyResults | Modified | (Reclamation Updates) B2 preprocessed flows removed |
| Trinitymin | wresl | .\common\NorthOfDelta\Trinity | Modified | (Reclamation Updates) 50 TAF Trinity River Fall Flow |
| CalSimConnection_PreSetup | wresl | .\common\CCWD | New | (Reclamation Updates) Re-activated the Delta Island water transfers to CCWD. |
| Kellogg_Creek_Inflow | table | .\CONV\Run\Lookup | New | |
| LV_evaporation | table | .\CONV\Run\Lookup | New | |
| LV_Precipitation | table | .\CONV\Run\Lookup | New | |
| CalSimConnection | wresl | .\common\CCWD | Modified | |
| CCWD_flow_disaggregation | wresl | .\common\CCWD\CCWD_Ops | Modified | |
| IO_Accounting | wresl | .\common\CCWD\LVE | Modified | |
| Inflow-table | wresl | .\common\CCWD\system | Modified | |
| Reservoir-table | wresl | .\common\CCWD\system | Modified | |
| CCWD_ann_demand | table | .\CONV\Run\Lookup | Modified | |
| delcar_swp | wresl | .\CONV\Run\DeliveryLogic | Modified | (DWR Updates) Update SWP carryover to 1.3 MAF; removed some aliases |
| delcar_swp | wresl | .\common\swp_dellogic\WSI_DI | Modified | |
| OroRuleCurv | wresl | .\common\NorthOfDelta\Feather | Modified | (DWR Updates) Update SWP carryover to 1.3 MAF |
| ExportEstimate1_B2 | wresl | .\common\Delta\Ann | Modified | |
| ExportEstimate1 | wresl | .\common\Delta\Ann | Modified | |
| feather_special | wresl | .\common\NorthOfDelta\Feather | Modified | (DWR Updates) Oroville Carryover to 1.3 MAF (prev 1.0 MAF); updates C6_valve to 4,000 cfs (from 1,500 cfs); moved Feather River Service Area (FRSA) Winter Water Allocation from Demands_69 and implements a hard cutoff of delivery based on storage |
| BanksLimits | table | .\CONV\Run\Lookup | Modified | (DWR Updates) Max monthly pumping capacity (Permit Cap 2) previously set 8,500 cfs. Recent 2017 operations confirmed sustained 10,300 cfs pumping over a month can occur |
| SoDeltaChannels | wresl | .\common\Delta\SoDeltaChannels | Modified | (Head of Old River Barrier) HORB operable gates activated in April – May when San Joaquin River flow is less than 10,000 CFS. |
| FRENotch_OnOff | table | .\CONV\Run\Lookup | Modified | (No Effect) - changes in the description |
| WIIN_wetness | table | .\CONV\Run\Lookup | New | (No Effect) - not used (deactivated the WIIN in the OMR_PA.wresl file) |
| wsi_di_cvp_sys.retrain1022 | table | .\CONV\Run\Lookup | New | (No Effect) - WSI-DI retraining |
| returns_nod | wresl | .\common\hydrology\RETURNS | Modified | (No Effect) - White space/removed comments |
| RockSlough_data | wresl | .\common\Delta\Ann | Modified | (No Effect) - white space only |
| X2setup_ANN_FWS | wresl | .\common\Delta\Mrdo\X2 | Modified | |
| FWS_SMELT_BO | wresl | .\common\Export_Ops\OMR | Modified | |

