

Operations & Engineering Workgroup

April 8, 2026



Agenda

1.1 Modeling updates to CALSIM 3 Reservoir Operations including revised North of Delta Operations

Engineering and Construction Manager's Report

Agenda Item 1.1

CalSim 3 Modeling

Ali Forsythe / Chad Whittington / Wes Walker



CalSim 3 Assumptions - Baseline

- 2024 BiOp with:
 - No Healthy Rivers & Landscapes
 - No Fall X2 (per Action 5 amendment to the 2024 BiOp)
 - Daily flow estimates in the Upper Sacramento River to more accurately determine weir spills into the Sutter Bypass and Yolo Bypass
- 2040 median hydrology with 15cm sea-level rise
- Existing Facilities
- Projected land use based on recent historical
- Projected urban demands based on 2040 estimated in 2020 UWMPs

CalSim 3 Assumptions - Sites Project

- 1.47 MAF reservoir capacity
- Pre-Draft-Water-Right diversions
 - Diversion criteria from the 2024 ITP (summarized on next slide)
- Releases to SOD are implemented July-November through:
 - Dunnigan Pipeline (1,000 cfs capacity)
 - Exchanges with Oroville
 - Real-time exchanges with GCID

Member	Participation Level (TAF)
North-of-Delta PWA	177 TAF
South-of-Delta PWA	764 TAF
CVP OpFlex	226 TAF
State Prop 1	244 TAF

CalSim 3 Assumptions - Sites Project

Sites Modeling Diversion Criteria	
	2024 ITP
Diversion Season	October 1 – June 14
Funks diversion capacity	2,100 cfs
TRR diversion capacity	1,800 cfs & variable winter capacities
Flow Dependent Diversions	Diversions limited by flow at Bend Bridge and Hamilton City (per Section 9.14 of the Sites Ops ITP)
Wilkins Slough Bypass	10,930 cfs
Shasta Spring Pulse	Limit diversions in months with Shasta releases for Spring Pulse objectives
Bend Bridge Pulse	Not included
Balanced Conditions	No diversions when Delta is in Balanced conditions
Near Excess conditions	Limit diversions to not use first 3,000 cfs of Surplus Delta Outflow

NOD Operations Update

- Previous modeling included:
 - In-reservoir transfers from NOD members to SOD members
 - Water could be moved from the NOD account to the SOD account in May, and released from the SOD account during the transfer window (July-November)
 - Transfer water not tracked after being moved into the SOD account
 - NOD transfers limited to May
 - Risked limiting water supply utilization for NOD and SOD members
- Updated modeling includes:
 - Real-time transfers:
 - **NOD->NOD transfers:** Direct delivery from NOD account to a NOD demand (non-Sites Participant)
 - **NOD->SOD transfers:** Direct delivery from NOD account to a SOD demand (could be a Sites Participant or non-Sites)
 - Transfers are implemented by TCCA, GCID, and RD108

Sensitivity Analysis

- Objectives:
 - Demonstrate a range of transfer and delivery capability for NOD and SOD members
 - Evaluate limitations on the timing and magnitude of deliveries
- Scenario 1: **Baseline Operation**
 - For SOD members:
 - Focuses operations on providing dry year supplies
 - Includes limitation on SOD deliveries in W, AN, and BN years
 - Includes limitation on SOD deliveries when SWP Table A allocations are high
 - Includes limitation on off-pattern deliveries (October-November)
 - For NOD members:
 - Includes limitations on NOD->NOD transfers to allow for more NOD->SOD transfers
- Scenario 2: **Top Speed Operation**
 - For SOD members:
 - Focuses operations on moving Sites Water through Delta more aggressively
 - Removes limitation on SOD deliveries in W, AN, and BN years
 - Removes limitation on SOD deliveries when SWP Table A allocations are high
 - Removes limitations on off-pattern deliveries
 - For NOD members:
 - Relaxes limitations on the NOD->NOD transfers to achieve more account utilization

Modeling Assumptions – Sites Delivery to SOD Members

- **Baseline Operation:** delivery targets for SOD members are structured to incentivize deliveries in drier conditions, when water is more valuable per acre-foot
 - These rules typically lead to no deliveries in Wet years and limited deliveries in Above Normal and Below Normal years

SWP Table A Allocation	Delivery Target
< 65%	100% of SOD members' available storage supply
65% - 85%	50% of SOD members' available storage supply
> 85%	0 TAF

