Truckee Planning Model

RiverWare User Group Meeting

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Boulder, CO

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PRECISION

WATER RESOURCES ENGINEERING

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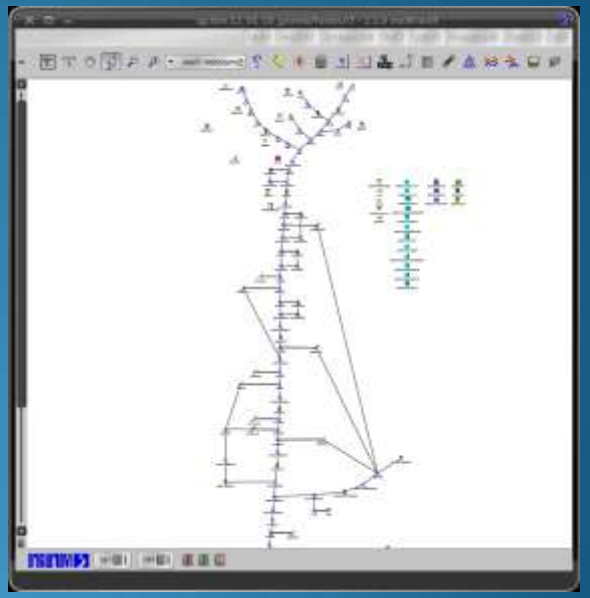
Truckee RiverWare Planning Model



PWRE

Collaborative Development

Technical Workgroup

- Bureau of Reclamation
- Federal Watermaster
- Truckee Meadows Water Authority (TMWA)
- Pyramid Lake Paiute Tribe (PLPT)
- State of California
- State of Nevada

Model Details

Model Run Time, 100-Year Run

Approx. 60 Min. (64-bit Machine, 8GB Ram)

Complete Basin Operations

Reservoir Operations,

Demands and Flows, and

Stakeholder Operations

Full Basin Accounting

Daily Timestep

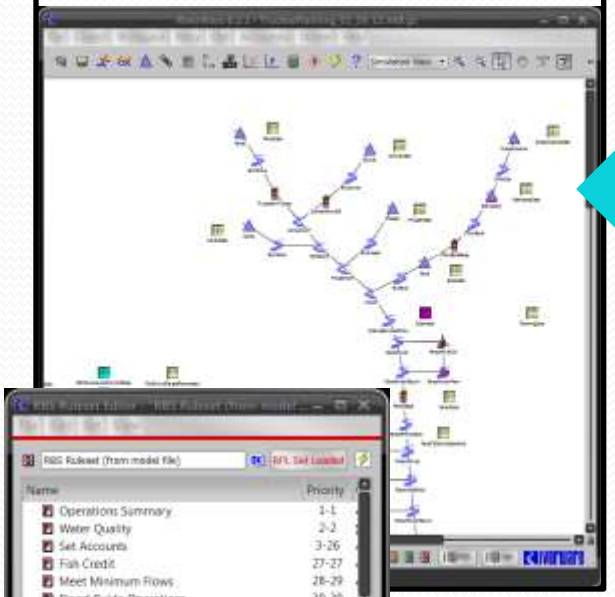
Run Times from 1 to 100 Years

Global Function Set

Shared with Truckee Operations Model (15-Month Daily Operations)

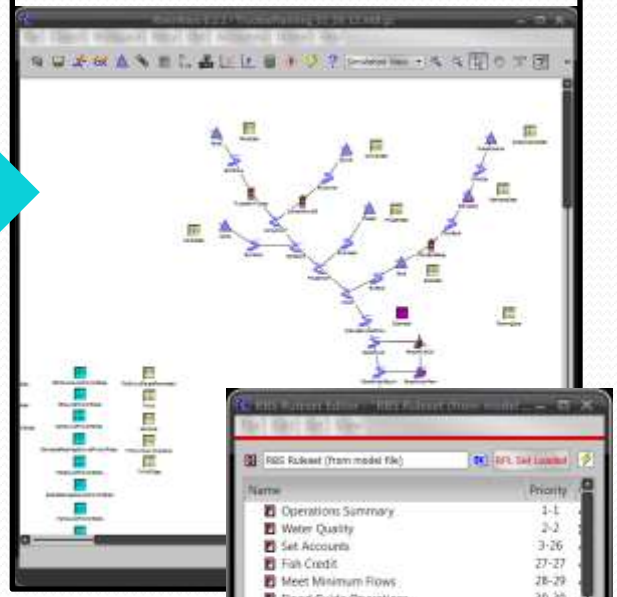
Truckee Global Function Set

Planning Model



Global Function Set

Operations Model



Continuity!

