CalSim 3
Automated Allocation Adjustment For CVP Operations

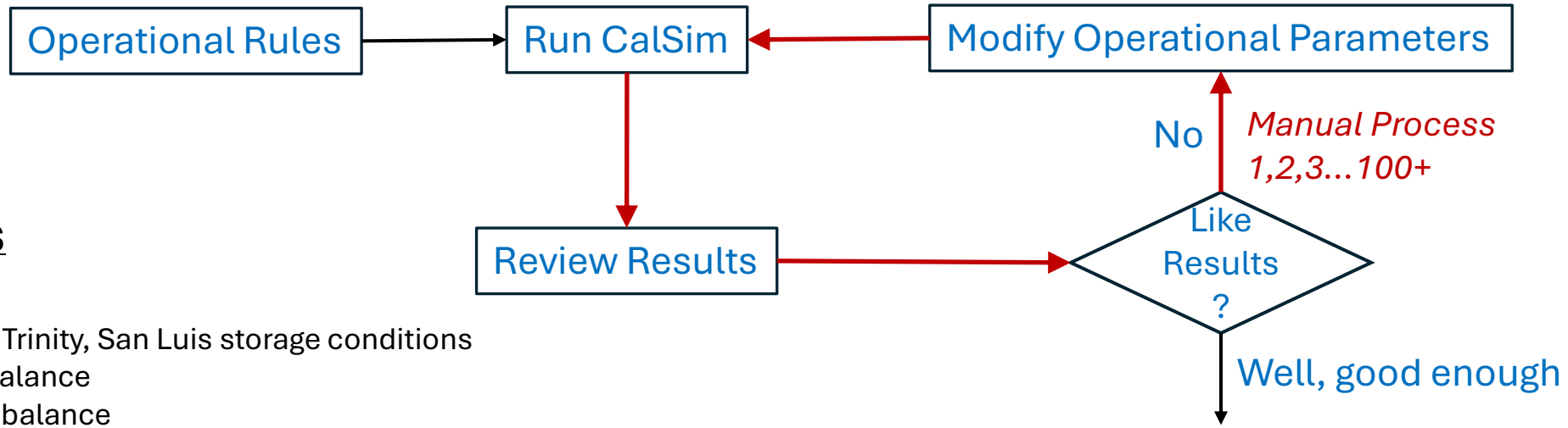
September 25, 2024

MBK ENGINEERS

Topics

- Current operating procedure
  - How we use CalSim to model **CVP** / SWP operations
- Considerations
  - Operational efficiency
    - Consistent operational efficiency to better compare effects of proposed actions
  - Operational rules that are more consistent with actual operation criteria
  - Standardization
- What are proposed changes to model application
  - Automate procedure with defined process
- Model Results

Current Procedure - Manual Process



Review Results

- Storage
  - Shasta, Folsom, Trinity, San Luis storage conditions
  - Shasta / Trinity balance
  - Shasta / Folsom balance
  - Shasta, Folsom, Trinity / San Luis balance
- Delivery
  - Delivery / carryover storage balance (upstream delivery / Trinity+Shasta+Folsom)
  - Delivery / carryover storage balance (Export are delivery / Trinity+Shasta+Folsom+San Luis)
  - Export capability / delivery balance
  - Ag contract / M&I contract / Settlement contract / refuge balance and contract
  - Upstream Ag, M&I / Export area Ag, M&I
- River flows
  - Instream flow compliance
- Delta flows
- COA
- Many more operational parameters

Current Procedure
Considerations for manual adjustments

- No standard for acceptable model simulation
- No standard for operational efficiency
  - Storage versus delivery
  - Reservoir balancing
  - Everyone's discretion / judgement is different
  - Baseline operational efficiency inconsistent with alternatives
    - Changes effects of proposed actions
- Results are influenced by
  - Expertise of modeler
  - Judgement of modeler
  - Level of effort by modeler
  - Political view
  - Model use
- Current process takes significant time to develop acceptable simulation

