BUREAU OF RECLAMATION

Modeling the Shasta Action for the 2021 LTO

CWEMF Session 21 - Wednesday, September 24, 2024

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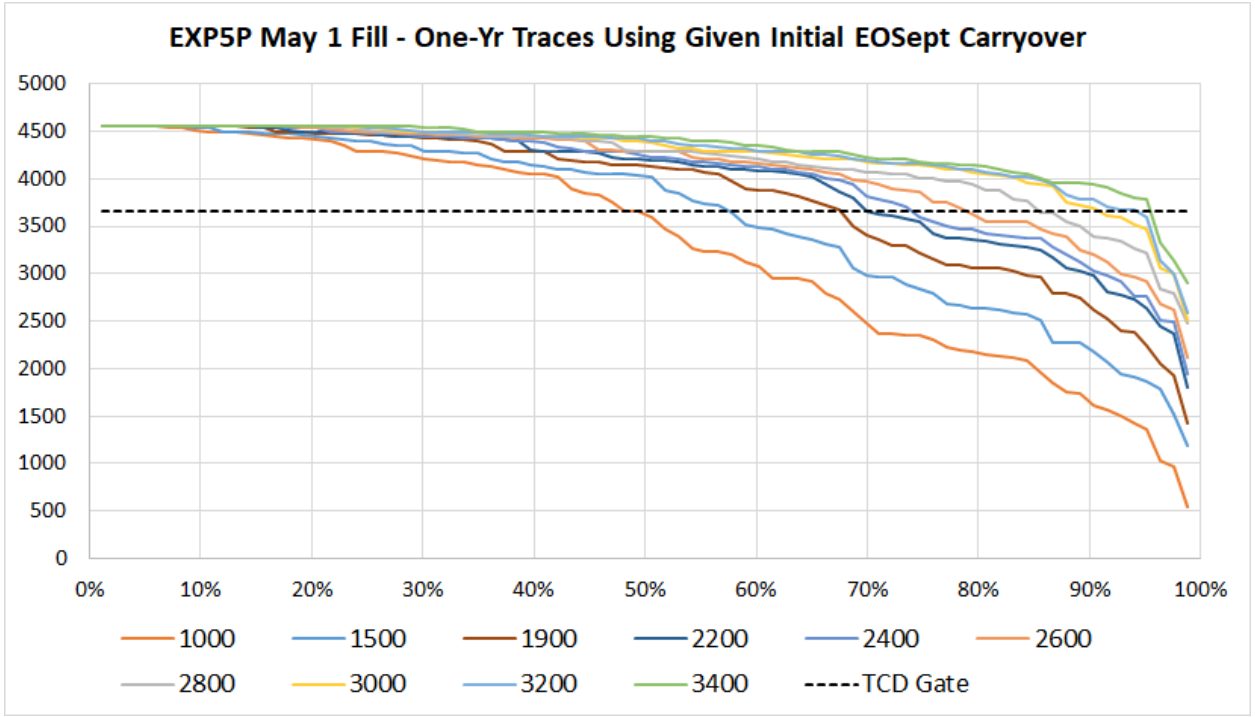
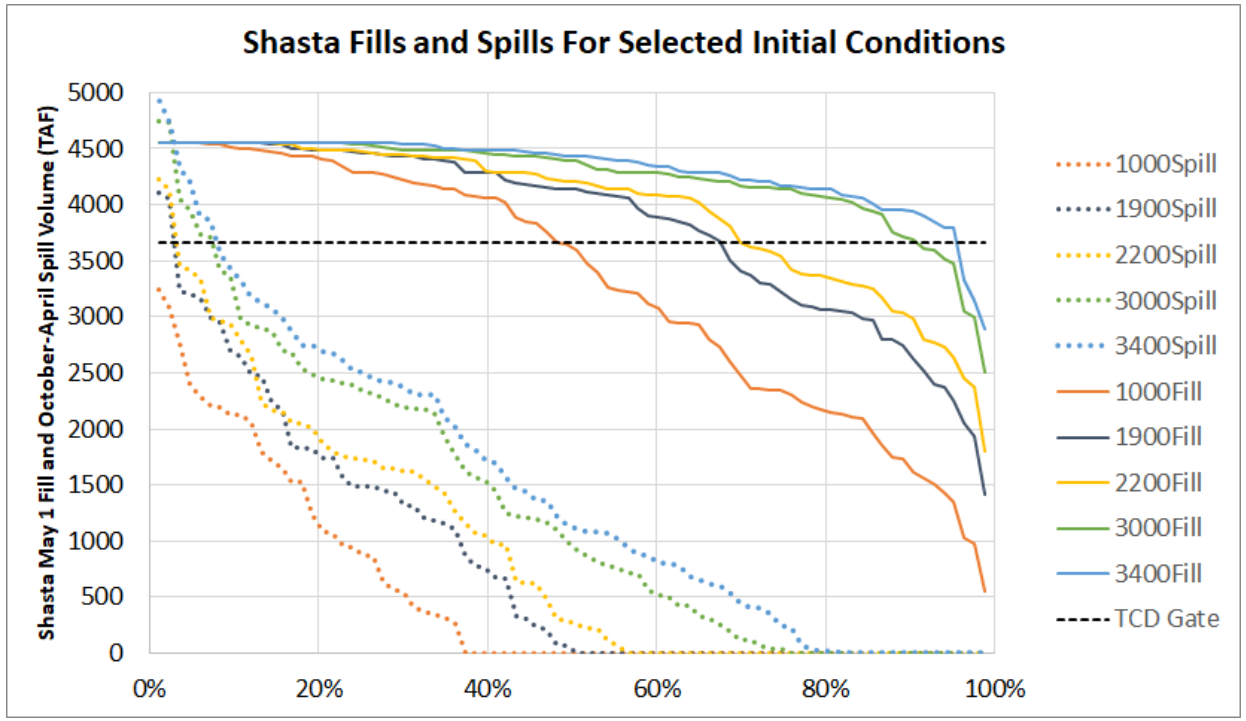
Modeling Supported Formulation of the Action