GFS preserves continuity between complimentary basin models and prevents diverging development.

Input Data

Initialization Spreadsheet

- Reservoir Account Storages
- Reservoir Physical Storages

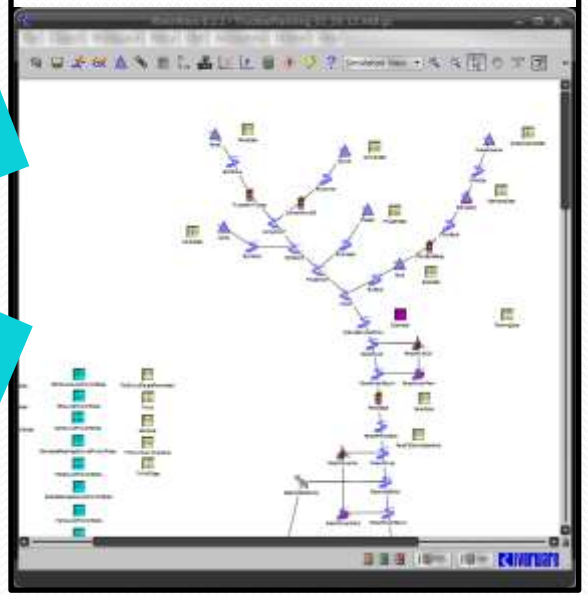
Hydrology Input Spreadsheet

- Reservoir Precipitation
- Reservoir Inflows
- Reach Local Inflows

DMI

DMI

Planning Model



Input Data – Reservoir Initialization

- Allows User to *quickly* alter Initial Basin Conditions
- User Inputs or Imports Starting Account Storages for all Reservoirs
  - User can enter either Current, Historic, or Synthetic Data
- Spreadsheet Calculates Physical Reservoir Storages
- Physical and Accounting Storage Data Brought into the Model through Direct Connect Excel DMI

Bring Staging Data | Move Edited Data To

DIRECTIONS

Boca Reservoir Initialization (acre-ft)

Pool Elevation	Total Storage	ASW	SW	Carryover ASW	Carryover SW	Pondage	Fish	Fish Credit	TMWA	Temp TCanal
5589.02	26700.0	0	25900	0	0	800	0	0	0	0

column#

Stampede Reservoir Initialization (acre-ft)

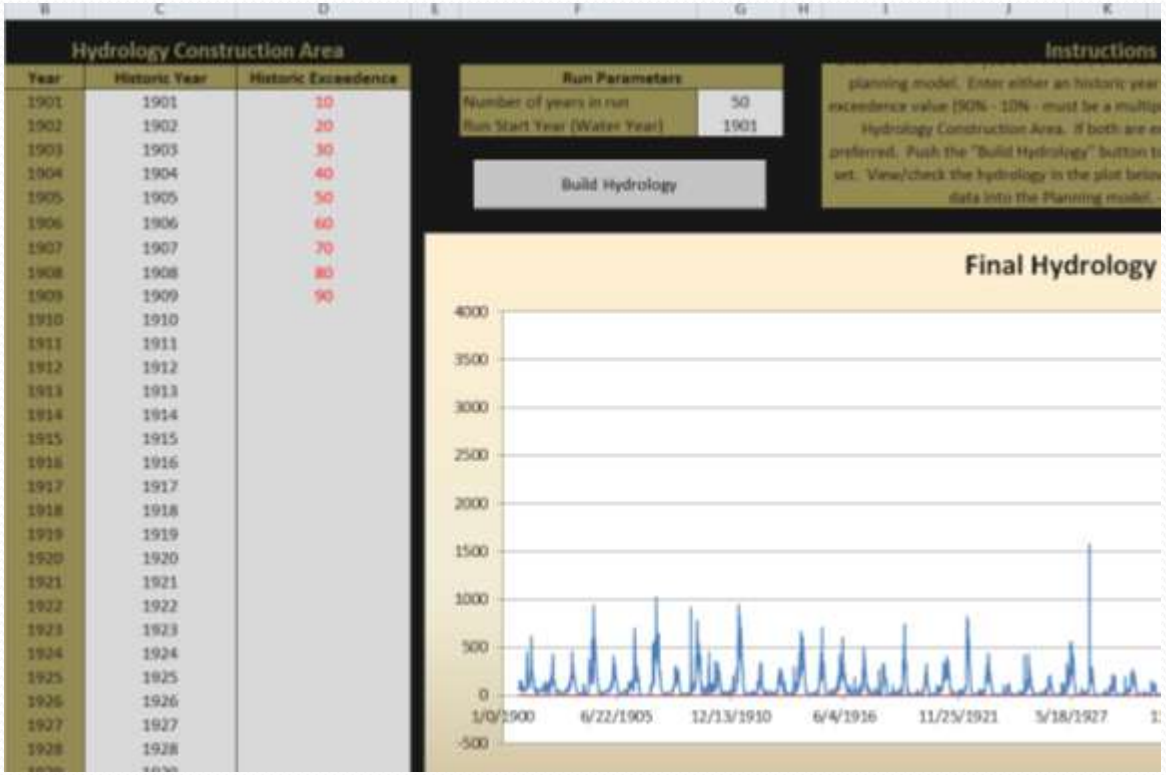
Pool Elevation	Total Storage	Fish	Fish Credit	TMWA	ASW	SW	Carryover ASW	Carryover SW	Temp TCanal
5896.47	87700	80010	2151	5539	0	0	0	0	0