Proposed Automated Allocation Adjustment (AAA) Process

- Apply criteria used in manual process
  - Criteria is not currently embedded in CalSim rule structure
  - AAA adjusts delivery allocations to achieve operational objectives
- Codify criteria for acceptable model simulation
  - Reservoir levels
  - Reservoir balance with delivery allocation
  - Rules more similar to actual operations
- Similar to WSI-DI training process

Actual operations

- Timeline
  - March –September
- What we know at decision time,
  - Forecasted inflow, A/D, other
- Season goals
  - Regulatory compliance
  - Carryover storage targets
  - More

Timeline of Operations - Shasta

Operation	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Hydrologic Forecast			*	x	x	x	x	x	x			
CVP Delivery Commitments					x	x	x	x	x			
Temperature Management Plan							*	x				
File for TUCP	x	x	x	x	x	x	x	x	x	x	x	x
Storage Fill												
Storage Drain												
Storage Target Considerations							By WYT					By WYT
D1641 MRDO, EC, & X2												
ESA Flow Actions	Fall Flow Stability						Spring Pulse					
ESA Temperature												
ESA Fall X2												AN & W

60 days

60 days

60 days

2

DRAFT-FOR DISCUSSION PURPOSES ONLY

- CalSim rules differ from actual operations process
  - May need to describes CalSim rules
- Iteration process uses real-time operations goals to adjust CalSim rules

What's the Basis for Allocation Adjustments?

Correct under-allocation:

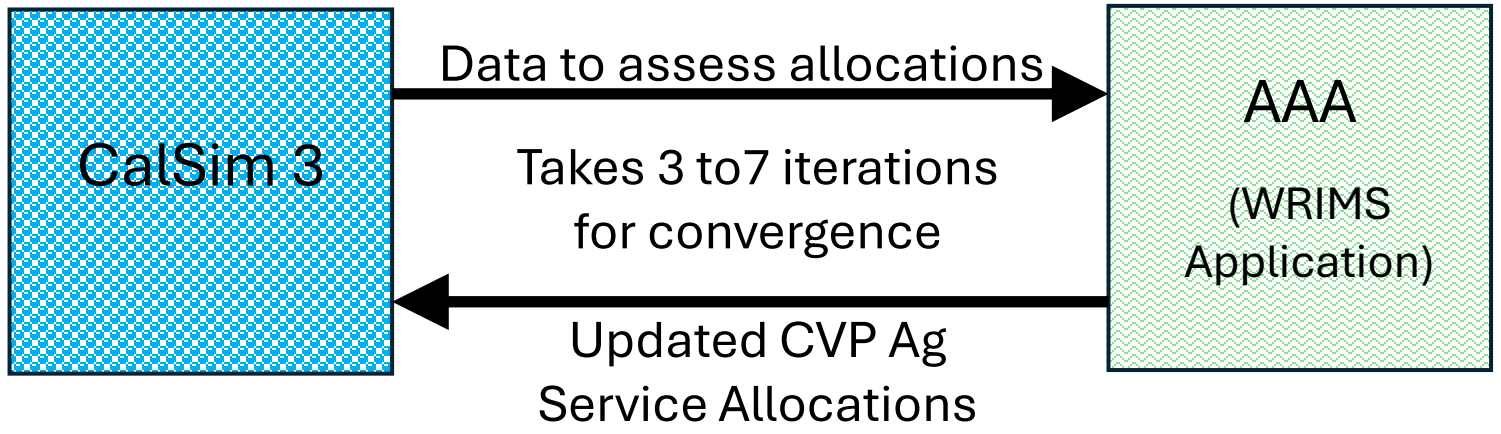
1. Surplus North of Delta storage combined with available export capacity to convey stored water
2. Surplus San Luis storage

Correct over-allocation:

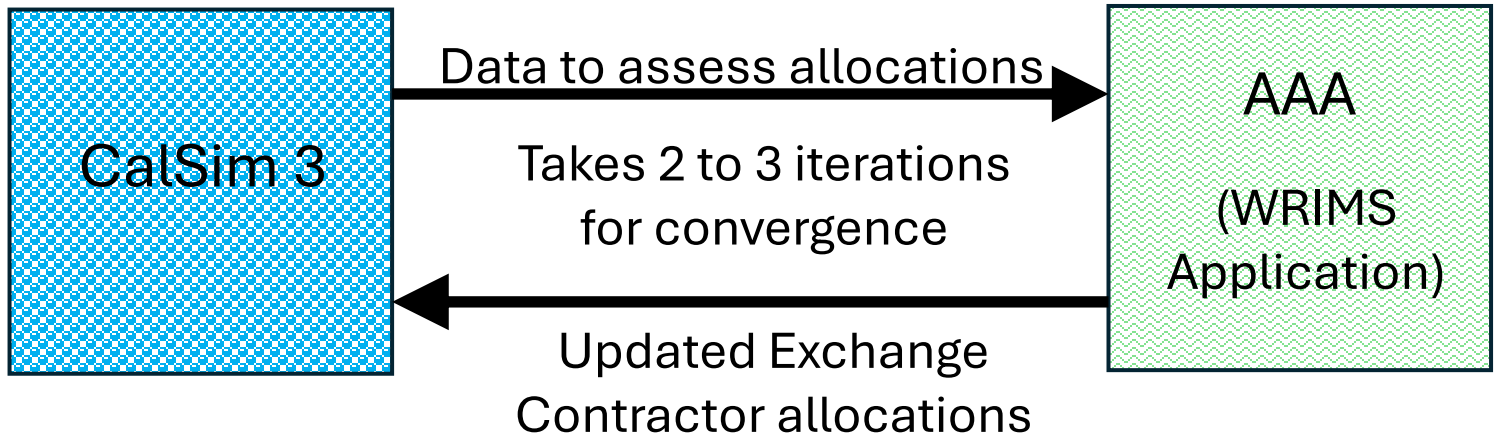
1. Shortage of North of Delta storage combined with export of stored water to support contractor allocated deliveries
2. South of Delta delivery shortages

AAA Procedure

Step 1: Use AAA to update CVP NOD and SOD Ag Service Allocations



Step 2 (Optional): Use AAA to cut CVP Exchange Contractor Allocations



User Defined AAA Inputs

1. End of September storage thresholds
   a) Shasta (2.4 MAF)
   b) Folsom (350 TAF)
   c) CVP San Luis (100 TAF)

2. Allocation thresholds necessary for Exchange Contractor reduced Delta supply
   a) SOD Ag Service (0%)
   b) SOD M&I (50%)

