Updates to Yuba River Development Project Representation in CalSim 3

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Agenda

- Introductions
- Overview of Yuba River Watershed
- Overview of Yuba Water Agency Transfers
- Updates to CalSim 3 Representation of YRDP
- Implementation of Dynamic Transfer Calculation
- Current Status

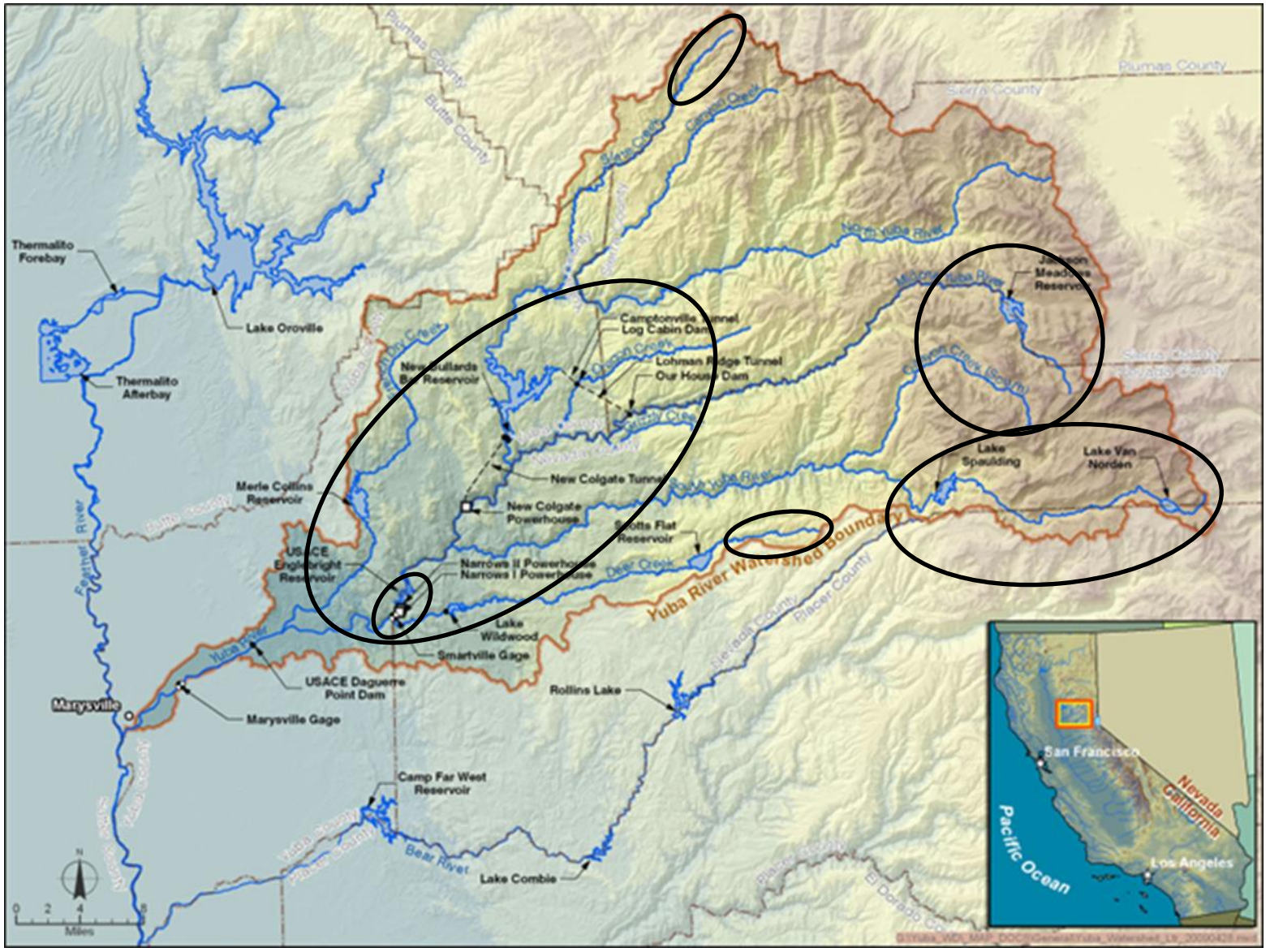
Background

- We’re here on behalf of YWA
- Since 2007, YWA has provided timeseries of Yuba River flows, including water transfers for input into CalSim II
- With recent updates to CalSim 3 and climate change, a dynamic calculation of water transfers is needed