- **Top Speed Operation:** the above rules are excluded

Modeling Assumptions – NOD Transfers

- Only difference in NOD operations between **Baseline** and **Top Speed** is the range of months that NOD->NOD transfers are implemented

	Baseline Operation	Top Speed Operation
NOD->NOD Transfers		
Season	March-May	March-November
Water Year Types	W and AN	W and AN
Delta Conditions	Balanced	Balanced
NOD->SOD Transfers		
Season	July-November	July-November
Water Year Types	BN, D, and C	BN, D, and C
Delta Conditions	Balanced	Balanced

CalSim 3 Results – Project Releases & Transfers

Releases (TAF/year)	Baseline Operation		Top Speed Operation	
	Average	Dry & Critical	Average	Dry & Critical
North of Delta Members (includes American Cany.)	10	11	9	7
Total NOD Release for Transfers	28	19	37	8
Transfer release to NOD Demand	12	0	30	0
Transfer release to SOD Demand	16	19	6	8
South of Delta Members	115	200	136	183
CVP Operational Flexibility	33	79	33	79
Refuge Water Supply	49	51	49	51
Total Releases & Transfers	235	360	263	328

- Compared to Baseline, Top Speed includes:
 - Greater long-term average annual releases for NOD and SOD members, but less in Dry & Critical year types
 - Increase in total NOD account releases for delivery and transfers (38 TAF/yr to 45 TAF/yr), but less NOD->SOD transfers (16 TAF/yr to 6 TAF/yr) and less Dry & Critical year releases for delivery (11 TAF/yr to 7 TAF/yr) and for transfers (19 TAF/yr to 8 TAF/yr)
 - Increase of long-term release to SOD members from 115 to 136 TAF (21 TAF/yr)
 - Reduction in Dry & Critical delivery to SOD members from 200 to 183 TAF (-17 TAF/yr)

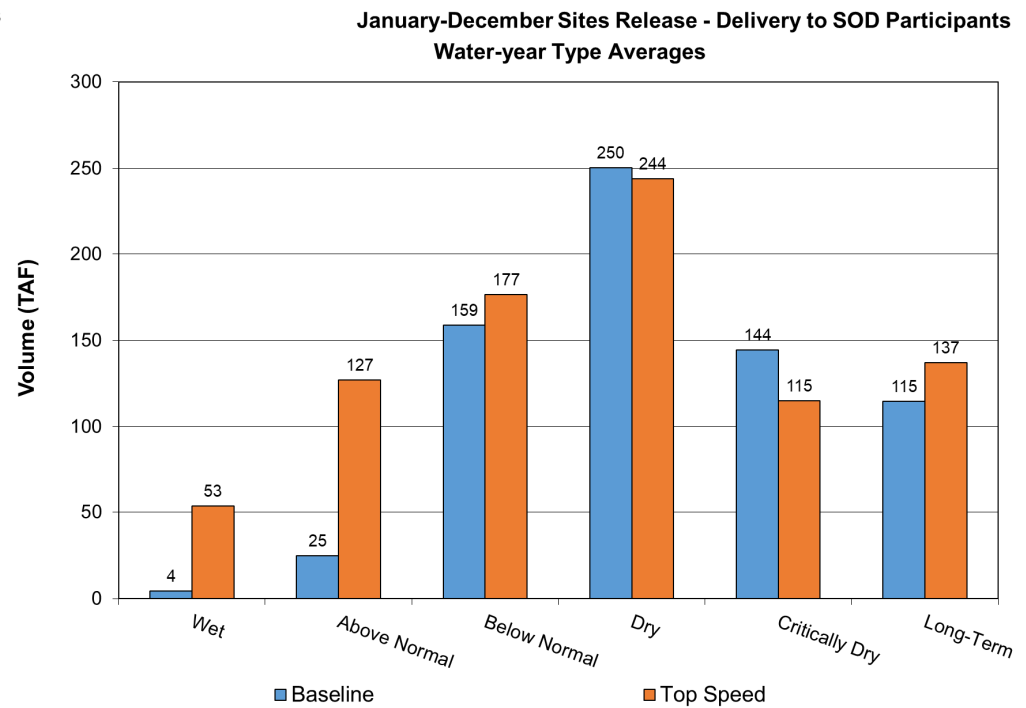
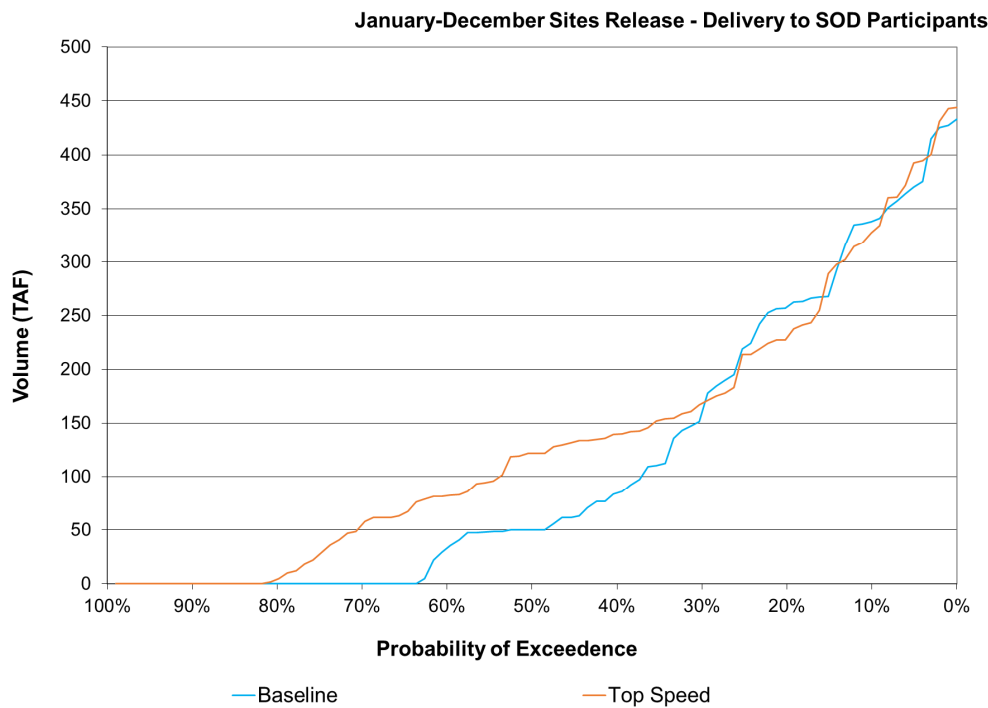
CalSim 3 Results – Project Deliveries & Transfers

