

Optimizing Storage: Using RiverWare Modeling to Enhance Strawberry Reservoir Operations

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CENTRAL UTAH WATER
CONSERVANCY DISTRICT

What is Central Utah Water Conservancy District (CUWCD)?

“With 62% of our growing state living in Central Utah Water’s boundaries we are dedicated to planning for the future by developing, delivering and efficiently using our limited water resources. Thank you for your trust.”

— GENE SHAWCROFT, GENERAL MANAGER



Managing
\$3.5 billion in
infrastructure



Treating more
than **100 million**
gallons per day



Serving **1.5 million**
people
every day



Maintaining
178 miles
of canals,
tunnels and
pipelines

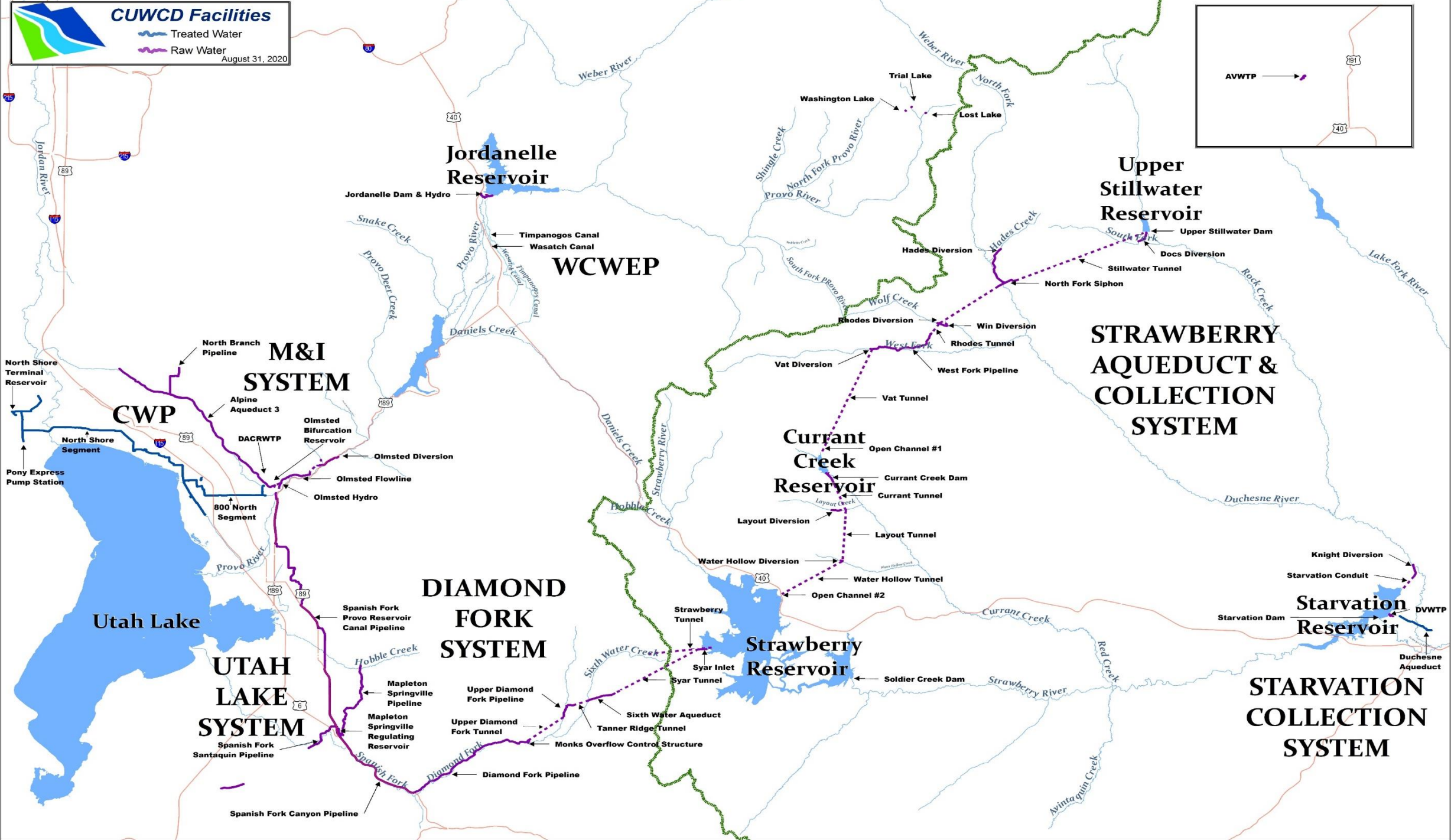
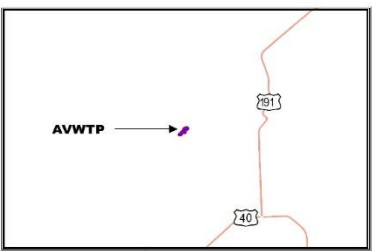


Delivering
more than
400,000 acre-feet
annually



Storing
565 billion gallons
in reservoirs







Strawberry Reservoir & Soldier Creek Dam

- Enlarged in 1973 from 283,000 acre-feet to 1.1 million acre-feet with Central Utah Project (CUP)
- Natural Inflows 10,000 acre-feet to 200,00 acre-feet
- Import Inflows 20,000 acre-feet to 150,000 acre-feet
- Outflow Demands 80,000 acre-feet to 175,000 acre-feet and Increasing as CUP Projects Complete
- No Spillway!