Yuba River Watershed Has Multiple Projects

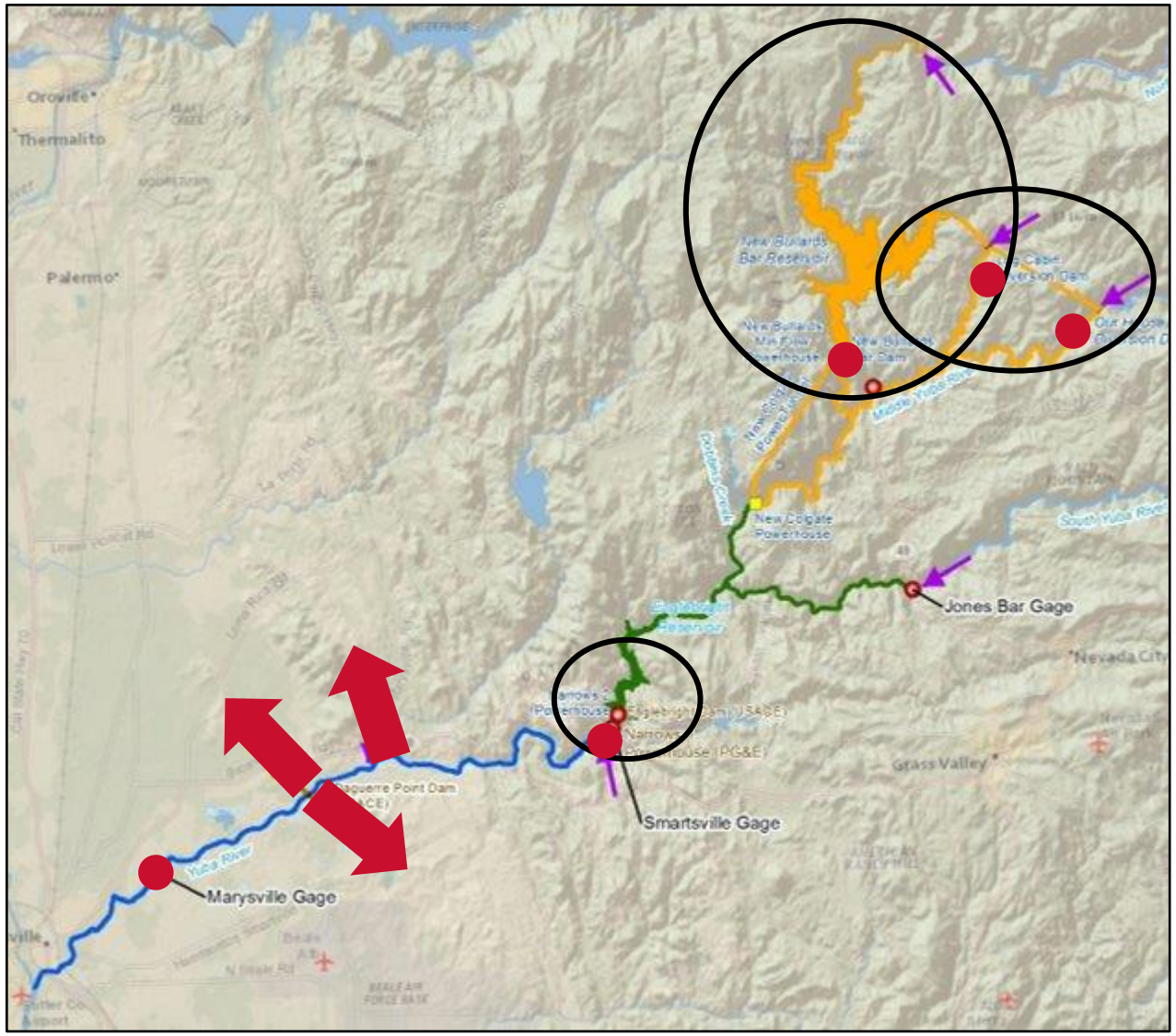
- South Feather Water And Power's South Feather Project
- Nevada Irrigation District has Yuba-Bear Project
- PG&E's Upper Drum-Spaulding Project
- PG&E's Deer Creek Project
- YWA's Yuba River Development Project
- YWA's Narrows Project