Deliveries & Transfers (TAF/year)	Baseline Operation		Top Speed Operation	
	Average	Dry & Critical	Average	Dry & Critical
North of Delta Members (includes American Cany.)	10	11	9	7
Total NOD Transfer (end-point delivery)	23	15	35	6
Transfer to NOD Demand (end-point delivery)	12	0	30	0
Transfer to SOD Demand (end-point delivery)	12	15	5	6
South of Delta Members	84	150	97	138
CVP Operational Flexibility	32	79	31	80
Refuge Water Supply	38	42	38	42
NOD (Level 4)	13	15	13	15
SOD (Level 4)	26	27	25	26
Total Deliveries & Transfers	188	297	209	273

- Compared to Baseline, Top Speed includes:
 - Increase in total NOD account utilization (33 TAF/yr to 44 TAF/yr), at the expense of less NOD->SOD transfers (12 TAF/yr to 5 TAF/yr) and less Dry & Critical year transfers (15 TAF/yr to 6 TAF/yr)
 - Increase of long-term delivery to SOD members from 84 to 97 TAF (13 TAF/yr)
 - Reduction in Dry & Critical delivery to SOD members from 150 to 138 TAF (-12 TAF/yr)
 - Less competition between NOD->SOD transfers and SOD PWA releases for available capacity to, through, and beyond the Delta