- Exploratory Analysis layered regulatory operations and obligations
- Position Analysis with a range of initial conditions illuminated tradeoffs among carryover, spill, fill, and water supply





Round Tables, White Boards, and Flip Charts

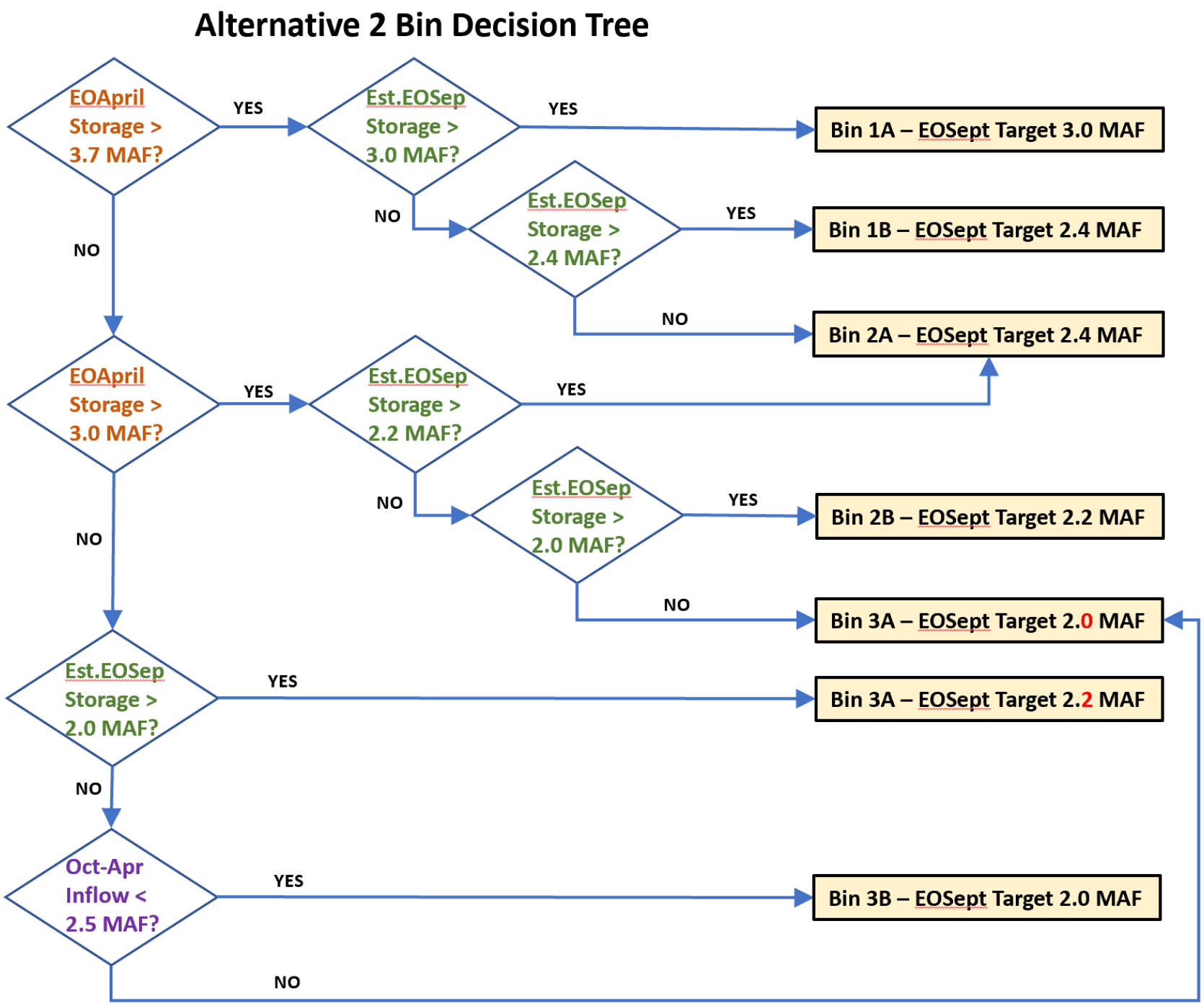
- Informed by exploratory analysis….
- August-October 2022 – elements of the proposed action formulated through extensive discussion