HDR reviewed project representations in CalSim 3 for their effects on YRDP



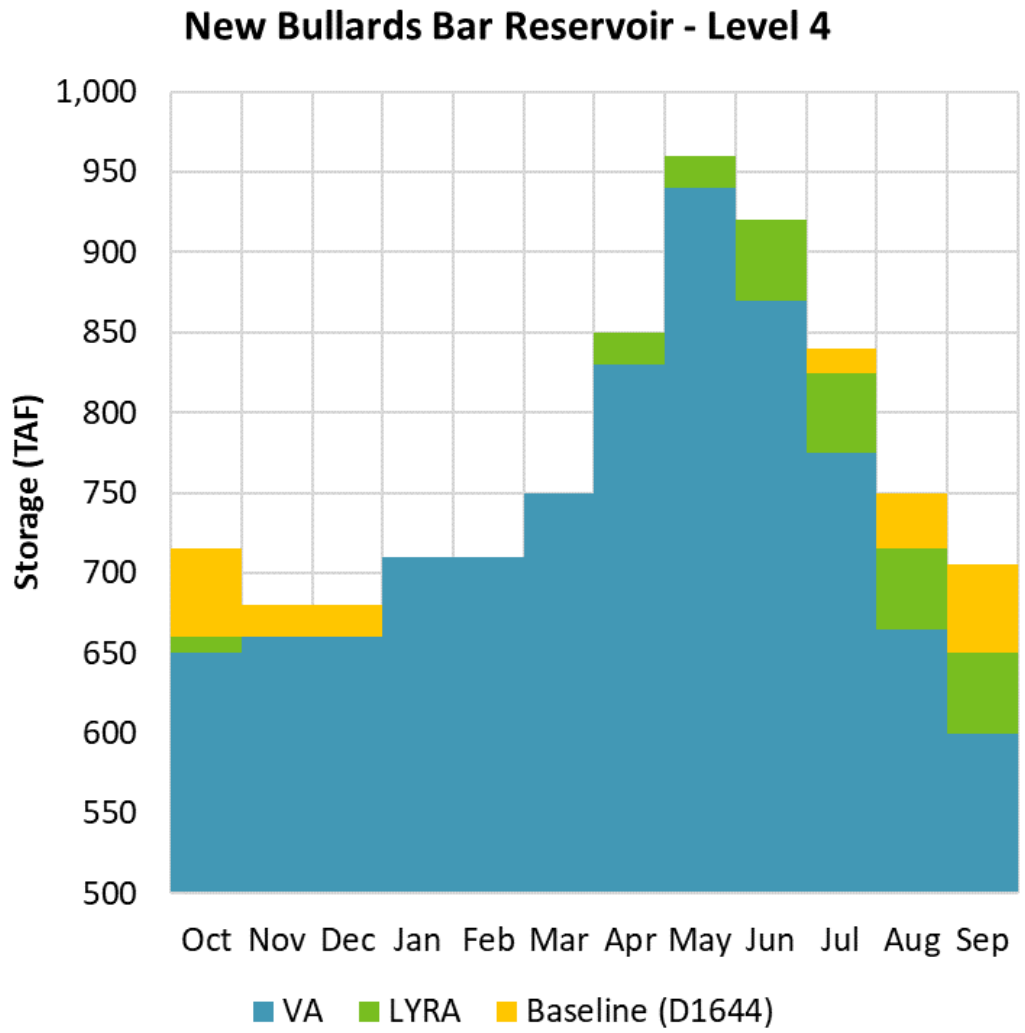
Yuba River Development Project

- New Bullards Bar Dam and Reservoir (970 TAF) on North Yuba River
- Diversion Dams on Middle Yuba River and Oregon Creek
- Releases from Englebright Reservoir
- Flow requirements above Englebright Dam
- Flow requirements below Englebright Dam (lower Yuba River)
- Agricultural diversions from Daguerre Point Dam on lower Yuba River