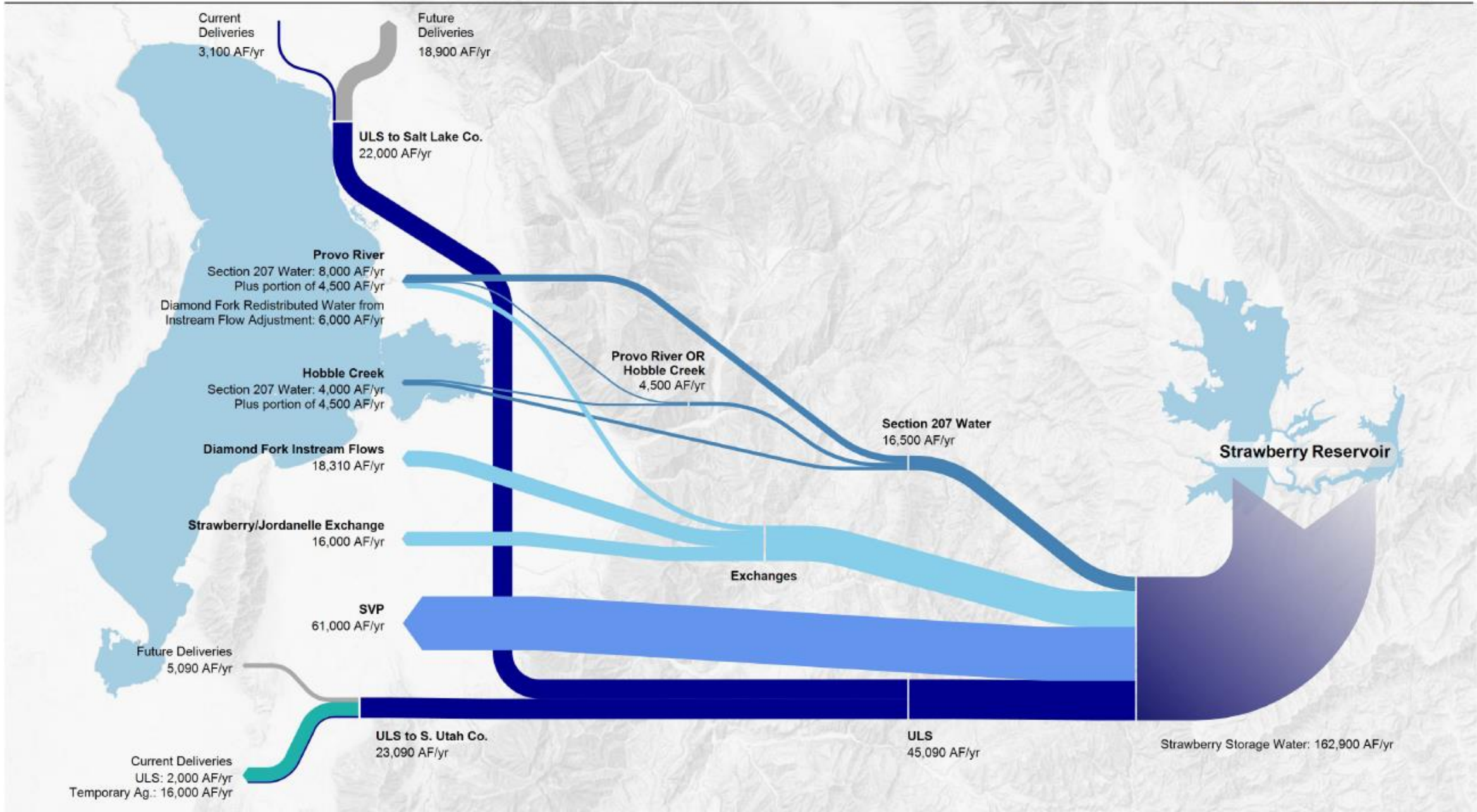


CUP Bonneville Unit Water Obligations & Contracts

Prepared for CUWCD Board Tour October 25, 2023
Based on 2004 DPR and Subsequent NEPA Decisions