Independence Reservoir Initialization (acre-ft)

Pool Elevation	Total Storage	TMWA	ASW	SW	Carryover ASW	Carryover SW	Temp TCanal

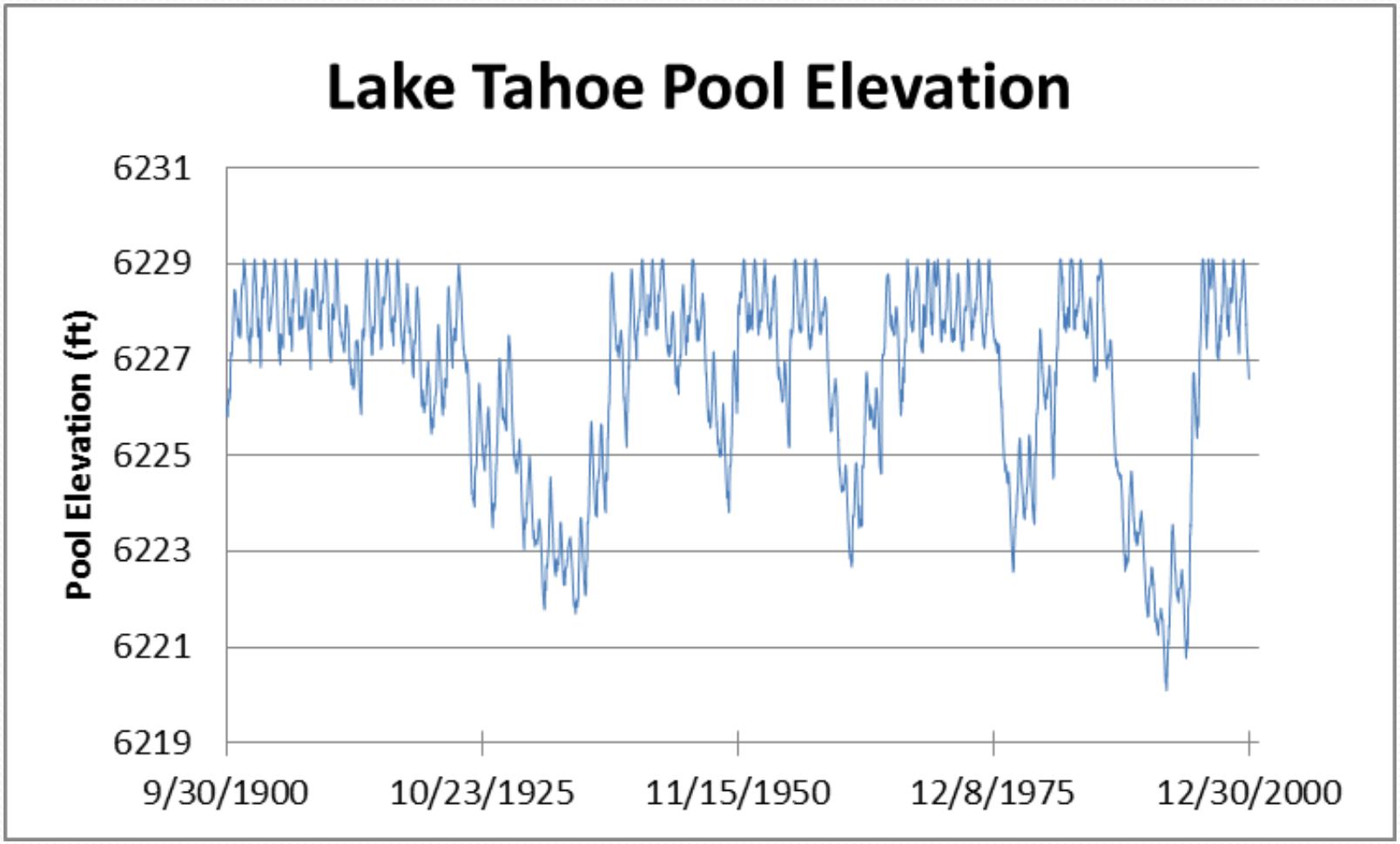
Input Data – Hydrology Input

- 100-Year Historic Dataset
- Dataset Builder
  - Historic hydrology,
  - Exceedence-based hydrology, or
  - Any combination of these, in any order.
- Data Brought into Model through Direct Connect Excel DMI