3. Allocation convergence criteria (2%)

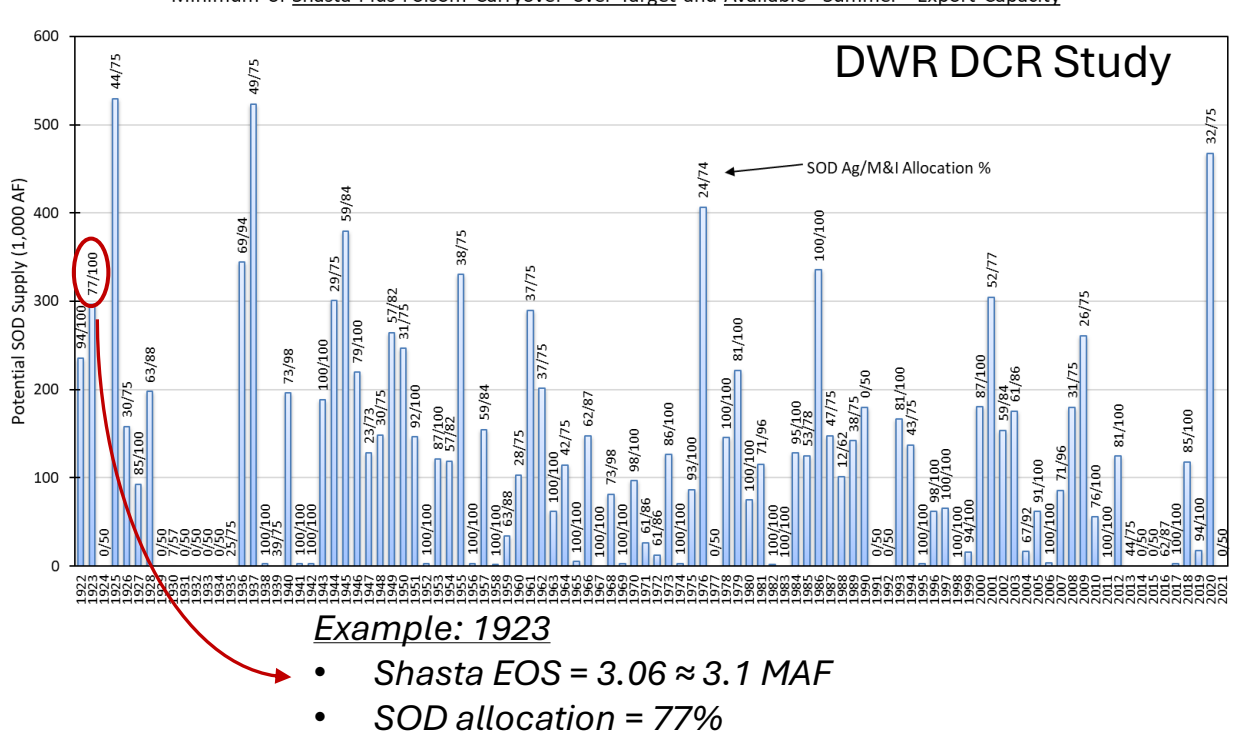
4. All criteria may be modified

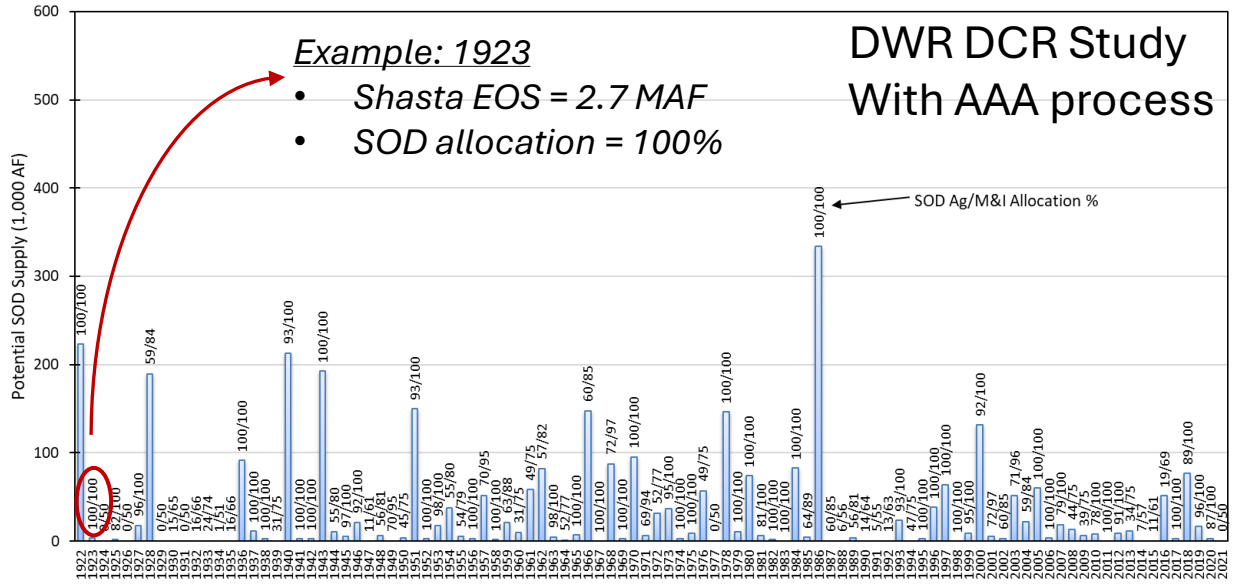
CalSim 3 AAA Inputs

1. Storage in Shasta, Folsom, and CVP San Luis
2. Jones and Banks Exports
3. OMR flow and requirement
4. EI Export Control
5. DMC and Intertie Use
6. Maximum possible reduction of CVP upstream storage release for Jones export (added refined output to CS3)
7. CVP SOD Delivery shortages (added refined output to CS3)
8. SOD CVP Ag service allocation