CENTRAL UTAH WATER

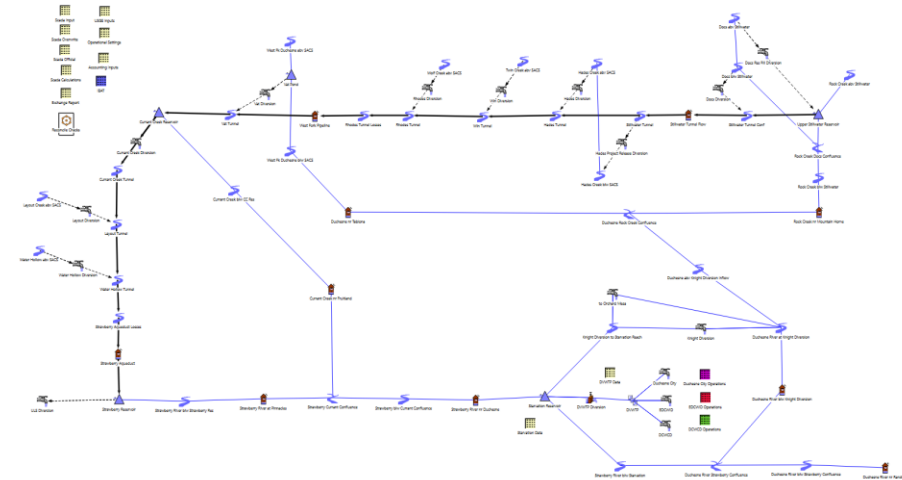


Strawberry Reservoir Contents



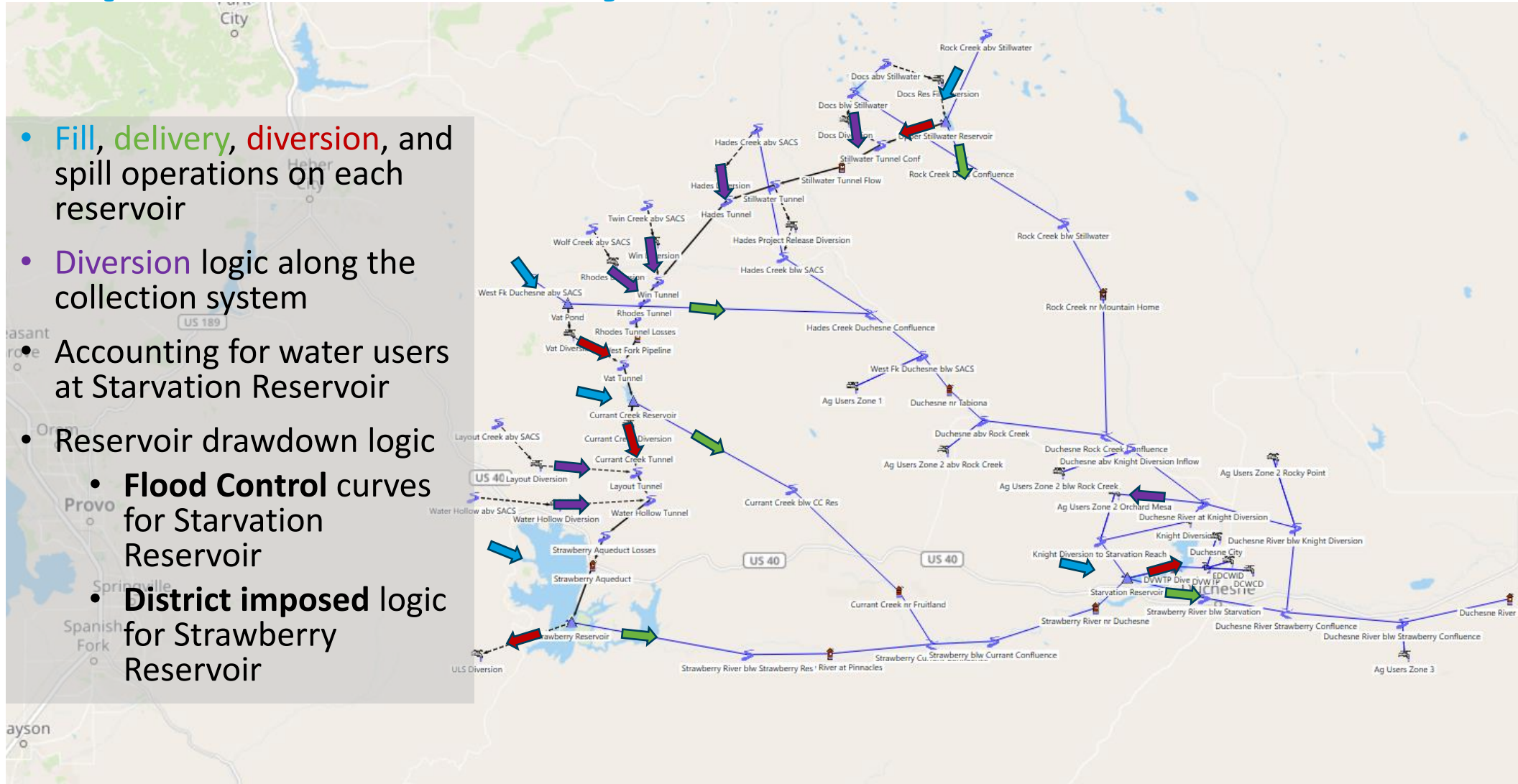
Strawberry Aqueduct Collection System (SACS) Operations Model

- Backward-looking and forward-looking operations model.
 - Accounting mode to reconcile operations and accounting in the system
 - Forecasting model to forecast current seasonal operations and accounting
- 15-Month, daily timestep, accounting enabled model with the same start and end date and a varying end of observed period date



Operational Policy in the SACS Model

- Fill, delivery, diversion, and spill operations on each reservoir
- Diversion logic along the collection system
- Accounting for water users at Starvation Reservoir
- Reservoir drawdown logic
 - Flood Control curves for Starvation Reservoir
 - District imposed logic for Strawberry Reservoir