Model Output Examples

Example Output – Lake Tahoe

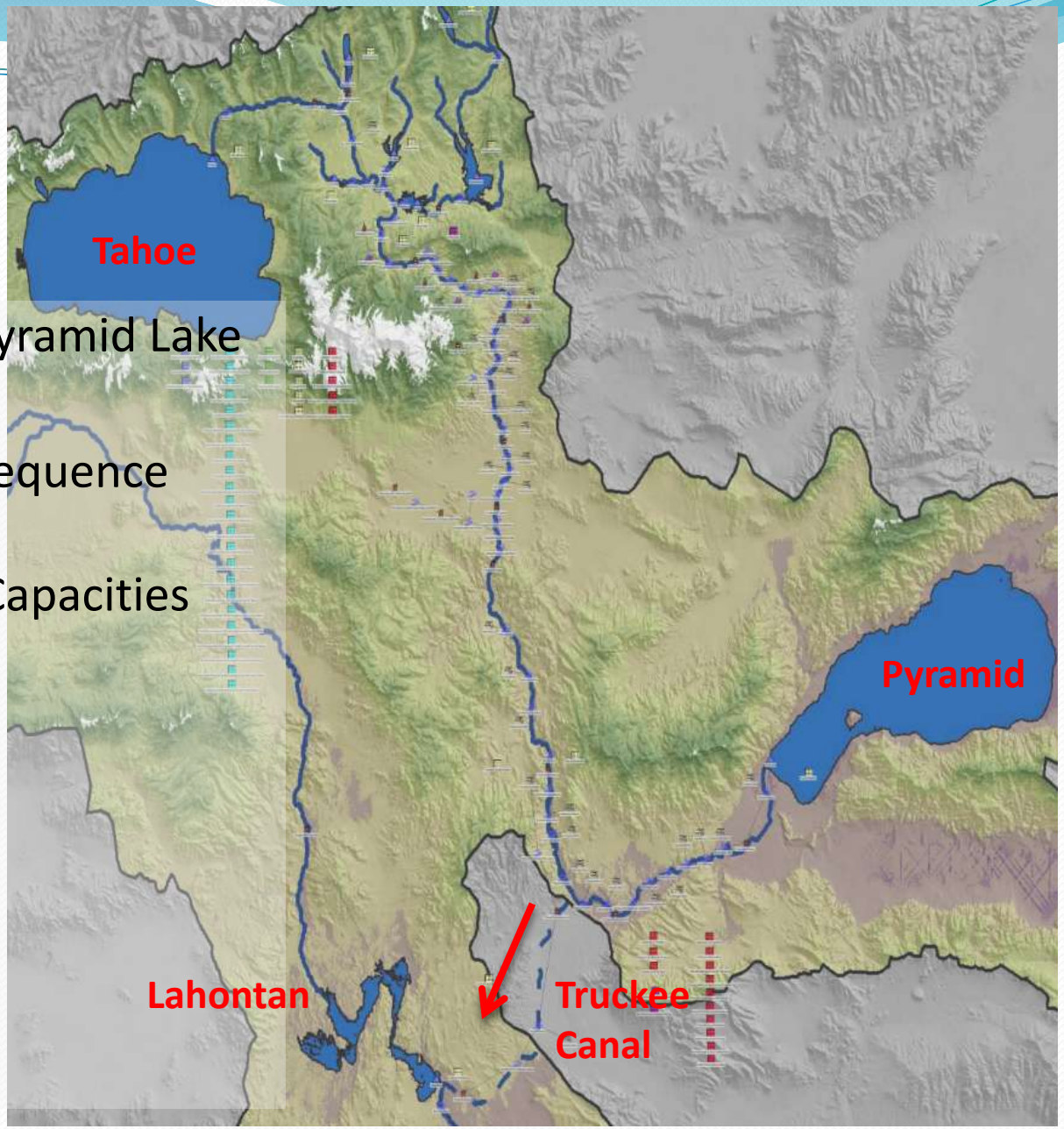


*Plot is for Demonstrative Purposes Only

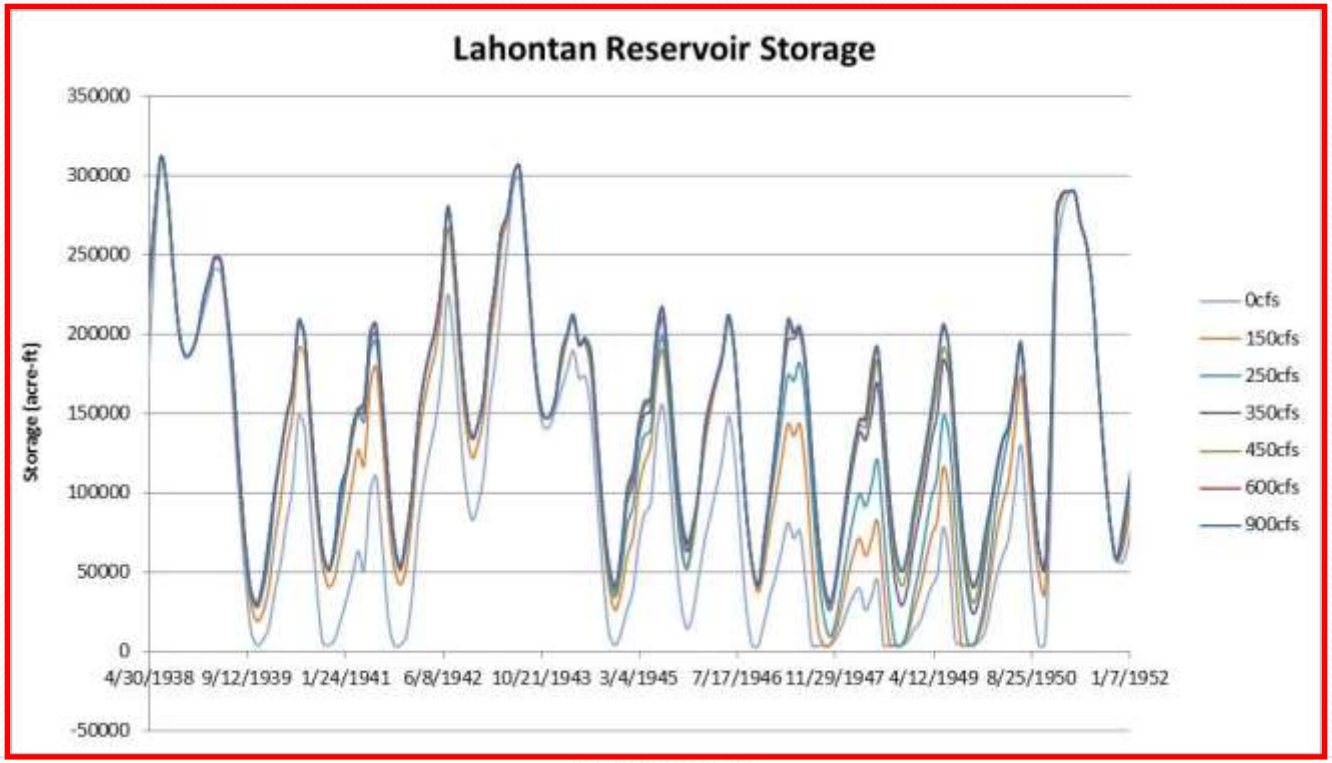
Example Output