Action Fundamentals

- Identify fill
- What would carryover be if no action were taken?
- Identify desired carryover and actions to ensure it
- Projected storage = current storage
  + forecasted inflow
  – estimated release

Bin Structure

- Water Year Type was not adequate to define operations strategies
- Fill defines Bins
  - >3.7 taf Bin1
  - 3.0-3.7 Bin2
  - <3.0 Bin3
- Carryover targets based on estimated carryover



Determining Bin in February and March

- Estimate Fill = f(storage,
  90% inflow forecast through April,
  full NOD demand through April,
  release for Keswick minimum flow through April)
- Estimate Carryover = f(storage,
  90% inflow forecast through Sep,
  full NOD demand through Sep,
  3250cfs for Keswick through April,
  estimated May-Sep regulatory cost)

Determining Bin in April

- Estimate Fill = f(storage,
  90% inflow forecast for April,
  NOD demand for April based on initial allocation,
  release for Keswick minimum flow in April)
- Estimate Carryover = f(storage,
  90% inflow forecast through Sep,
  NOD demand through Sep based on init alloc,
  3250cfs for Keswick for April,
  estimated May-Sep regulatory cost)

Determining Bin in May

- Estimate Fill = May 1 storage

- Estimate Carryover = f(storage,
  timeseries of inflow May-Sep,
  NOD dem May-Sep based on unadjusted alloc,

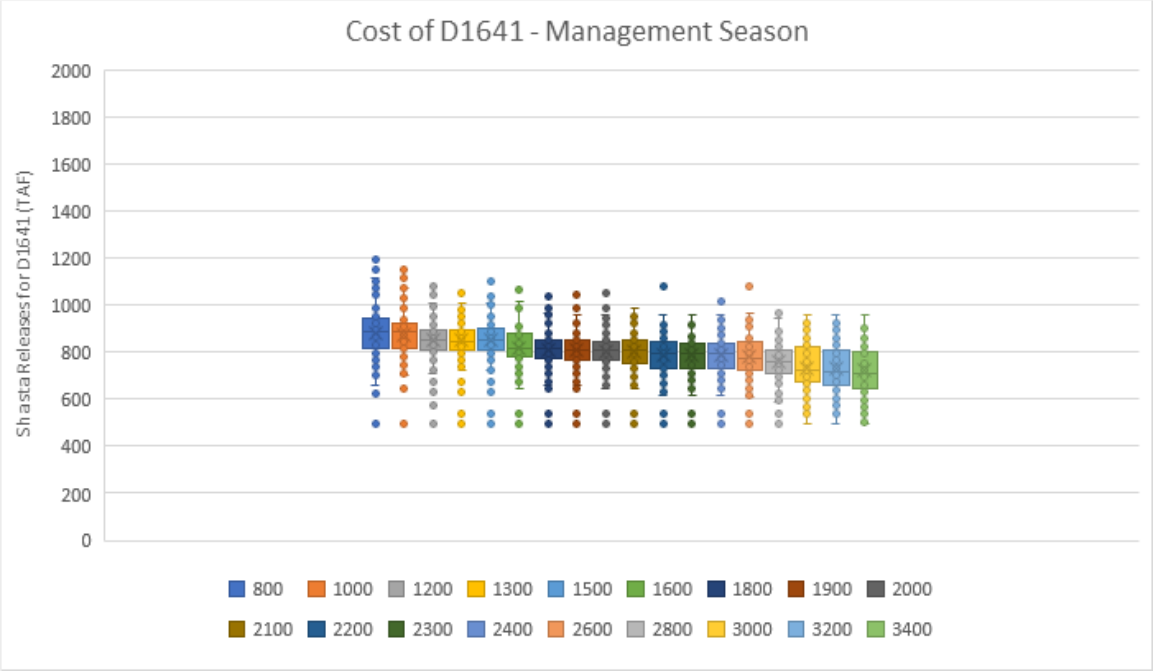
  estimated May-Sep regulatory cost)