9. NOD CVP Ag service allocation

Model Results
Operational Efficiency

- Operational efficiency has influence on effects of proposed actions
- Operational efficiency needs to be consistent for all model runs, especially if they are being compared
- Currently, operational efficiency is at discretion of modeler

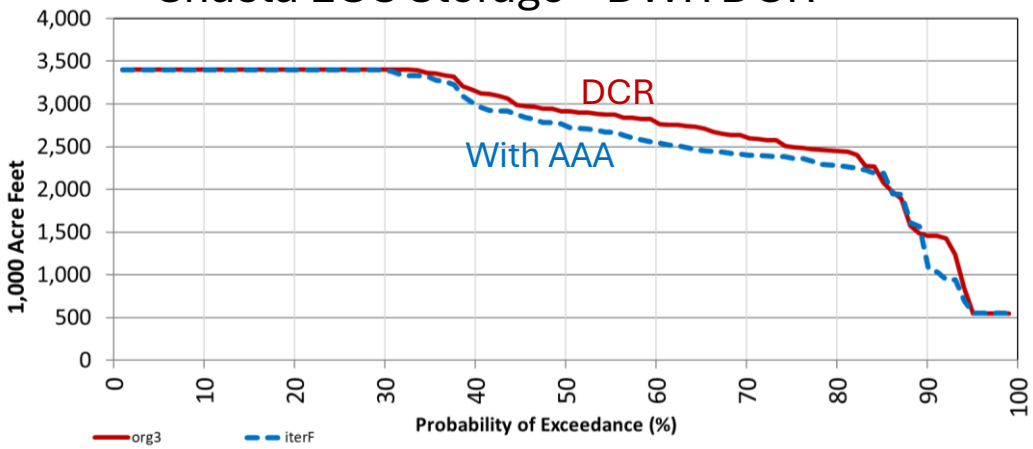




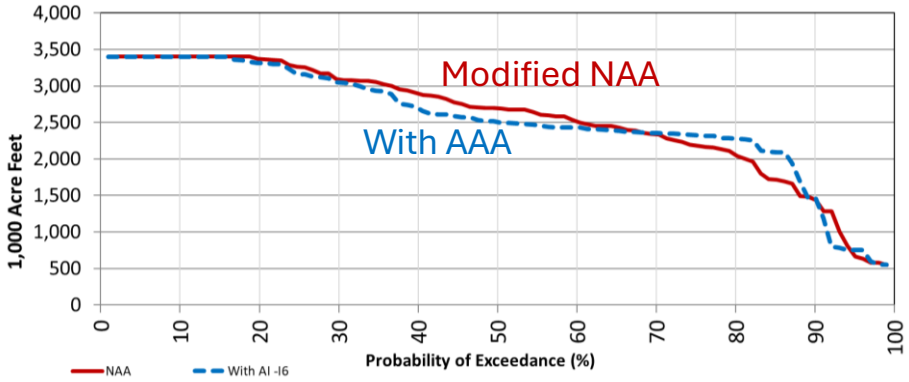
Model Results
Reservoir Storage

- Increase use of Shasta when EOS >2.4
- Some critical years have lower storage
- Greater use of water remaining in San Luis