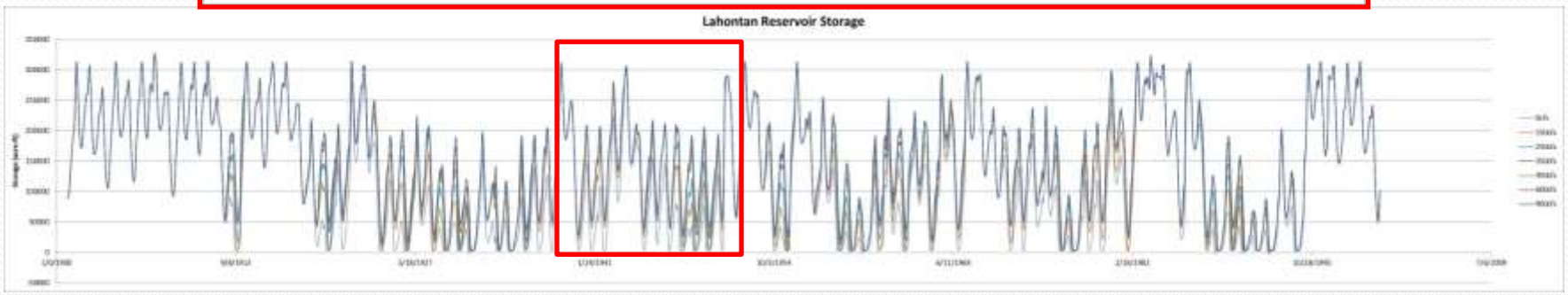
Lahontan Reservoir and Pyramid Lake

- Seven 100-year Runs
- Historic Hydrology, In Sequence (1901-2000)
- Varying Truckee Canal Capacities
  - 0 cfs
  - 150 cfs
  - 250 cfs