CalSim 3 Results – SOD Releases

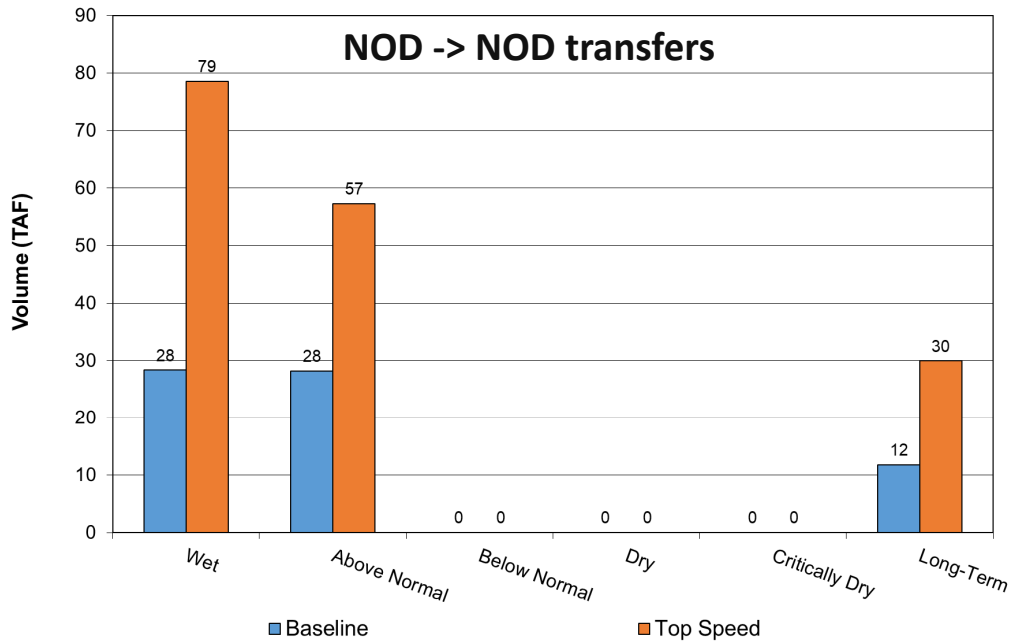
- Trade-offs between dry year benefits vs long-term account utilization



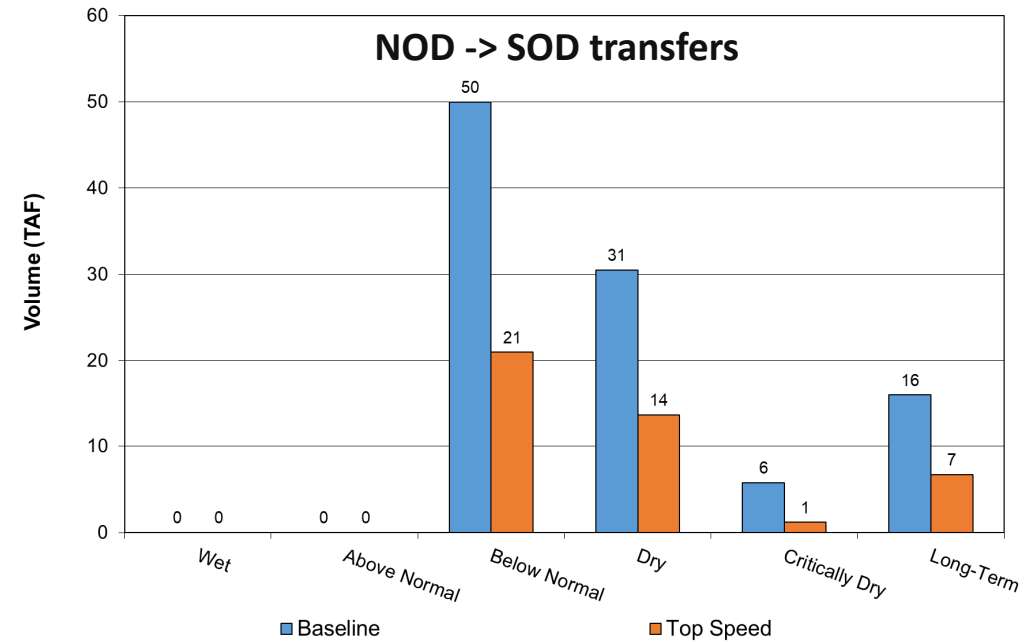
*NOD to SOD transfers are not included in the above charts

CalSim 3 Results – NOD Transfers (releases)

