EVALUATION OF CENTRAL UTAH PROJECT WATER SUPPLY VARIABILITY AND FORECASTING OF FUTURE CONDITIONS

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PROJECT BACKGROUND

• Project Goals:

- Evaluate stressful meteorological and operational conditions
- Understanding the sensitivity and vulnerability of the system
- Develop operational criteria and plans to aid in operating under adverse conditions.

CENTRAL UTAH WATER CONSERVANCY DISTRICT (CUWCD)

- Organized in 1964 as a repayment entity for the Central Utah Project (CUP)
- Assumed management of CUP under the Central Utah Project Completion Act (1992)
- Wholesale supplier of:
 - 354,141 acre-feet total
 - 150,000 acre-feet M&I water supply
- 3 reservoirs
- 134 miles of pipelines
- 3 WTP



WATER RIGHTS

- Natural Flow, Utah Lake rights
- Provo water users
- Bonneville-unit CUP
- Operational Constraints:
 - minimum instream flows
 - Weber and Duchesne rights
 - Utah Lake
 Compromise elevation



EXCHANGE AND CONVERSIONS

Flow/Storage Accounts

- Provo River runoff
- Imported Water
- System Storage
- Priority Storage
- Accounting
 - Conversion:
 - System Storage to Priority
 - Exchanges: between reservoirs



CLIMATE CHANGE SCENARIOS

Climate Scenarios

- Historic natural flows (WY 1950 to 2009)
- Downscaled GCM Projected Trends and Variability
- Paleo Record Trends and Variability
- Observed Record Trends and Variability





CLIMATE VARIABILITY SCENARIO



CUPSIM MODEL

- PROSIM : base model
- Goals:
 - Accessibility
 - Simplifications
- Features:
 - Monthly timestep
 - 60 years period of record
 - Accounting
 - Initialization rules : hydrology datasets and scenarios
 - Post-processing rules : scenario statistics



CUPSIM GRAPHICAL USER INTERFACE (GUI)

- GUI provided for convenience
- Input DMI:
 - Scenario types
 - Period of Record
 - Drought of Record
 - Percentile
 - Reservoir and account storage
 - Inflow and demand adjustments
- Output DMI:
 - Annotated post-processing statistics
 - Spreadsheet and RiverWare model file

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OUTPUT EXAMPLES





SUMMARY

- Proactive evaluation of operations and water rights sensitivity to changes in climate
- On-going work to evaluate climate change scenarios
- Possible future applications:
 - Explore adaptation planning
 - Additional climate change effects
 - Annual Operating Plans