| Document Name | Type | Folder Name | Status | Component |
|---|---|---|---|---|
| delta-outflow | wresl | .\common\Delta\Mrdo\Delta-outflow | Modified | (No Effect) - TUCP logic (unused in COS since the Wytypes.table does not turn on "DriestYrs") |
| JerseyPoint_data | wresl | .\common\Delta\Ann | Modified | |
| riovista | wresl | .\common\Delta\Riovista | Modified | |
| Emmaton_data | wresl | .\common\Delta\Ann | Modified | |
| X2days_FWS | wresl | .\common\Delta\Mrdo\X2 | Modified | |
| X2days_WQCP | wresl | .\common\Delta\Mrdo\X2 | Modified | |
| TUCP_est | wresl | .\common | New | |
| demands | wresl | .\common\hydrology\DEMANDS | Modified | (No Effect) - Removed comments |
| X2setup_ANN | wresl | .\common\Delta\Mrdo\X2 | Modified | |
| wq_defs_Disag | wresl | .\common\SanJoaquin\WaterQuality | Modified | |
| wytypeSJR_Rest | table | .\CONV\Run\Lookup | Deleted | (No Effect) - not used in DCR17 (excess file) |
| SJRR_Rest_BUFF | wresl | .\common\SanJoaquin\Friant | Deleted | |
| EBMUD_CVP | wresl | .\common\SanJoaquin\Friant | Deleted | |
| cvpcut_sys | wresl | .\common\cvp_dellogic\cvp_dellogic_sys\cvpcut_sys | Modified | (No Effect) - not used in COS (excess file) |
| OMR_RV_DXC_balance_calcs | wresl | .\common\Delta\Xchannel | New | |
| xc-gates-rv | wresl | .\common\Delta\Xchannel | New | |
| cvpcut_jmg | wresl | .\CONV\Run\DeliveryLogic | New | |
| cvpcut_1004 | wresl | .\CONV\Run\DeliveryLogic | New | |
| TrinRuleCurvEWA | wresl | .\common\NorthOfDelta\Trinity | Deleted | (No Effect) - No longer operating to EWA (not used in DCR17) |
| ShaRuleCurvEWA | wresl | .\common\NorthOfDelta\Sacramento | Deleted | |
| FolRuleCurvEWA | wresl | .\common\NorthOfDelta\American | Deleted | |
| OroRuleCurvEWA | wresl | .\common\NorthOfDelta\American | Deleted | |
| EwaPurchase | table | .\CONV\Run\Lookup | Deleted | |
| EwaAllocPurch | table | .\CONV\Run\Lookup | Deleted | |
| NegCarriageOpsLimit | wresl | .\common\Delta\Ann | Modified | (No Effect) - Comment change (new logic commented out while in development) |
| WTS_Stage1_Targets | table | .\CONV\Run\Lookup\WSIDItraining | Modified | (No Effect) - Comment change |
| Collins_data | wresl | .\common\Delta\Ann | Modified | (No Effect) - Changed names to be more accurate |
| mrdo_ANN | wresl | .\common\Delta\Mrdo | Modified | (No Effect) - Capitalization |
| nod | wresl | .\common\NorthOfDelta | Modified | |
| SwpDeliveryLogic | wresl | .\CONV\Run\DeliveryLogic | Modified | |

# Appendix A-3: List of model inputs that change between the 2017 DCR and the CM3

**BASE STUDY:** DCR 2017 Existing Conditions
**ALTERNATIVE STUDY:** CM3 2019

| Variable Name | Type | DSS File Name | Status | Component |
|---|---|---|---|---|
| NDO_NDS | Timeseries | Init.dss | Deleted | (Reclamation Updates) Name Changed to NDO_MOD |
| X2_PRV_NDS | Timeseries | Init.dss | Deleted | (Reclamation Updates) Name Changed to X2_PRV_MOD |
| NDO_MOD | Timeseries | Init.dss | New | (Reclamation Updates) Name Changed |
| X2_PRV_MOD | Timeseries | Init.dss | New | |
| CON_114GCID | Timeseries | SV.dss | Modified | (Reclamation Updates) Updated Settlement CVP Contractor Demands |
| CON_131SC | Timeseries | SV.dss | Modified | |
| CON_14301SC | Timeseries | SV.dss | Modified | |
| CON_14501SC | Timeseries | SV.dss | Modified | |
| CON_18301SC | Timeseries | SV.dss | Modified | |
| CUAW_131SC | Timeseries | SV.dss | Modified | |
| CUAW_14301GCID | Timeseries | SV.dss | Modified | |
| CUAW_14301SC | Timeseries | SV.dss | Modified | |
| CUAW_14501GCID | Timeseries | SV.dss | Modified | |
| CUAW_14501SC | Timeseries | SV.dss | Modified | |
| CUAW_18301SC | Timeseries | SV.dss | Modified | |
| DEM_D167A_WR_ANN | Timeseries | SV.dss | Modified | (Reclamation Updates) Folsom disaggregation |
| DEM_D300_WR_ANN | Timeseries | SV.dss | Modified | |
| DEM_D8F_WR_ANN | Timeseries | SV.dss | Modified | |
| DEM_D8I_PMI_ANN | Timeseries | SV.dss | Modified | |
| DEM_DSA70_PMI | Timeseries | SV.dss | Modified | |
| PRJ_DR70_IMI | Timeseries | SV.dss | Modified | |