January-December Sites Transfer - NOD
Water-year Type Averages

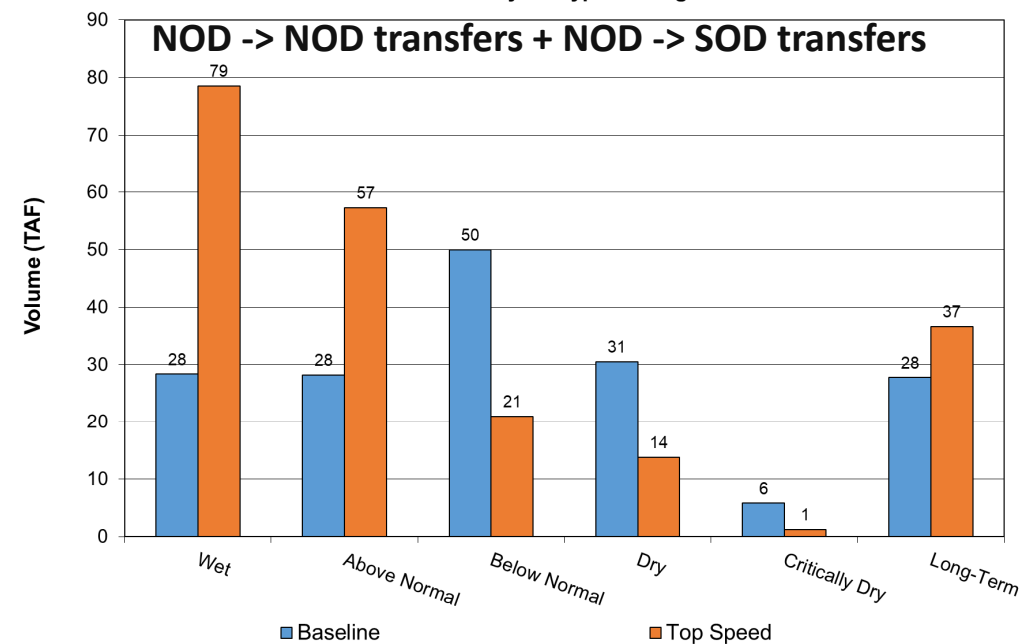


January-December Sites Transfer - SOD
Water-year Type Averages



- Trade-offs between dry year benefits vs long-term account utilization and between NOD vs SOD transfers

January-December Sites Transfer - Total
Water-year Type Averages



South of Delta Delivery Limitations

Delivery Control	Baseline Operation	Top Speed Operation
High SWP Allocation	44%	0%
Sites Storage Supply for SOD Members	24%	29%
Banks Pumping Plant at Capacity	5%	26%
California Aqueduct (CAA) at Capacity	13%	20%
Dunnigan at Physical Capacity & real-time exchanges with GCID Canal are maxed out	10%	11%
Limited Conveyance Availability through Delta	2%	10%
Long Term Delivery	84 TAF	98 TAF

- In the Top Speed Operation:
 - Deliveries are not limited as much in wetter years when SWP Table A allocations are high
 - Storage supply is limiting more frequently (24% to 29%)
 - Banks capacity is reached more frequently (5% to 26%)
 - CAA capacity is reached more frequently (13% to 20%)
 - Conveyance availability through the Delta limits delivery more frequently (2% to 10%)
 - Dunnigan Pipeline capacity is reached more frequently (10% to 11%)

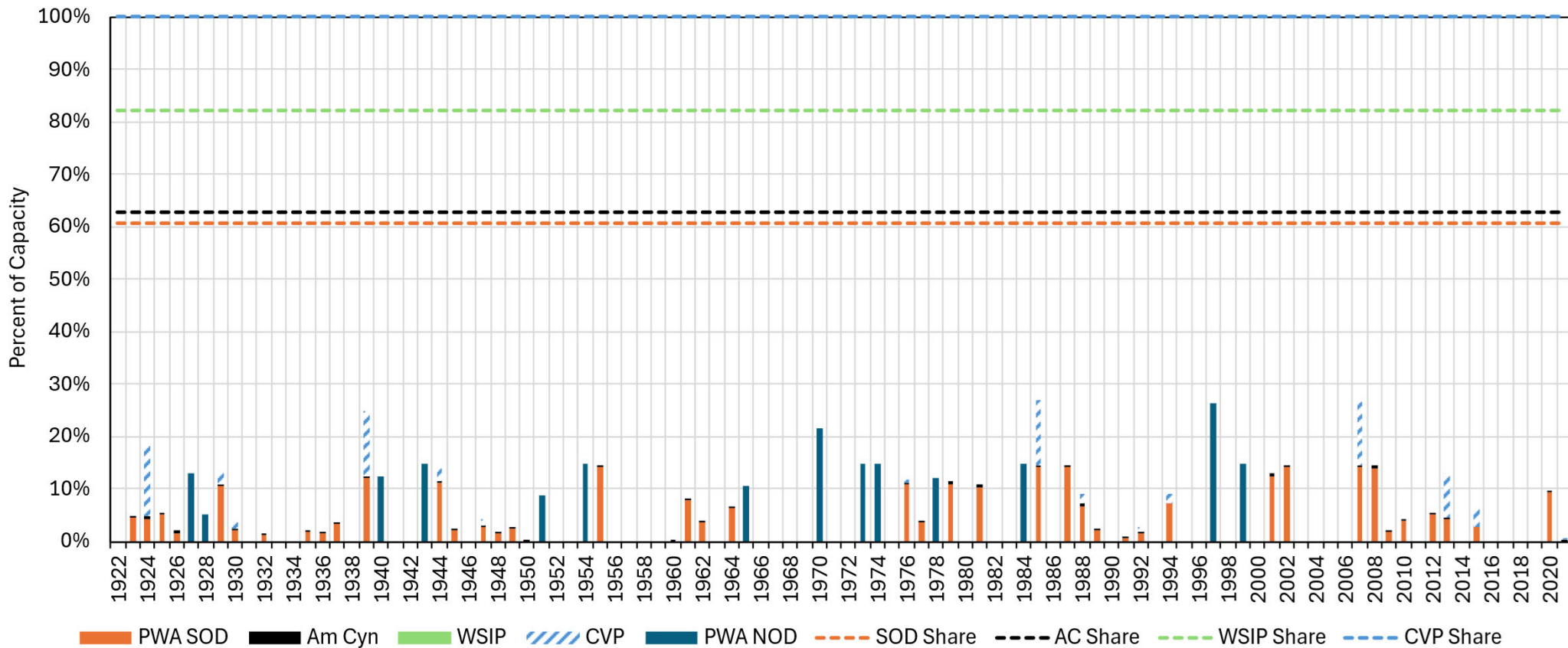
*Represents percentage of months in July-November that release & delivery constraints are controlling SOD deliveries