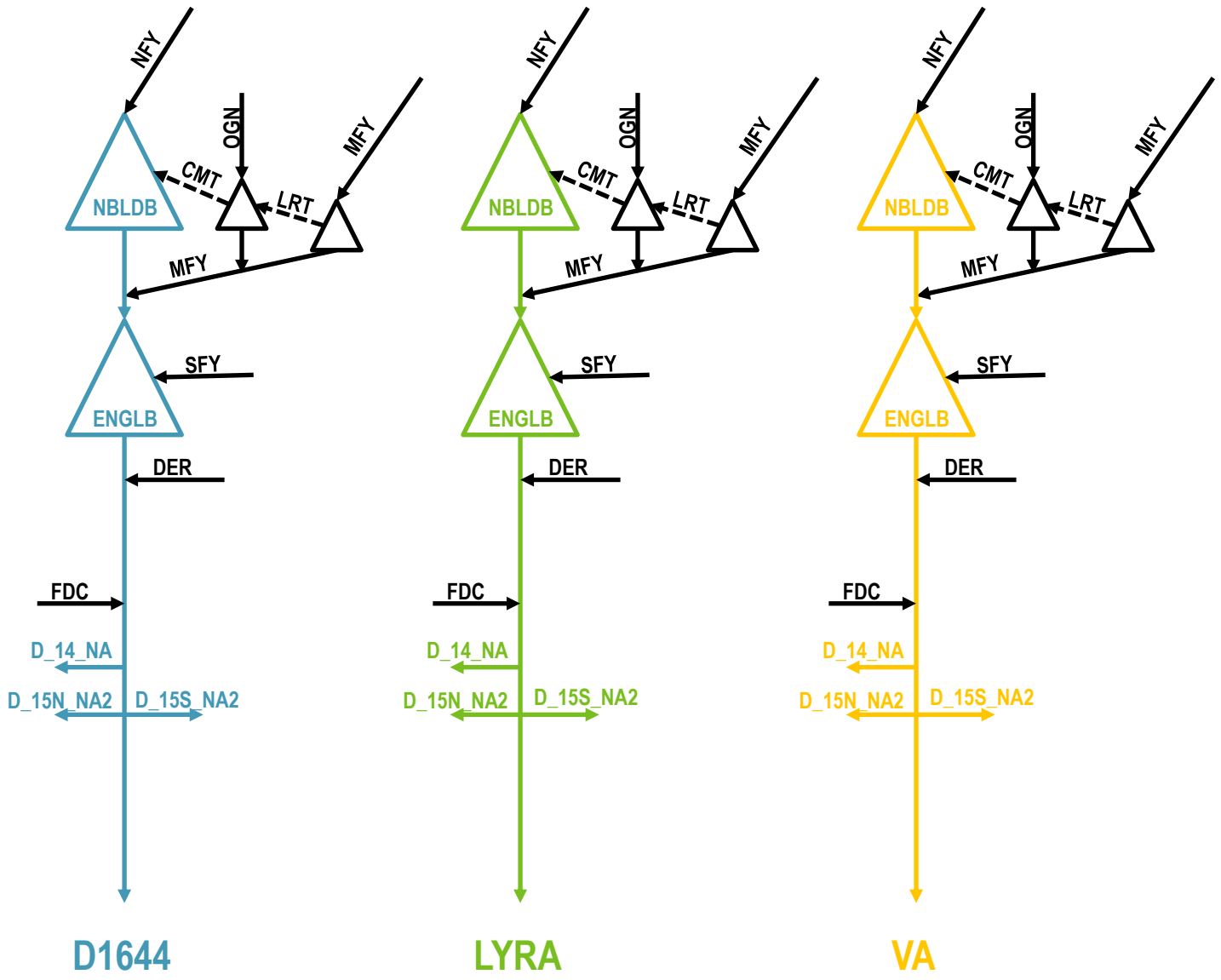
YWA Water Transfers are Embedded in Lower Yuba River Accord

- Yuba Accord includes a long-term Water Purchase Agreement with DWR and Reclamation
- Since 2007, YWA has transferred over 1 MAF of stored water and 500 TAF of groundwater substitution to its partners
- Water transfers are computed relative to Baseline (D1644) operations
- Transfers generated through two mechanisms
  - Operations for end-of-September storage
  - Operations for flow requirements
- Water Transfers also include refill accounting
- DWR operates to both “back“ water into Oroville and move transfers when available according to operational constraints/regulatory conditions
- YWA also has a MOU with the State for a VA