  - 350 cfs
  - 450 cfs
  - 600 cfs
  - 900 cfs



Example Output – Lahontan Res.





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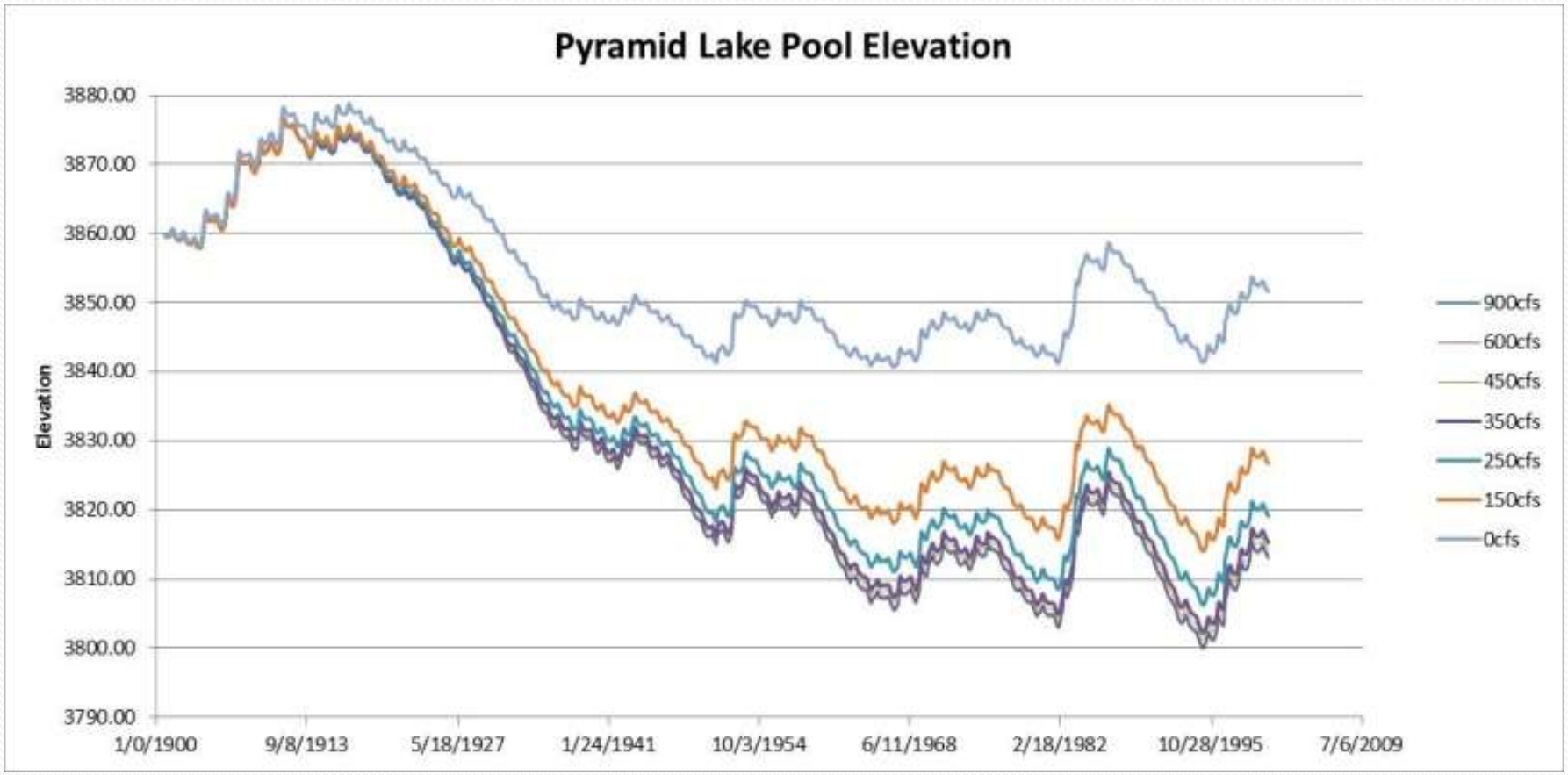
Example – Pyramid Lake