*Although it is possible that multiple “controls” may limit deliveries in the same month, only one “control” was identified per month for this analysis. Controls were identified in the order as listed in the above table, from top to bottom.

Dunnigan Capacity

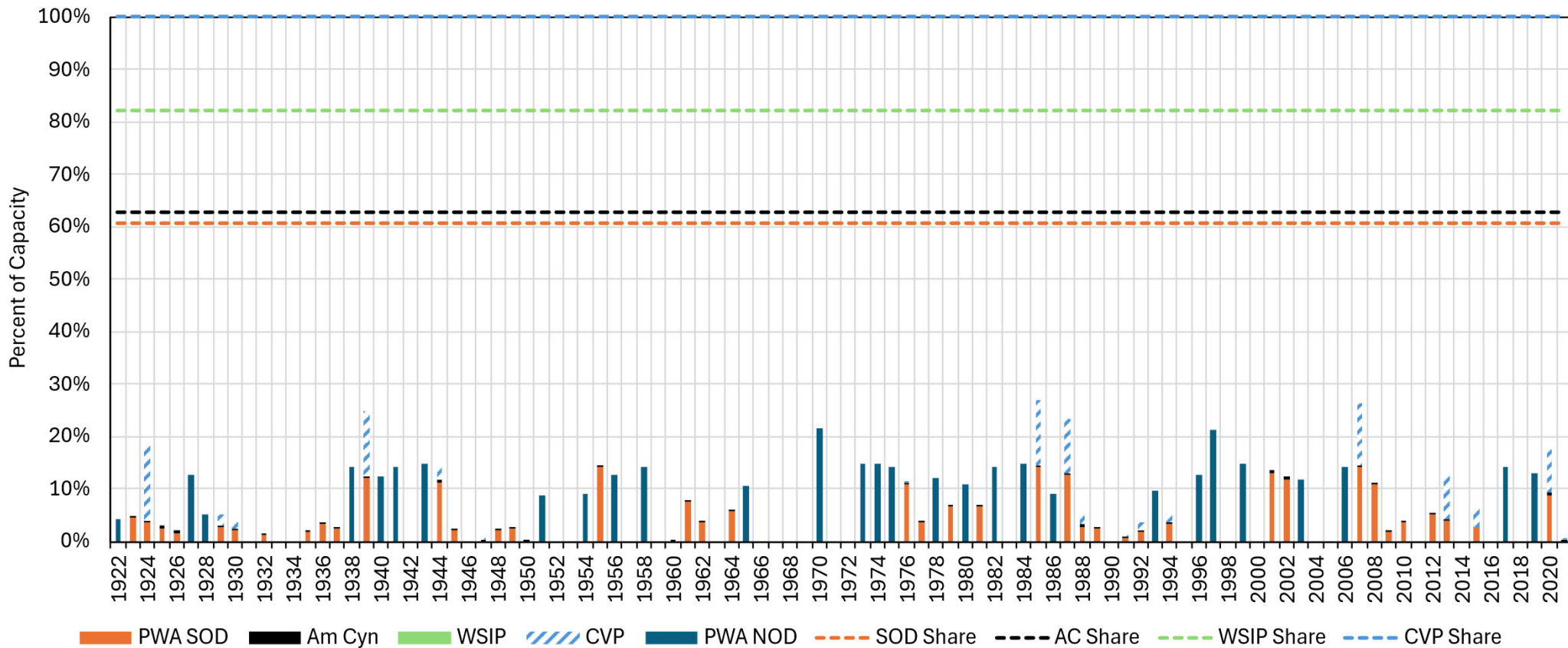
- Per Operations Plan, capacity will be administered and accounted for on a seasonal basis
 - Non-transfer window (December – June)
 - Transfer window (July – November)
- Keep in mind these are focused exclusively on Dunnigan capacity