Strawberry Carryover WY 2024

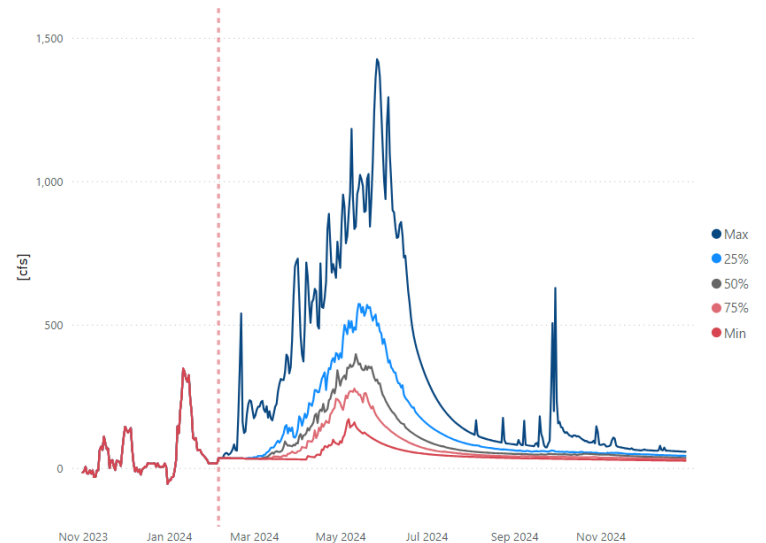
- District guidance for Strawberry Reservoir
 - Draw Strawberry Reservoir down 150 KAF from full pool by Nov 1
 - Is this level too aggressive and could more water be carried over each year in Strawberry Reservoir?
- Winter of WY 2024, Strawberry Reservoir was carried over at 100 KAF below full pool
- Can we balance flood control and dam safety while maximizing water supply?
- Can forecast informed operational strategies be used to fill Strawberry Reservoir while mitigating any surcharge storage due to spring runoff?
- Note WY 2024 was 128% of average (CBRFC)



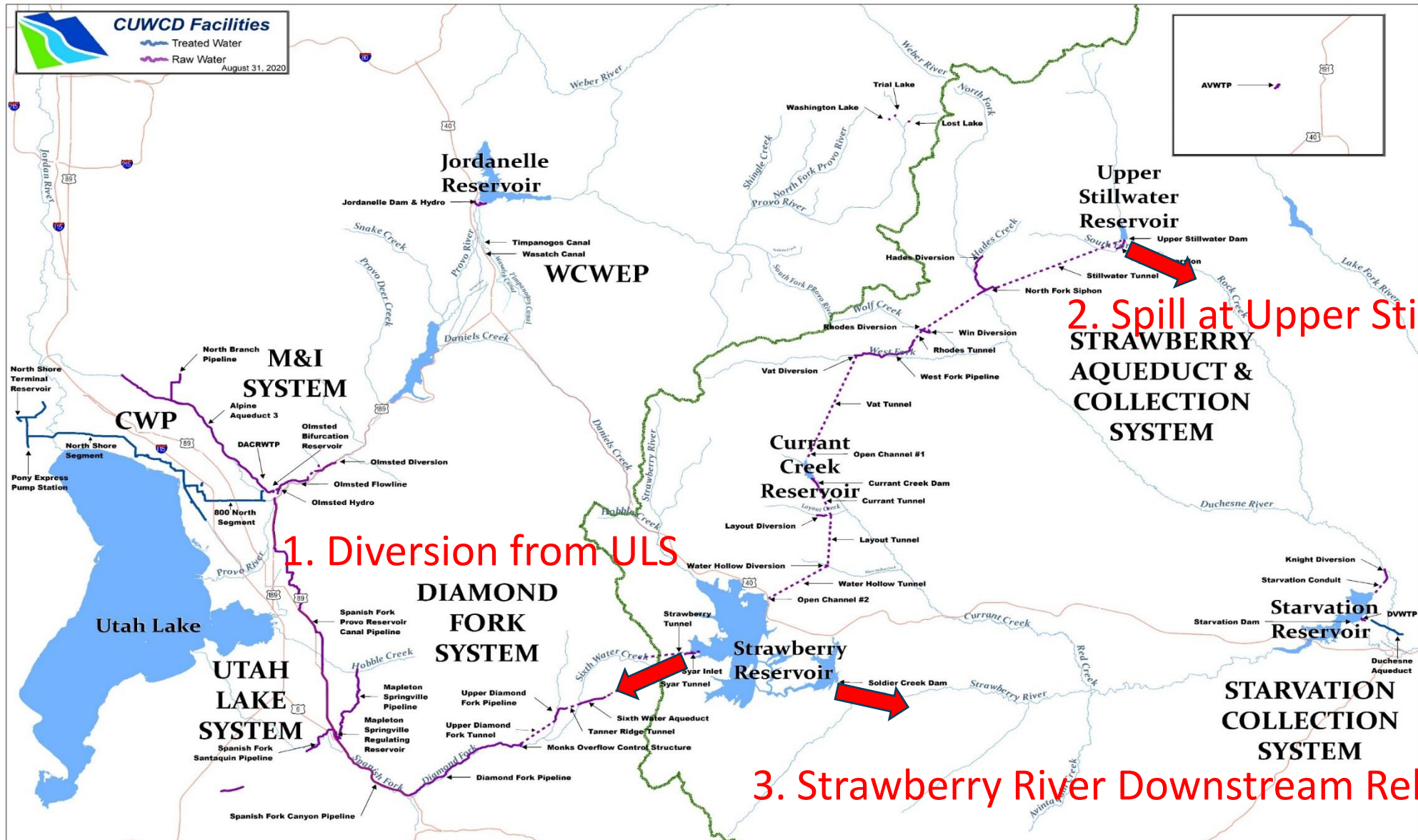
Forecast Integration into the SACS model