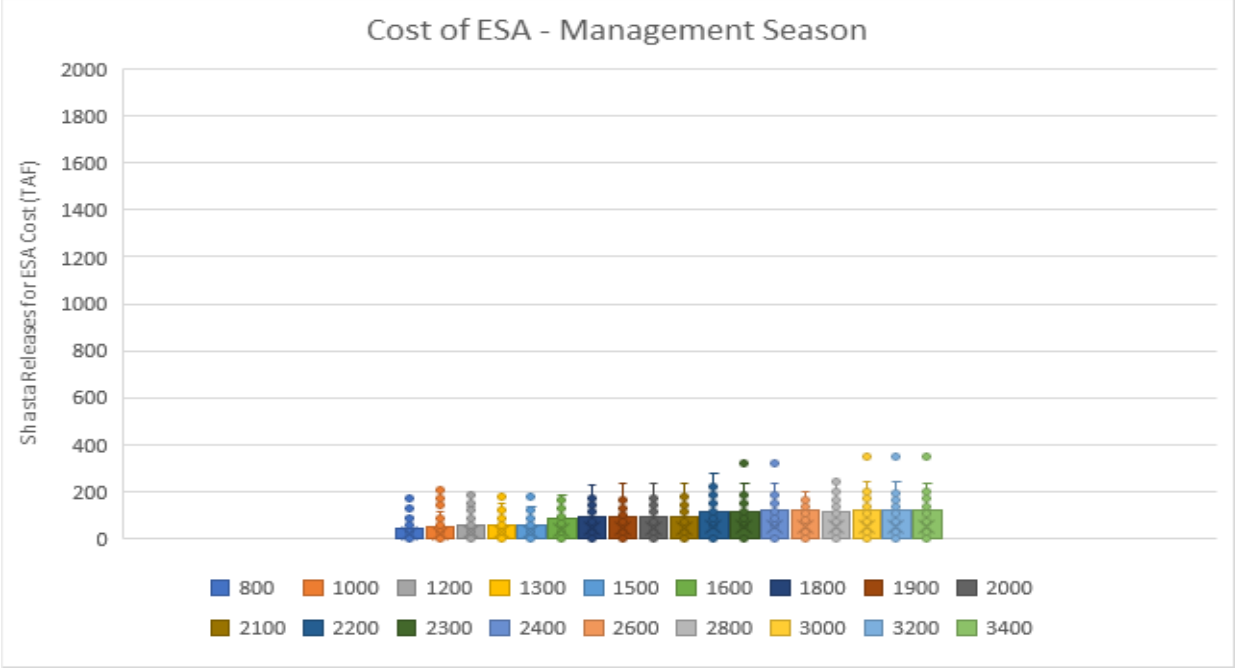
Hydrology Elements for Bin Definition

- 90% forecast defined in February and April
- New code for demand totals
  - Now through April
  - Now through September
- Estimates of regulatory cost

Identifying Influences on Carryover

- Seasonal "cost" to Shasta for meeting regulatory obligations was evaluated for all exploratory position analysis runs





Options for Actions to Protect Shasta

- Bin1
  - use Trinity and Folsom where possible in lieu of Shasta release
- Bin2
  - reduce allocation to CVP service contractors
- Bin3
  - Reduce allocation to CVP service contractors
  - CVP borrows COA resources from Oroville (payback in wetter conditions)
  - SRSC allocation reduced; account in Shasta tracks contribution
  - FRSA and TableA deliveries cut when SRSC is cut
  - New Melones contribution to Delta outflow

2022 CalSim Modeling

- Models developed in CalSim2
  - Historical, 2035, & 2040 climate
  - Numerous sensitivities to action definitions
- Temperature performance evaluated
- Iterative process continued through December 2022

Transition to CalSim3

- Focus on CalSim3 NAA development in early 2023
  - Integration of extended data set
  - Gaining insights on hydrology, groundwater, climate impacts

- PA implementation in CalSim3 ~ May 2023
  - Extended data set has more Bin3 years
  - Hydrology
    - Groundwater model influences
    - Demand profiles/operations
  - Effects seen to NAA-PA differences

Summary

- Modeling tools and analysis used to formulate the Shasta Action
- New CalSim logic developed to model the Shasta Action
  - Valuable insights to project operations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