Shasta EOS Storage – DWR DCR

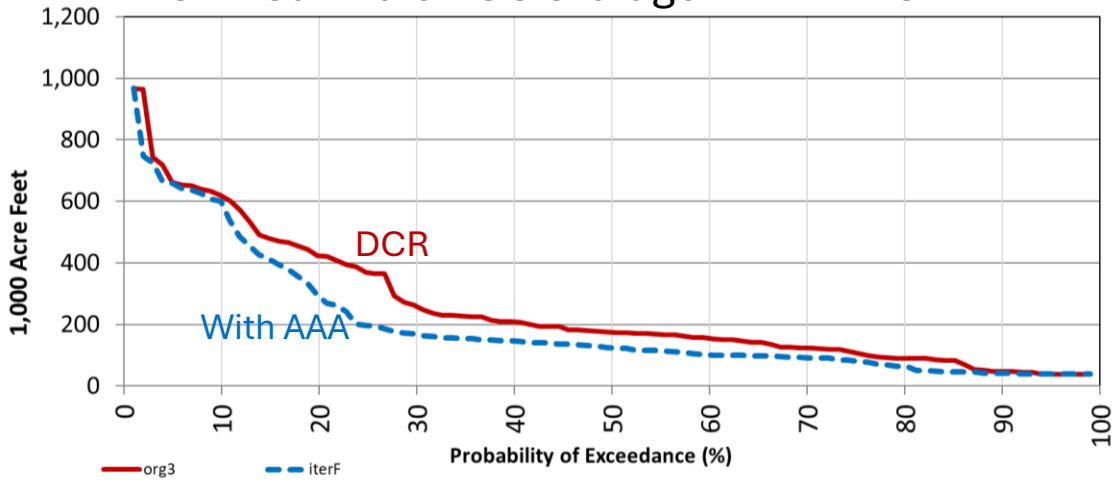


Shasta EOS Storage – Modified Reclamation NAA



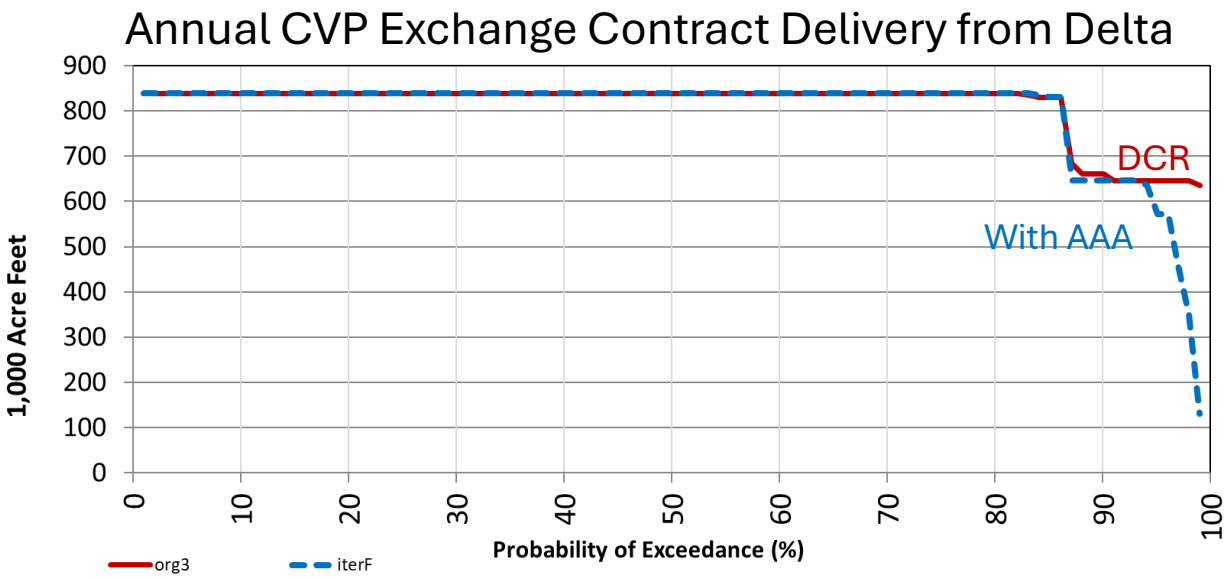
Effects of AI differ due to differences in CalSim Baseline