Dunnigan Capacity Baseline Operation: Non-Transfer Window (Dec to June)



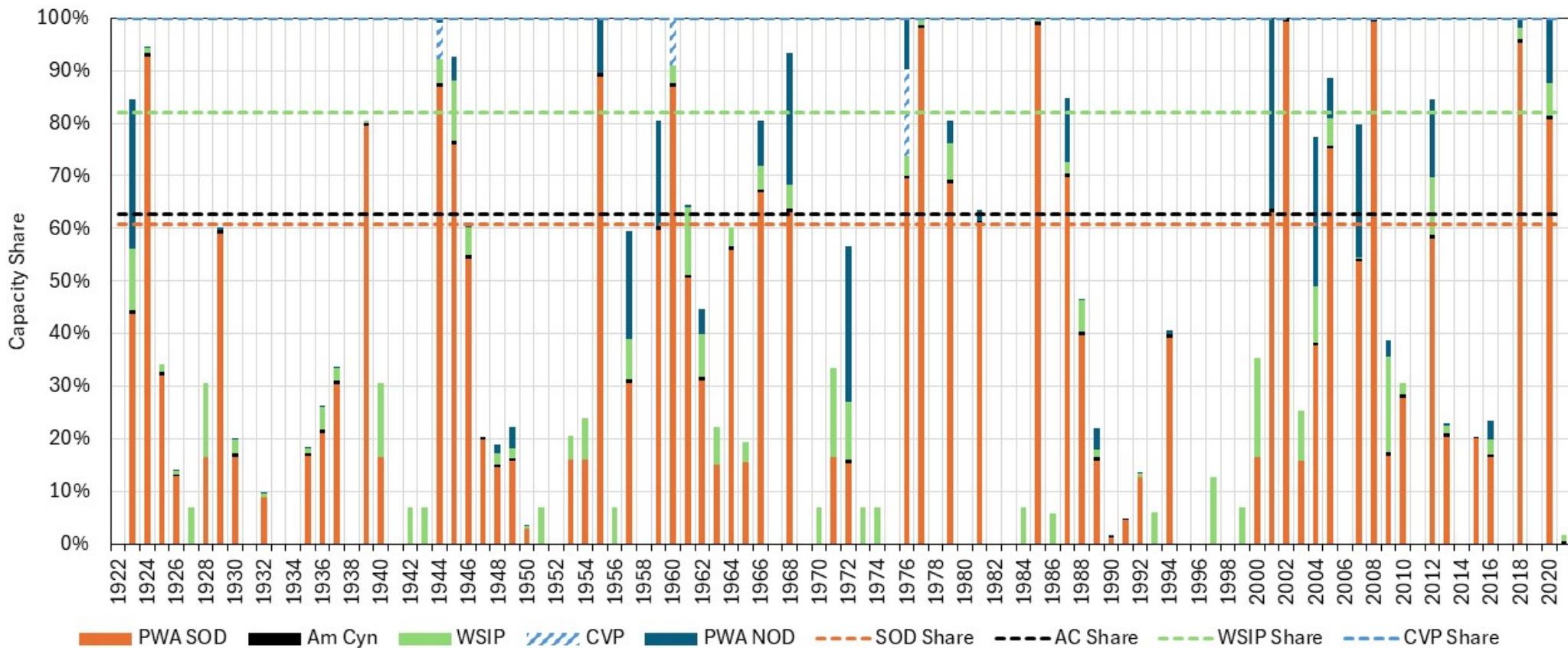
- Capacity concerns essentially non-existent
- PWA SOD utilizes for Oroville exchanges; Oroville exchanges for WSIP not currently modeled
- CVP utilizes during this period when TC/GCID exchanges not available
- PWA NOD utilizes for NOD transfers