- Colorado Basin River Forecasting Center Ensemble Forecasts
 - 40 daily forecasts based on historical climate data
 - Provides inflow to the SACS Model
- Each Forecast is simulated through the SACS model
 - No Mitigation (No Action) simulations, then
 - Mitigation to surcharge simulations
- Ensemble output is evaluated and reviewed

February 5, 2024 Natural Flow Forecast for Strawberry Reservoir

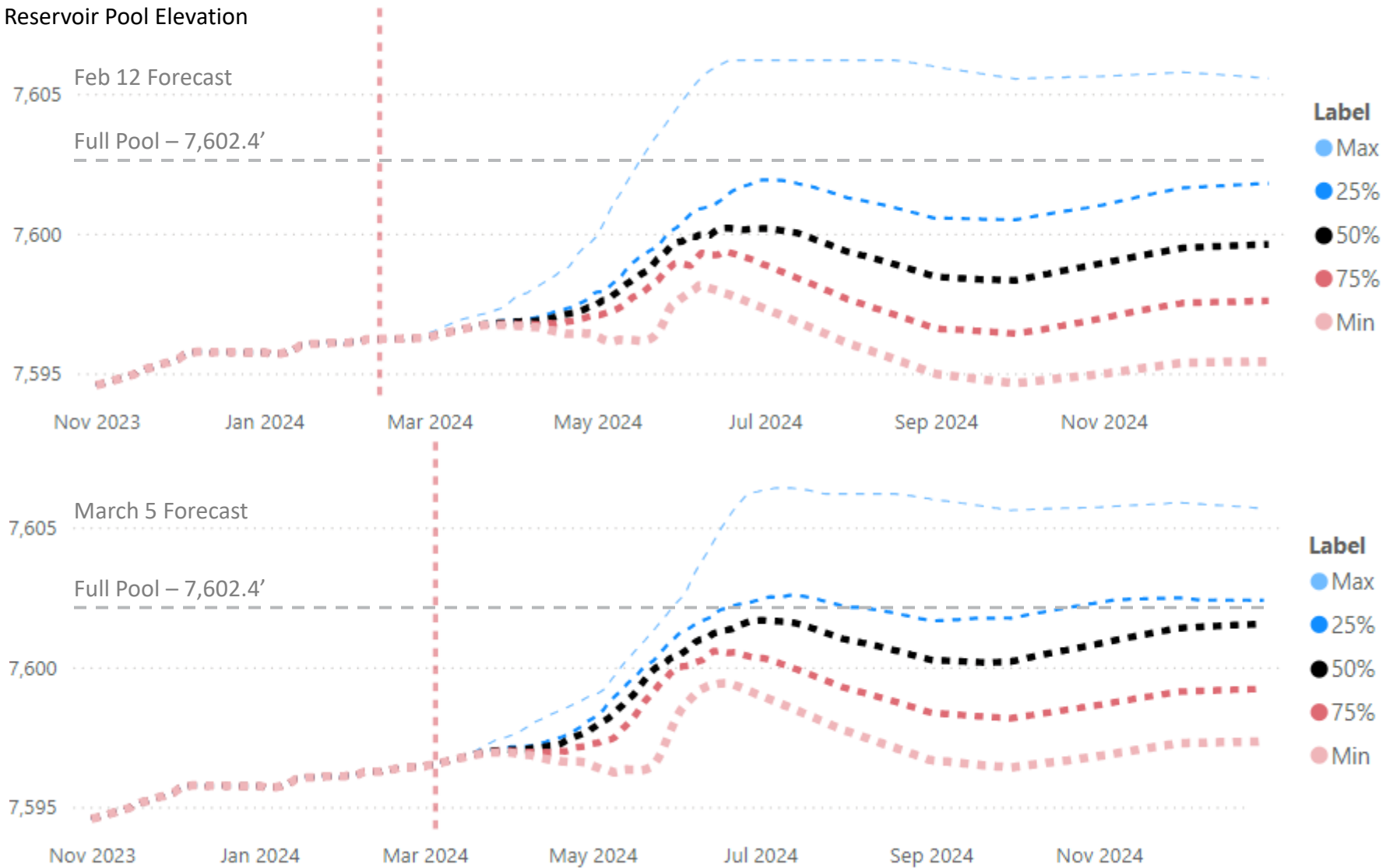


Mitigation Strategies



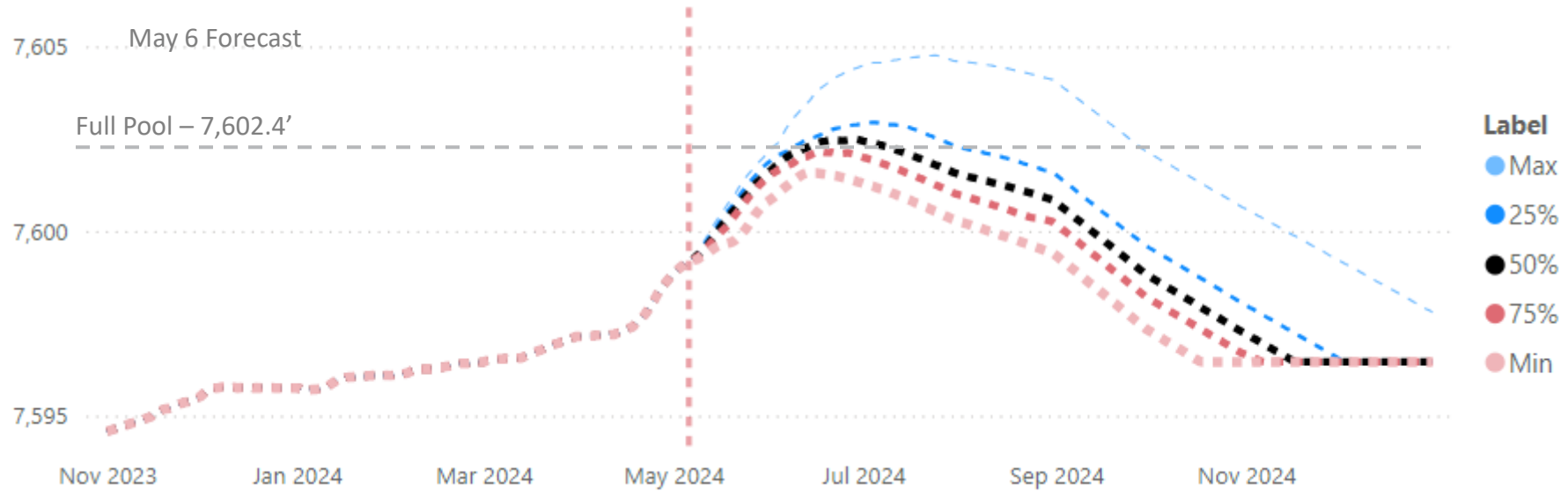
Feb 12 and Mar 5 forecast with No Action