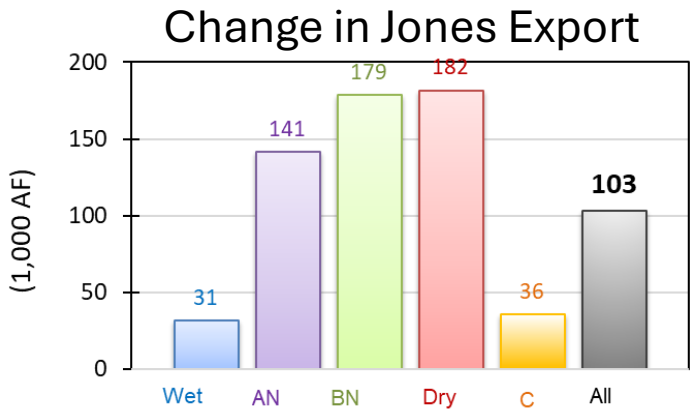
CVP San Luis EOS Storage – DWR DCR

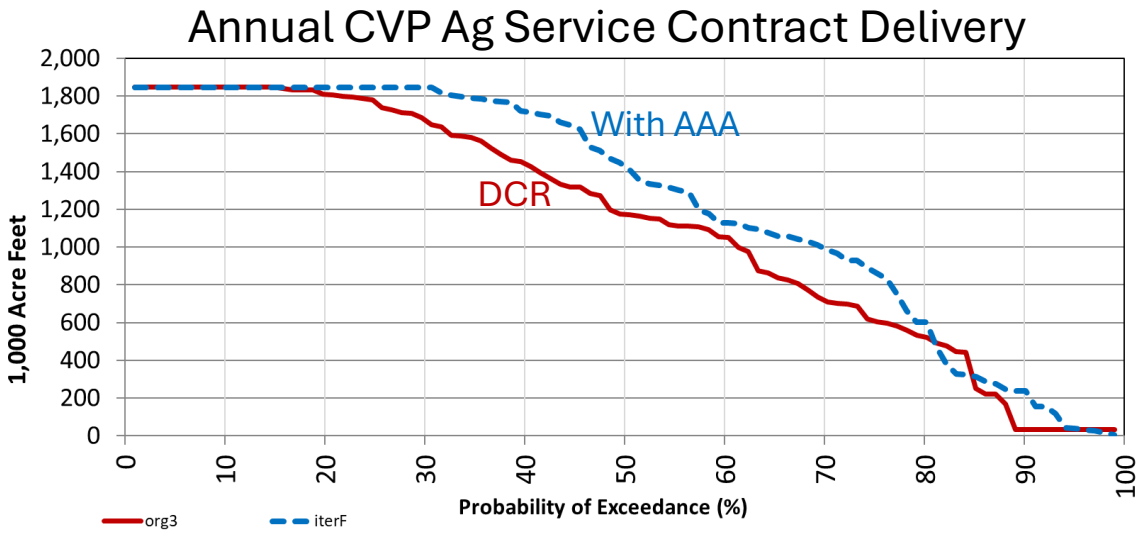


Results
Export and Delivery

- Greater delivery in most years
- Logic for decreasing Exchange Contract delivery from Delta







Findings

- Standardization of model runs
  - Reproducible results with defined rules
- Consistency
  - Currently, the effects of proposed actions MAY be different
  - With AAA standard rules the effects of proposed actions will more consistent
- Can implement rules more similar to actual operations
- AAA saves time

Next steps

- Testing and refinement
  - Effects on operational objectives
  - Effects under various climate scenarios
- Effects on secondary models (e.g., water temperatures)
- Operational adjustments (such as the Protect Shasta logic, San Luis rule curve, etc.) to support AAA implementation
- Modeler outreach
- Documentation
- Schedule
  - Late October - ready for broader testing