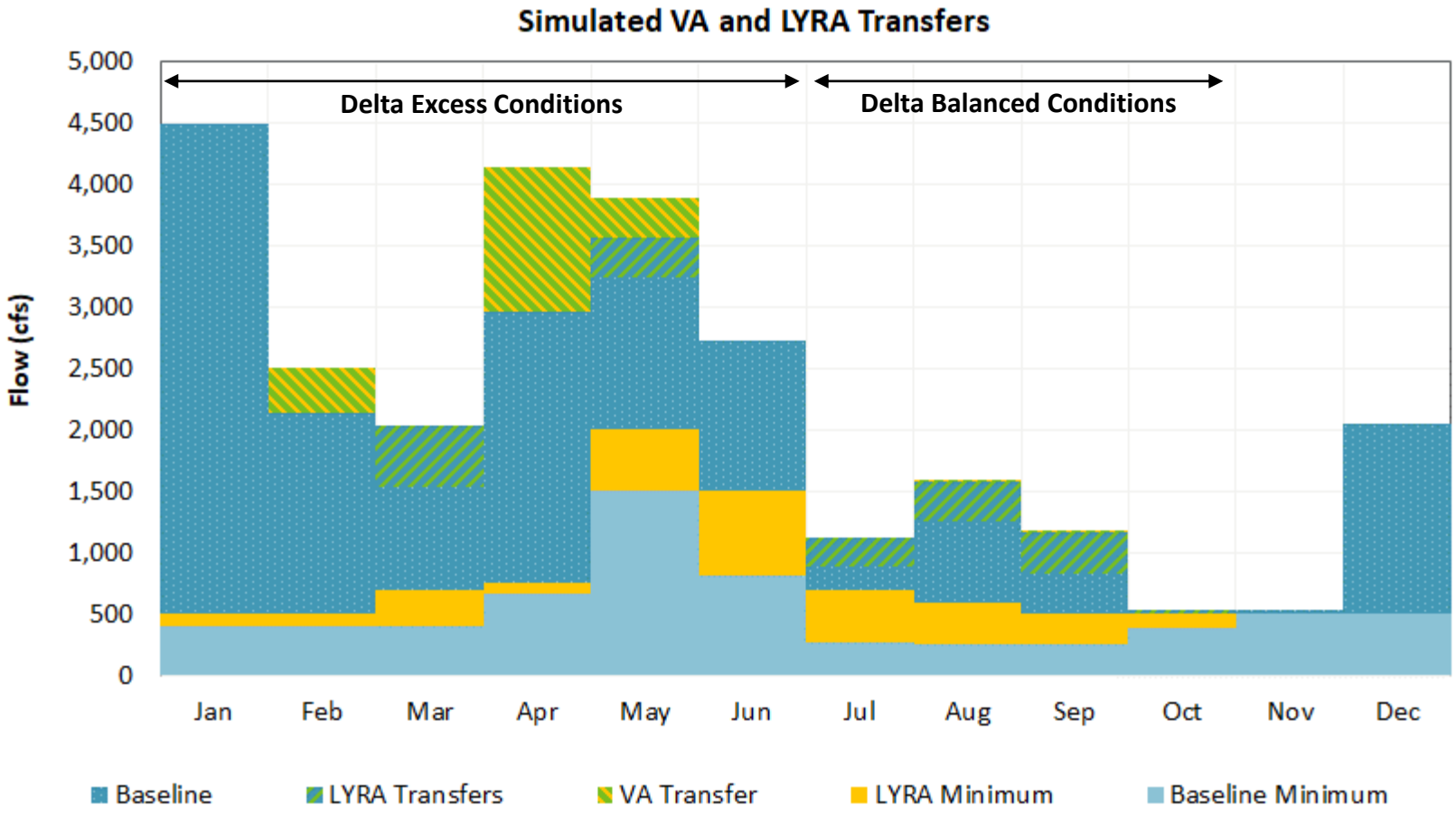
Wanted to Represent Dynamic Transfer Calculation