Strawberry Reservoir Pool Elevation

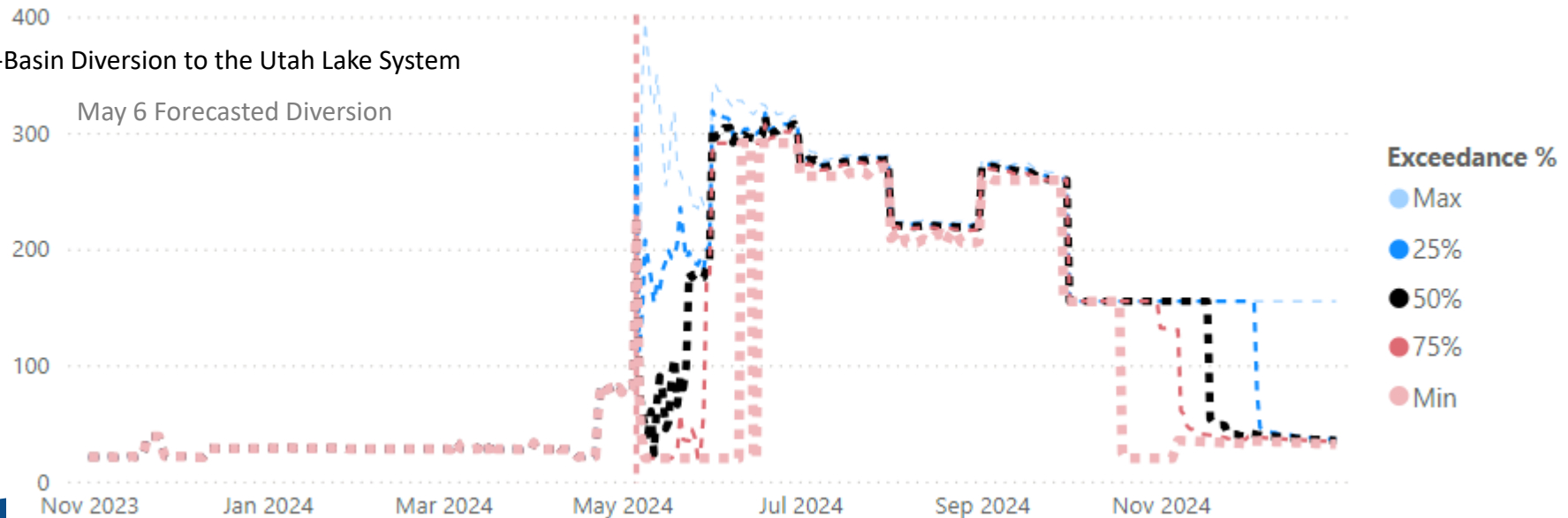


May 6 forecast with No Action

Strawberry Reservoir Pool Elevation



Trans-Basin Diversion to the Utah Lake System