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Example Model Uses

Model Use #1 – Evaluate/Optimize Stakeholder Operations

The Planning model rule logic provides for flexibility in stakeholder operations.

- The user can adjust: demands, diversion capacities, release priorities, etc.
  - Adjustable values are stored on Data Objects and not hard-coded into the rules.
- Allows for evaluation of alternative operational policies.
  - For example, a stakeholder could perform an outside cost analysis and then evaluate the top alternatives for reliability and feasibility using the model.
- Allows stakeholders to plan for future conditions.
  - Evaluate potential effects of climate change, an increase in demand, changes in irrigation practices or crops, etc.

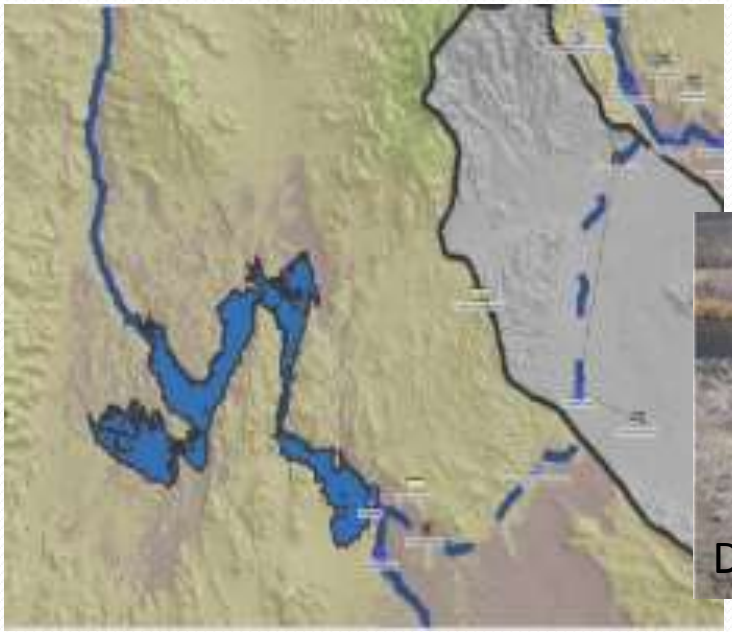
Model Use #1 – Evaluate/Optimize Stakeholder Operations