Dunnigan Capacity Top Speed Operation: Non-Transfer Window (Dec to June)



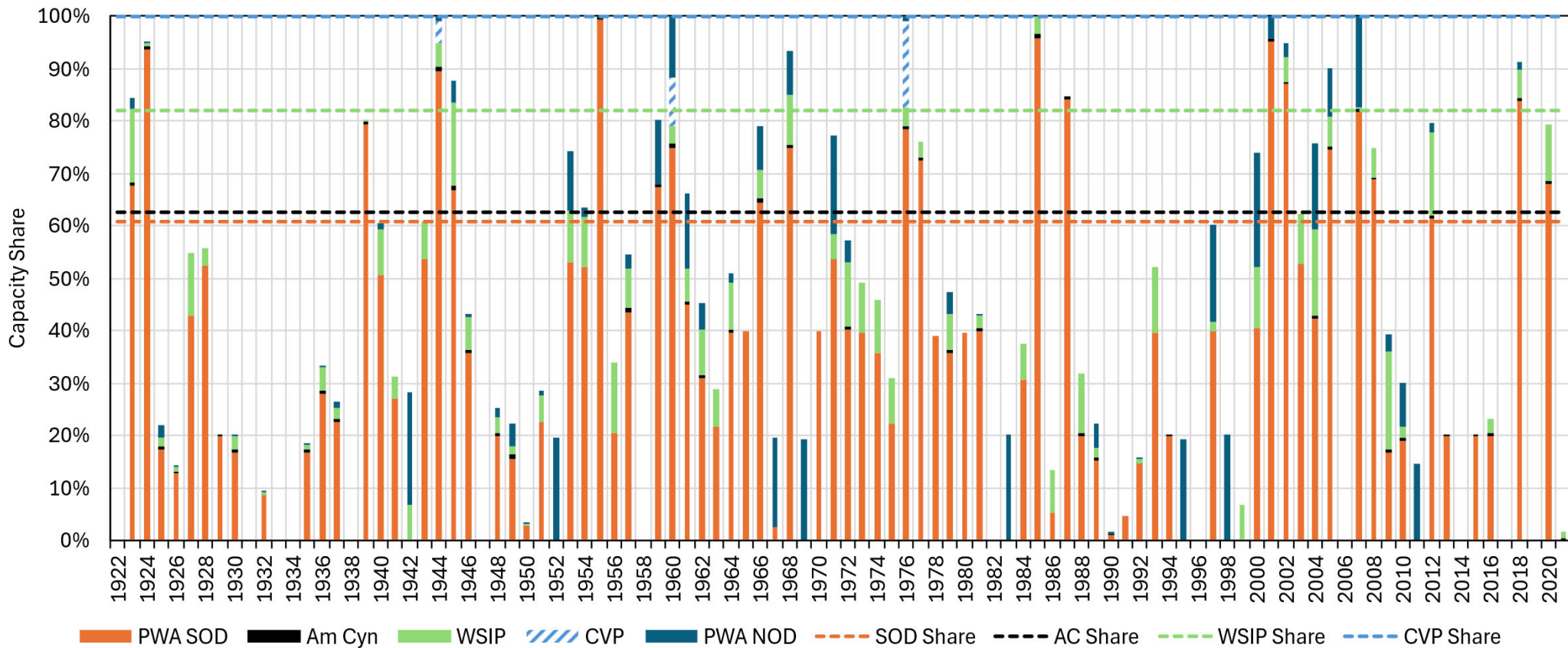
- Similar to baseline operation, although annual frequency of utilization increases for PWA accounts
- Capacity concerns essentially non-existent

Dunnigan Capacity Baseline Operation: Transfer Window (July to Nov)



- 11 years at capacity (5 yrs SOD > 95%; all 11 years > 61%)
- PWA SOD & WSIP utilize in 63 years
- CVP utilizes least frequently; NOD PWA utilizes CVP space

Dunnigan Capacity Top Speed Operation: Transfer Window (July to Nov)



- 7 years at capacity (3 yrs SOD > 95%; all 7 years > 75%)
- PWA SOD utilizes in 78 years; WSIP in 64 years
- CVP utilizes least frequently; NOD PWA utilizes CVP space

Engineering and Construction Manager's Report

JP Robinette

Questions?



Thank you!

Upcoming Meetings:

Reservoir Committee and Authority Board:
Friday April 17th – 9 am to 12 pm

O&E Workgroup:
Wednesday May 13th – 1:30 to 3:30 pm