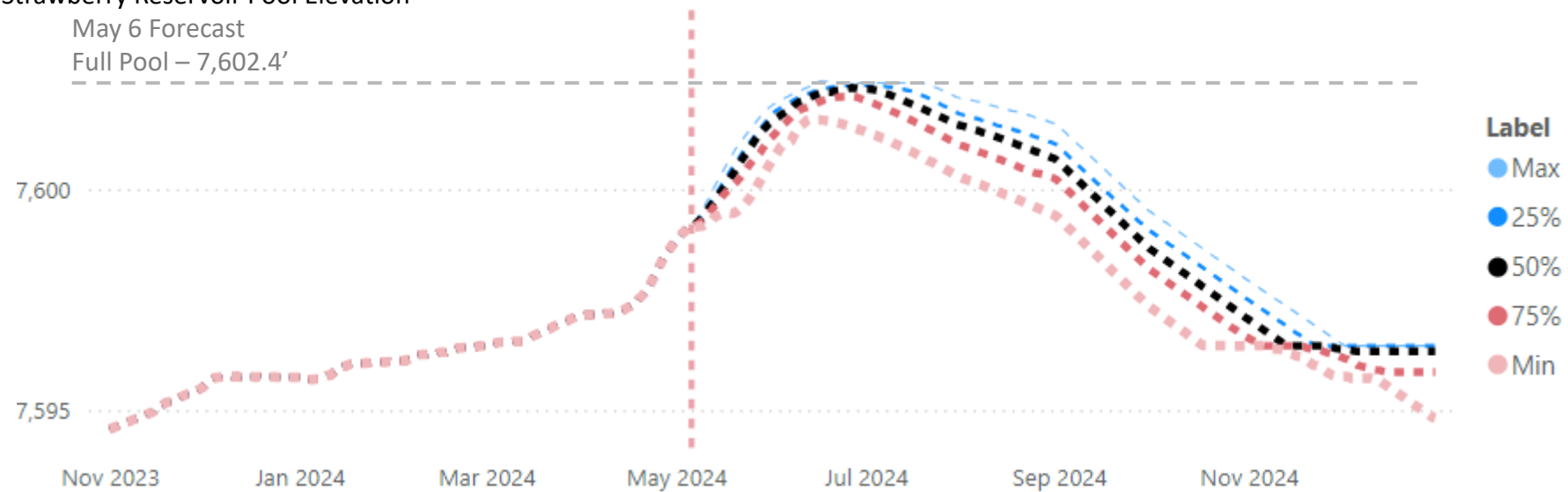


May 6 forecast with Mitigation Actions

Strawberry Reservoir Pool Elevation

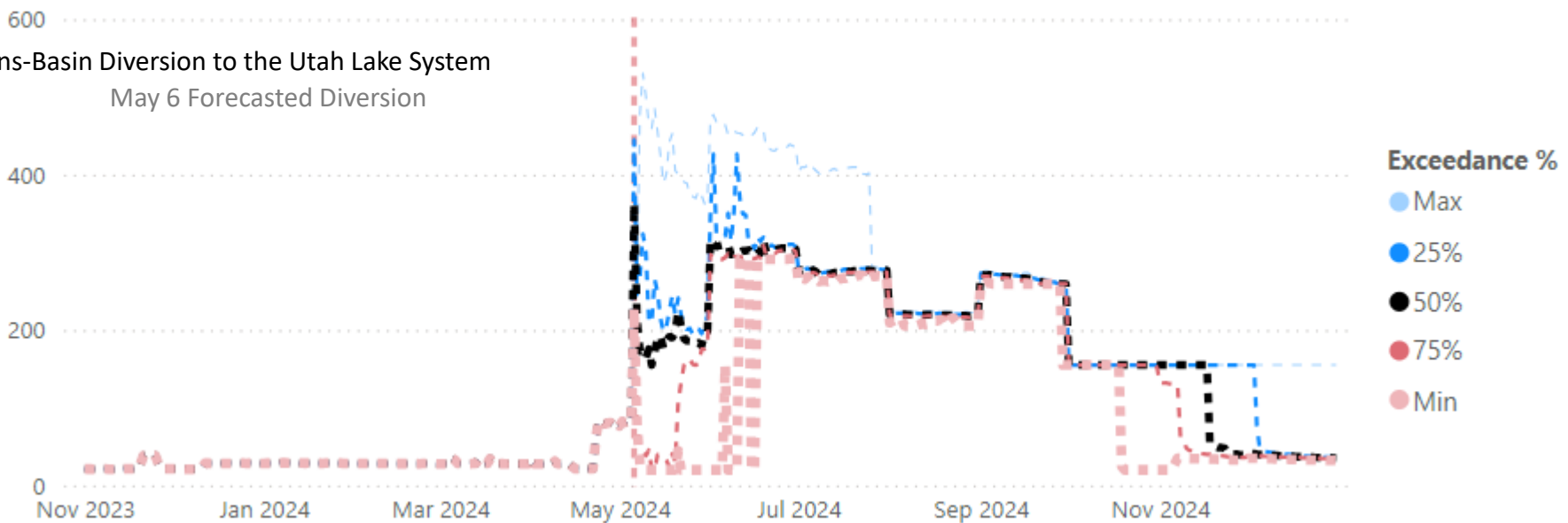
May 6 Forecast

Full Pool – 7,602.4'