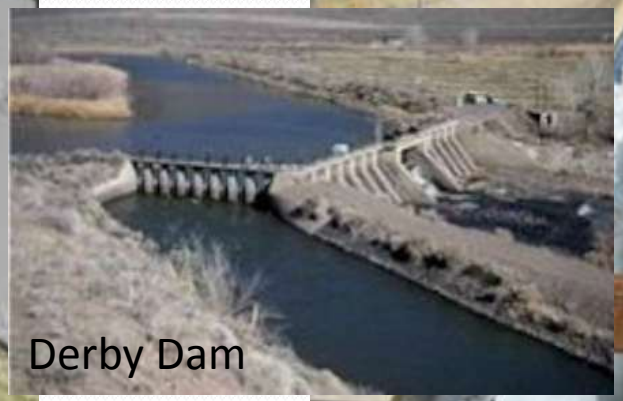
- Example: Truckee M&I Operations
  - Rule logic performs current M&I operations and provides flexibility to analyze alternatives.
  - Customizable Information Includes:
    - Annual M&I Demand
    - Daily Distribution of Annual Demand
    - Annual Groundwater Availability
    - Annual Groundwater Recharge Goal
    - Daily Groundwater Extraction and Recharge Capacities
    - Treatment Plant Capacities
    - Surface Water Diversion Capacities
    - Priority Order of Additional M&I Drought Water Sources
      - Floriston Rate Water (Always the top priority)
      - Groundwater and Drought Groundwater
      - 6 Surface Water Sources

Model Use #2 – Truckee Canal Diversions

Operating Criteria and Procedures for the Newlands Reclamation Project (OCAP)

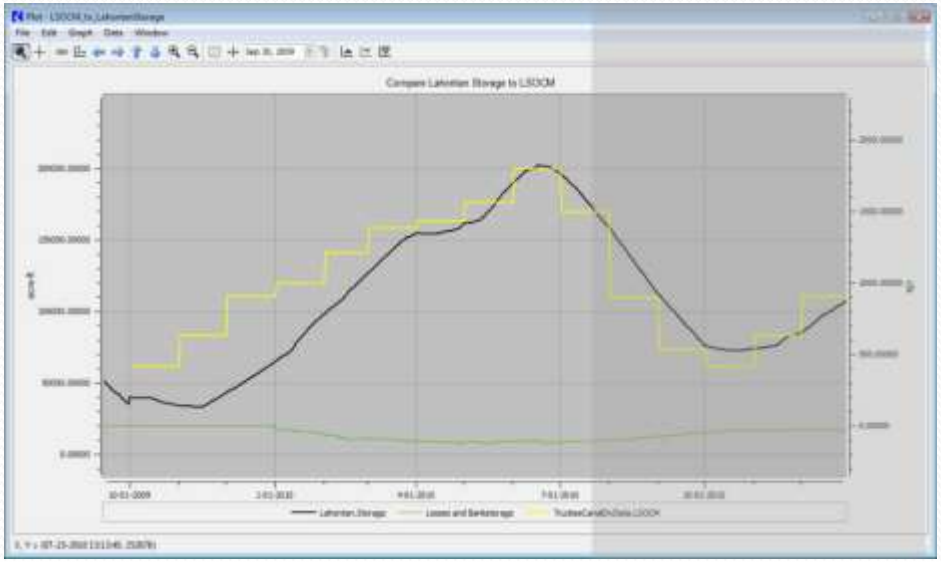
- Truckee Canal diverts water from the Truckee River and delivers it to Lahontan Reservoir on the Carson River.





Model Use #2 - OCAP

- The OCAP specifies monthly storage targets on Lahontan Reservoir;
- The Bureau of Reclamation is responsible for setting the flow targets in the Truckee Canal needed to meet these monthly storage targets on Lahontan Reservoir.



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Model Use #2 - OCAP

- The purpose of the OCAP is to maximize the use of the Carson River and minimize the use of the Truckee River to meet Newlands Project water rights.
- The Bureau of Reclamation will most likely be assessing the OCAP.
- The Planning model will be used for the analysis involved in any revisions to the OCAP.
- Modeled Elements of OCAP include:
  - Lahontan Storage Targets
  - Incentive Credit Water earned by water right holders for exceeding efficiency targets, allowing for additional storage in Lahontan Reservoir.
  - Reduced allocations in years of drought.

Model Use #3 – Newlands Project Planning Study

- The study is being conducted for the Mid-Pacific Regional Office of the Bureau of Reclamation by MWH and PWRE.
- The study formulates and evaluates a wide variety of alternatives to reliably serve Newlands Project water rights.
- Alternatives include various Truckee Canal capacity limitations. The main objectives are safety, water rights reliability, and viability of the Newlands Project.

Questions?