- Split YRDP operations into 4 bins
  - Common – Variables used regardless of operations
  - D1644 – Baseline operations
  - LYRA – Accord operations
  - VA – VA operations
- Most variables are defined 3 times to define “Shadow” simulations of YRDP
- Only one set of output from YRDP operations is passed on to the full system model based on user selected conditions
- All YRDP operations are simulated in the LowerYuba cycle
- Computed Accord and VA transfer volumes in the subsequent Transfer cycle



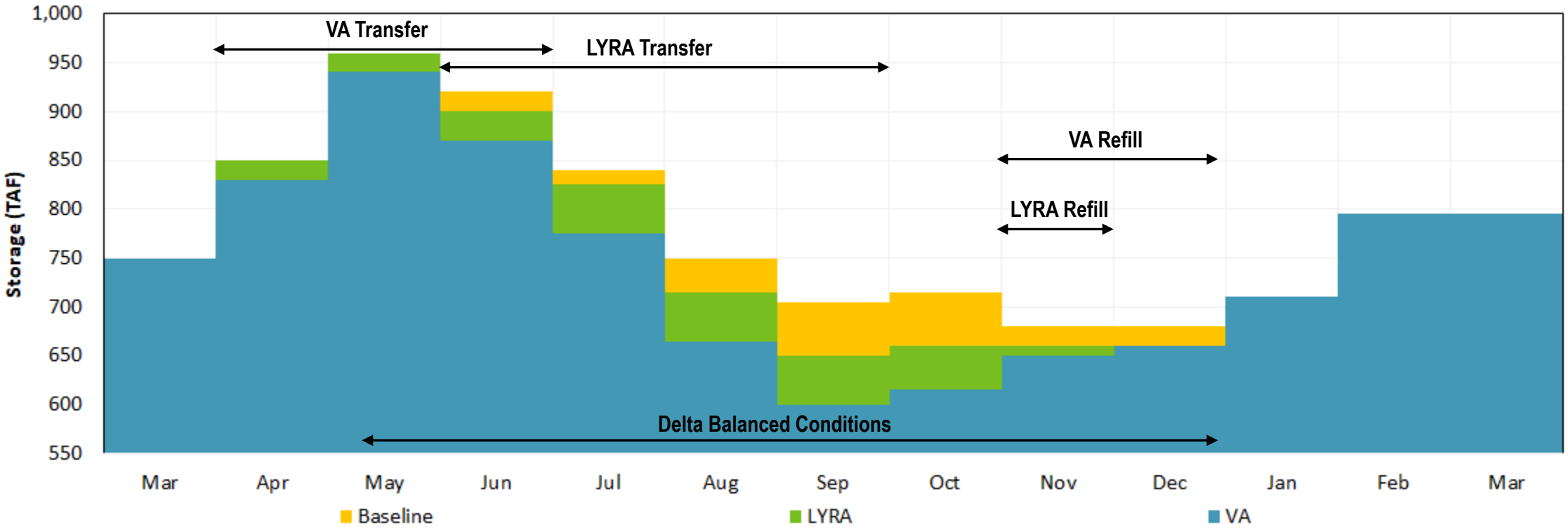
Dynamic Transfer Calculation

- Uses flow at Marysville (C_YUB006) from Baseline (D1644), LYRA, and VA simulations
- VA Transfers
  - Delta excess or balanced conditions
  - April through June in AN-D years
- Accord Transfers
  - Delta balanced conditions
- Generate final timeseries for both VA and Accord transfers
- Generate final timeseries for all YRDP timeseries for other CalSim 3 calculations



Dynamic Refill Calculation

- Uses flow at Marysville (C_YUB006) from Baseline (D1644), LYRA, and VA simulations
- VA
  - Refill is computed, but accounting for and repaying impacts are still in development
- LYRA
  - Storage refill and associated impacts are accounted for and impacts are repaid by reducing subsequent transfer volumes
  - Negative transfer impacts are tracked and repaid by reducing subsequent transfer volumes



Current Status

- ✓ Extracted a stand-alone Yuba River module
  - ✓ Implemented D1644/LYRA/VA Shadow representations
  - ✓ Developed Accord/VA transfer accounting logic
- Integration of the updated modules into CalSim 3 is in progress