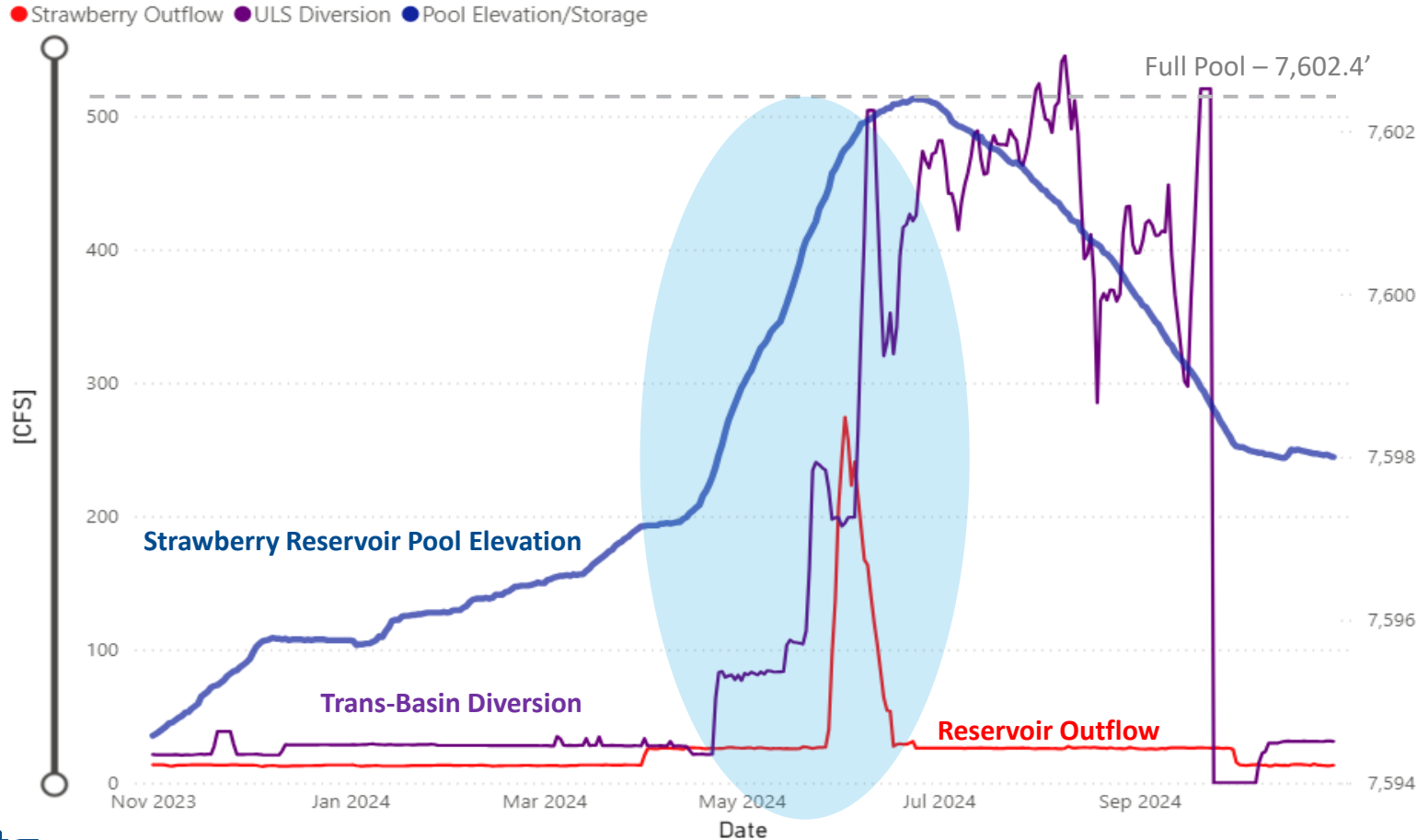


Trans-Basin Diversion to the Utah Lake System

May 6 Forecasted Diversion



WY 2024 Strawberry Reservoir Operation



- Spring **Flushing Flow** (May 28 to June 23 - 5,100 AF)
 - *Strawberry Reservoir Outflow was increased in June to “flush” the system and improve water quality*
- **Increased Diversion** (Apr 23 to Jun 14 - 15,600 AF)
 - *Mitigation strategies to send more water to the Utah Lake System were used to mitigate*
- Strawberry Reservoir Filled
 - *7,602.4 feet on June 23, 2024*





Summary and Next Steps

Forecasting helped ensure that carrying Strawberry Reservoir over at a higher level can be done and there are operational mechanisms to balance the Water Resource and Flood Control nexus

Continued use of the tools will ensure accountability and help in operational decision making in the coming years

Water Year 2025 may prove to show why carrying water over in 2024 was a good decision.



Questions?

